

# RADIO WORLD

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ILLUSTRATED

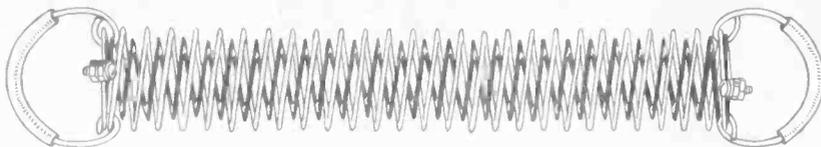
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(Foto Topics)

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# RADIO WORLD

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## Short Wave Adapter for Receivers

By J. E. Anderson, M. A.

**S**HORT waves which lie below the broadcasting range and above about fifty meters are daily becoming of greater importance and interest in radio communication.

All the highly interesting amateur transmission which is nightly rippling the ether is done on a wave within this range, particularly on 200 meters. Point to point communication between a master broadcaster and its relay stations also is done in most cases on wave lengths falling within this range. Thus the signals transmitted from station KDKA at Pittsburgh to the relay station at Hastings, Nebraska, and to stations in England, for re-transmission, are carried by a wave 94 meters in length. A vast amount of experimental work in radio communication is also being done within the range stated above.

These facts make it desirable to have a receiver which will tune down to these waves. Many broadcast listeners often tune down to the amateur waves but are unable to go much below. They suspect that something is going on just beyond their reach, and they immediately begin to look for a receiver with which they can explore the unknown region.

Here is described a method whereby any receiver from the simplest crystal to the most elaborate super-heterodyne may be used to receive the shorter waves, whether that receiver has been designed to receive waves in the broadcasting range or the extremely long waves employed by the high-power commercial stations. The method involves the use of an attachment which may be called a short wave adapter for a standard receiver.

This device is based upon the super-heterodyne principle, and in its simplest form it consists of an oscillator and a modulator. The first must, of course, be a vacuum tube oscillator, but the second may be a crystal detector.

One schematic diagram of the arrangement is shown in Fig. 1. Another is shown in Fig. 2. The only difference between these two is in the form of the oscillator.

In Fig. 1 a grid leak resistance  $R_1$  is used to maintain

the grid of the oscillator tube negative and a single oscillating coil is used.

In the second a grid battery is used to maintain the grid negative, while the tickler type of coupling is used to obtain oscillation. There is very little difference in the functioning of these oscillators and either may be used with excellent results. The circuit shown in Fig. 2 is slightly less expensive to build.

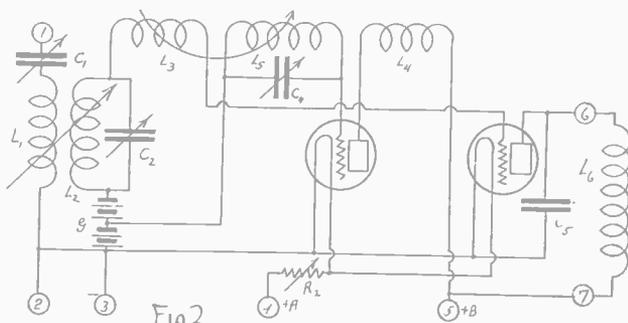
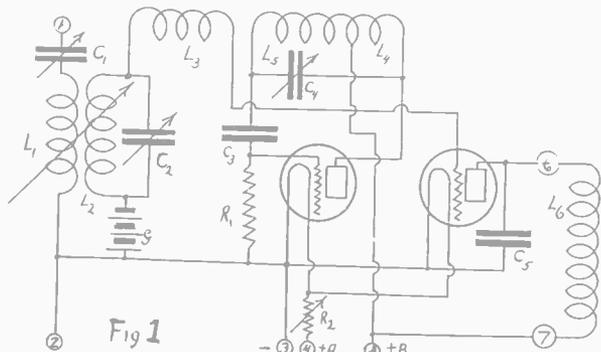
The electrical design of these circuits largely depends on the wave length range it is desired to cover, and to a certain extent on the kind of antenna which is available for use with the device. Assuming that the capacity of the antenna available, or of the one that is erected for the set, has a value of 600 micro-microfarads, and that the wave length range is from 220 to about 50 meters, the following design may be used.

The antenna inductance coil  $L_1$  should be wound with 36 turns of No. 24 or No. 26 double cotton covered wire on a tube  $2\frac{1}{2}$ " in diameter. This will give an inductance of about 100 microhenries. If desired, more turns can be put on this coil and taps brought out at convenient points. This, however, is not necessary, and it merely complicates the circuit. The secondary inductance coil  $L_2$  should consist of 30 turns of No. 24 double cotton covered copper wire wound on a bakelite tube 2" in diameter. This will give an inductance of 50 microhenries.  $L_2$  should preferably be mounted at the end of  $L_1$  in such a manner that the coupling may be varied either by sliding or by turning.

$L_3$  is a small coupling coil by means of which the high frequency generated by the oscillator is impressed on the modulator. Its coupling with respect to  $L_4$  should be variable either by sliding or by turning. Or it may be tapped so that the number of effective turns may be varied. It should consist of about 12 turns of No. 26 double cotton covered wire wound on a tube 1.5" in diameter. This coil may also be wound on the same tube as coil  $L_5$ , but then it should only have 6 turns, second and fourth turns tapped.

$L_4$  and  $L_5$ , Fig. 1, are two parts of the same coil,  $L_4$  having 12 turns and  $L_5$  18 turns of No. 24 double cotton covered copper wire wound on a bakelite tube 2" in diameter. A single tap is brought out at the 12th

(Concluded on next page)



HOW the coils are placed in adapting a broadcast receiver for short

THE SAME COILS as shown in Fig. 1 may be used in

# Adapter Uses "Super-Het" Principle

(Concluded from preceding page)

turn from the plate terminal, to which the plate battery lead is connected.  $L_4$  and  $L_5$  in Fig. 2 are two identical coils of the same specifications as the secondary tuning coil  $L_2$ . These two windings may be put on the same tube, in which case there should be a separation of about one-half inch between them. The two terminals which are physically farthest apart should be connected to the grid and the plate, while the two terminals which are close together should be connected to the batteries.

$L_6$  is the output coil, which may have the same specification as Coil  $L_1$ . In some of the applications of the circuit this coil may be omitted as it is already incorporated in the receiver with which the adapter is used.

The three tuning condensers  $C_1$ ,  $C_2$ , and  $C_3$  should all be of the 11 plate size; that is, they should have a capacity of about 200 micromicrofarads.  $C_4$  should preferably be supplied with vernier adjustment. The blocking condenser  $C_5$  should be a good mica dielectric condenser of .001 mfd. capacity.  $C_6$  is a high frequency by-pass condenser having mica dielectric and a capacity of .0001 microfarad.

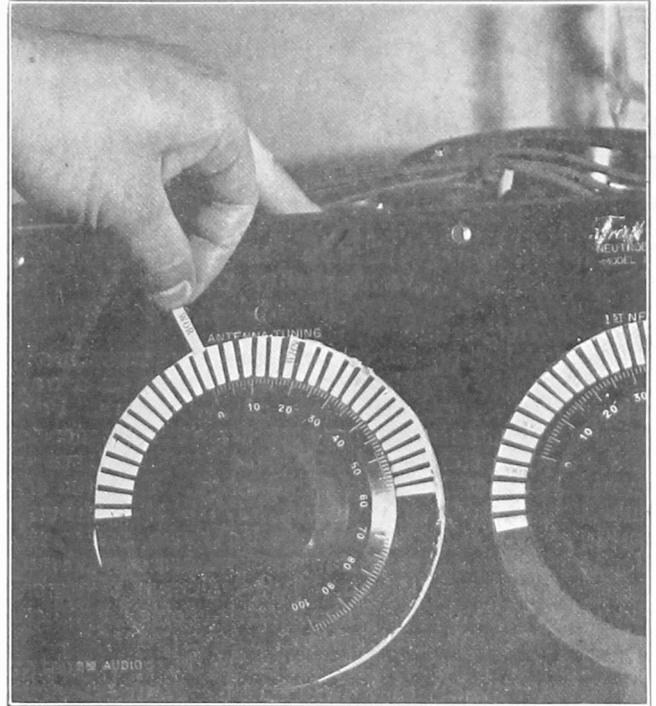
The grid leak resistance of the oscillator in Fig. 1 should not be greater than 20,000 ohms and it may be as low as 5,000 ohms. A good value to use is 12,000 ohms. The filament rheostat  $R_2$  should preferably have a resistance of 30 ohms, but 20 ohms may be used. Since extremely high frequencies are involved, the tubes best suited for this circuit are UV199 or C299.

The most suitable filament supply is probably a couple of Eveready 771 batteries connected in parallel. The plate supply for both oscillator and modulator should be about 60 volts. The grid bias voltage on the modulator should be about 9 volts, while that on the oscillator should be 4.5. These voltages may be obtained from a battery of small dry cells.

As stated above, the arrangement described operates on the super-heterodyne principle. Terminals 1 and 2 are connected, respectively, to any ordinary antenna and ground. The tuned circuits  $L_1C_1$  and  $L_2C_2$  are brought in resonance with the short wave it is desired to receive. The oscillator is started and its frequency adjusted by means of condenser  $C_4$ .  $L_6$  is placed in inductive relation with the input circuit of any ordinary radio receiver. This receiver is then tuned accurately to the longest wave to which it responds, or to the wave at which it is most efficient. Then the frequency of the oscillator of the adapter set is adjusted until the difference between this frequency and the frequency of the desired signal is equal to the frequency to which the main receiver is tuned. The signals will then come through very strong. Their strength may be varied by varying the coupling between  $L_3$  and  $L_5$ . The frequency of the oscillator must be adjusted very accurately by means of  $C_4$  because the arrangement is very selective.

The method of coupling the adapter to the receiver depends on the kind of input circuit which is used with the receiver. If a loop is used,  $L_6$  may merely be placed near the loop. If the input circuit has a primary and a secondary without a condenser in the antenna circuit, the primary will serve for  $L_6$ . If a condenser is used in the primary circuit, the antenna and ground terminals of the receiver should be connected to terminals 6 and 7, and  $L_6$  should be a 150 turn duolateral radio frequency choke coil. This requires, of course, that the adapter and receiver be electrically independent in other respects, or there may be a short circuit. An inspection will readily show the proper

## Tunes by the Letters



(Photonews)

**NOVEL STATION-FINDER**—Instead of tuning in a station by the calibration in degrees on your dial, you can get the stations by their call letters if you follow the above plan. Put a circular piece of cardboard behind the dial, with slots cut out for the stations. The cardboard remains fixed and the call letters are inserted as the change in dialing brings in the respective stations. The idea can be carried out with each dial where more than one is needed for tuning.

type of coupling between the adapter circuit and the input tuner of any receiver.

The circuit described above uses two tubes, an oscillator and a modulator. An additional tube may be used in front of the modulator to prevent audible beat notes from radiating. This, however, should not be necessary since there will not be many receivers in the neighborhood tuned to the low wave, and there is very little cause for producing any audible beat. This only occurs when the oscillator is changed from the lower to the upper side-band or vice-versa.

It is also possible to use a single tube, the oscillator. This may be made to both generate the high frequency and to modulate. This may be done much better in this circuit than in the ordinary super-heterodyne because the two frequencies involved are much farther apart, relatively, than in the latter. Another method of using a single tube is to use a crystal detector as modulator. This will give entire satisfaction provided a stable crystal is used. A carborundum crystal with the proper biasing battery will probably give best results, but an iron pyrite crystal has been found to give excellent results. In one hook-up the writer used one short wave double circuit tuner, two iron pyrite crystal detectors, one oscillator tube, and one long wave double circuit tuner and got fair results. Better results were obtained when tubes were used in the long wave receiver.

# Setting Stage for Circuit Tryouts

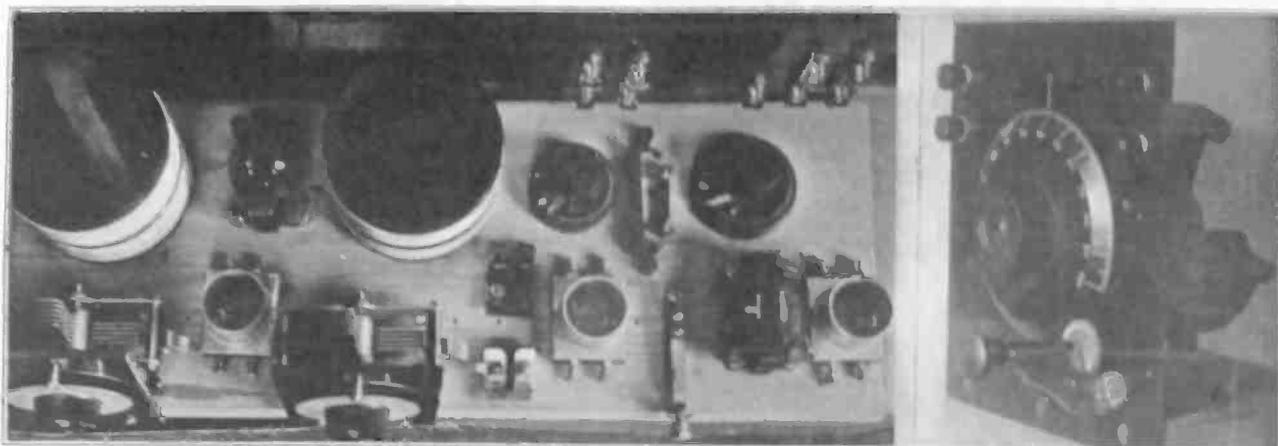


FIG. 1.—How to construct a "breadboard" for quickly testing out various circuits. Note that each of the two variable condensers has a separate little panel of its own. The larger panel contains the binding posts. Fig. 2 (at right) shows how to rig up an obsolescent 4-plate variable condenser for experimental use.

*By Brainard Foote*

**A**LTHOUGH the rest of the family may be perfectly satisfied to listen in nightly and may not care how the set works as long as it does work, the maker of the outfit is always attracted by the newest and latest in circuits. Of course he doesn't like to squander a small fortune on 7 x 24 panels and what-not, just to try out another circuit, but he usually rigs it up on a board or work-bench, hooking the parts together with lengths of bell wire.

For convenience, the experimenter ought to have a few extra parts on hand for try-outs. For instance, there should be a board about 2 x 1 feet for mounting the parts, an assortment of clip connectors, a roll of annunciator or "bell" wire, some sockets with thumb-screw connectors, perhaps a couple of extra rheostats, condensers mounted on small panels or else enclosed table-mounted condensers and three or four sizes of fixed condensers.

The board lay-out is useful because it helps to forecast how the completed receiver will function and may assist in the placing of the units. The photo (Fig. 1) shows the scheme I'm in the habit of using when trying out a circuit or in devising a new one. One of the most handy aspects of the arrangement lies in the 6 x 7 subpanel which is used as a rear connection block. Fahnestock clips are fastened to regular Eby binding posts, there being 9 connectors. Two are for antenna and ground. Two more are for the "A" battery, three for the "B" battery and two extras for the loud speaker. The panel used is a Radion stock size, so you needn't do any hacksawing for that. Then you'll notice several Dubilier fixed condensers fitted with two Fahnestock stocks each—and these are time-savers.

The sockets shown are out of the way, and they have knurled thumbscrews for easy connections. Two variable condensers are shown mounted to small panels which were made of a 6 x 7 Radion panel cut in two. Clip connectors are likewise affixed to them. Note the quick-change grid leak mounting, shown between the rheostats. This was made out of a short length of hard rubber and two double clips, cut and bent to allow a grid leak to snap into place. One mounting screw of the jack was removed and replaced by a long wood screw which serves to hold the jack to the board.

The peculiar position of the first audio transformer is due to the lay-out being made for a tuned R.F. reflex

circuit, the transformers (radio frequency) for which are wound with No. 18 wire on 4-inch Radion tubing.

This sort of circuit is the easiest thing in the world to rig up. All you need is a pair of "flats" or long-nosed pliers. These help to remove the insulation from the bell wire. Just squeeze the insulation between the jaws of the pliers, then loosen up on your grip a little, and slide the "squashed" piece of insulation right off the end of the wire.

You can connect up a complicated circuit in an hour or so with scarcely a need for the soldering iron. And if you want to try the grid leak from grid to negative filament instead of to the positive, go ahead and un-snap a clip. Snap the wire into the positive A battery clip in a second and listen once more. If you want to test the regeneration with and without a certain by-pass condenser, the change-over is a cinch. You can try changing the angle between the coils to note whether inductive coupling is present in any noticeable degree.

If you are inclined to get a bit careless now and then with your experimental hook-ups, it may be well to safeguard your tubes by inserting a high resistance in series with the B battery. A 15-watt 110-volt lamp will do. Insert this in the negative lead, using a 10c porcelain socket for the connections. If a "short" develops when you accidentally drop the pliers on the jack, nothing will happen except a faint illumination of the lamp—the tell-tale sign which warns you that you'll have to do a little Sherlock Holmes work to find out what's amiss.

Fellows who have two or three sizes of antenna often find use for their 43 plate condenser in discovering just how different "juice collectors" operate with their latest circuit. If you happen to have one of those antiques getting dusty on the shelf, here's a good way to put it back into service. Get a 6 x 7 inch panel and mount the condenser in the middle of it. Use two or three screws to fasten the panel to a small square of wood for support, scratch a line for an indicator mark and fasten on a good 4-inch dial. Put on a double set of binding posts so you can make connections coming and going from both sides. A vernier is a useful thing to add also, and one of the "rubber-tired" kind is just the thing. The extra plate vernier condenser operates as well, but you can't keep a record of the dial settings as you can when the vernier control just moves the whole set of rotor plates along very slowly.

# Which Circuit Do You Like Best?

MAKE YOUR DECISION, THEN WRITE, EXPLAINING WHY. ADDRESS TECHNICAL EDITOR

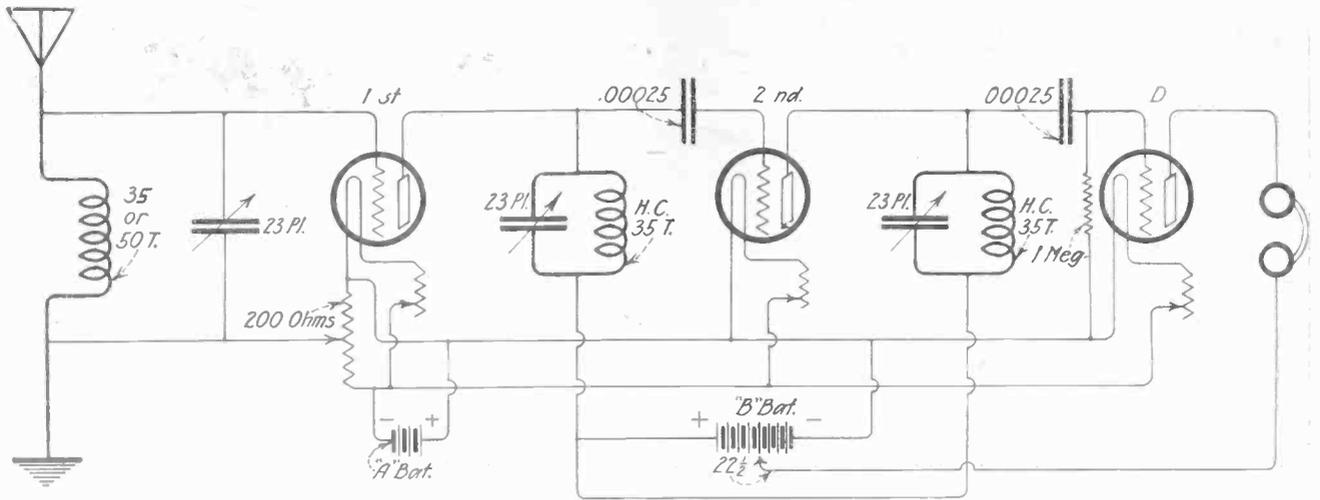


FIG. 1—Diagram of a three-tube tuned radio-frequency receiver. The first two tubes are the tuned radio-frequency stages, and the third tube a detector. Honeycomb coils are used in place of the usual radio-frequency transformers. The constants are all marked on the diagram and should be followed carefully. In the circuit a 200-ohm potentiometer is used to stabilize the grid potentials. D signifies the detector tube.

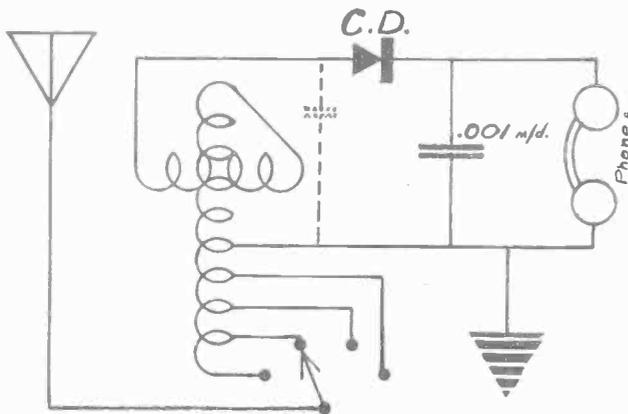


FIG. 2—A selective crystal circuit, embodying a special tuner in the form of a variometer with an extended primary. Both primary and secondary in this circuit are tuned to resonance with the incoming wave by using a large inductance and a small capacitance. The inductance is the variometer and the capacitance, represented by the dotted lines, is the distributed capacity in the windings of the variometer. If this variometer cannot tune up to the higher wavelengths, a capacity may be added by twisting together for about an inch or so two insulated wires connected to the points indicated by the dotted lines.

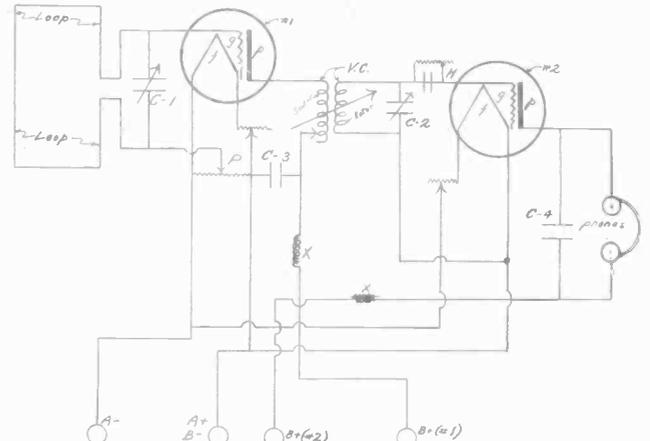


FIG. 3—Radio-frequency receiver using two tubes on a loop and capable of very sharp tuning. In this circuit a variocoupler is used as a radio-frequency transformer. The loop for this outfit should measure 3 feet on the diagonal of the square, and should have 10 turns of wire in all. An 11-plate condenser with a vernier should be used at C-1 to allow fine tuning. A grid condenser of .00025 m.f. (H) and a 5-megohm variable grid leak will aid greatly in getting clear detection. C-4 has a capacity of 1 m.f. Potentiometer P has a resistance of 400 ohms. The inductance choke coils (X) help to keep the high and low frequency currents where they belong.

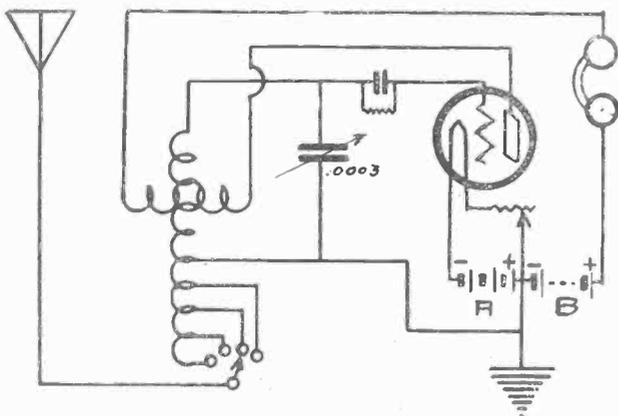


FIG. 4—This is the same tuner as used in Fig. 2, except that it is a one-tube set and that the secondary of the inductance is disconnected from the primary, and placed in the plate circuit. This combines the advantages of the single-circuit set and the three-circuit set, as well as eliminating most of their disadvantages. From the single-circuit set we get simplicity of tuning. From the three-circuit set we get the selectivity and sensitivity and eliminate the complicated tuning. The grid leak values are to be determined by experiment. Any type of tube may be used. This circuit is not a squealer if operated on a loop, as shown in diagram.

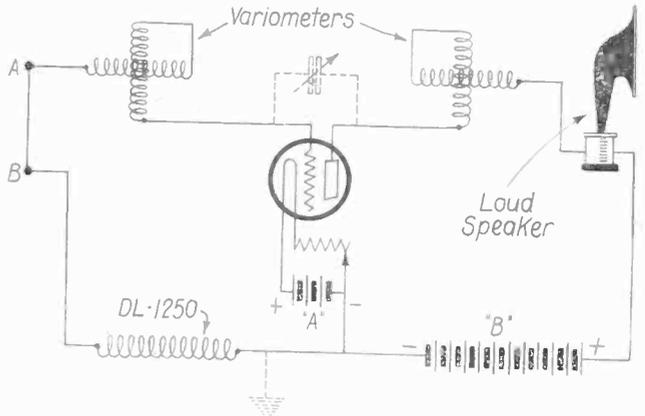


FIG. 5—A new variation of the super principle embodying two variometers and a high value inductance coil. Tuning for a given wavelength is accomplished by the grid variometer while the selectivity and volume are controlled by the plate variometer. Best apparatus should be used. If added selectivity is wanted, the optional condenser, shown by the dotted lines, should be used. This condenser also permits the use of small tubes such as WD's. The use of a ground in this circuit is optional. A loop usually does the trick for the antenna. In the diagram A and B denote the connections to the loop, or A and B may be connected together and the antenna connected to A.

# RF Regeneration Used with Loop

By Ralph C. Powell Jr.

ALL radio frequency amplifiers in use today have as one of their features an adjustment by which regeneration may be controlled in order to prevent the amplifier tube from oscillating. The neutrodyne provides for the effect of the tube capacity to be overcome by means of a small condenser and coil in series, which arrangement allows a certain amount of energy to be fed back to the grid of the tube opposite in phase to that which is fed back through the grid plate capacity. The superdyne makes use of magnetic feedback alone. In other forms of amplifiers a resistance is introduced into the grid circuit of the amplifier tubes which lowers their efficiency to a point where oscillation is impossible. The amplification which may be obtained in all of the above types depends upon how close the amplifiers may be brought to the point of oscillation without their becoming unstable and spilling over into oscillation. The amplification obtained is fairly good but in no case approaches the amount which is possible to obtain.

In the system described below there is no theoretical limit to the amplification obtainable since oscillation is made use of instead of being prevented. In fact, the stronger the received signal the more feedback can be used, so that it is easy to operate a loudspeaker on local stations. On distant stations loudspeaker operation is not always possible on the two tubes although some of the nearer stations have been brought in satisfactorily on the horn.

Referring to Fig. 1, points A and B are connected to an ordinary loop aerial. A loop which has proved very satisfactory consisted of 16 turns of stranded wire wound flat on a 26" frame. With this loop, using a .0005 variable condenser at C1, a wavelength range of from 250 to 550 meters is covered. The radio frequency transformer which is used to couple the amplifier to the detector tube is made as follows:

On a three-inch bakelite tube wind forty-five turns of No. 22 DCC wire. Bring out leads on each and then cover the entire winding with a layer of thin cardboard. Over this wind a coil of twenty turns, using the same size wire.

The twenty-turn coil is connected in the plate circuit of the first tube as L1. The forty-five turn coil or secondary winding is shunted by another .0005 variable condenser and connected into the grid circuit of the detector tube as L2-C2.

L3 and L4 are large honeycomb coils, 1,250 turns and 1,500 turns, respectively. These are shunted by condensers C3 and C4. C3 is a .001 micadon and C4 a .0025 micadon. The C battery shown in the grid lead of the detector tube should be variable from 1 to 4 volts. For this purpose the tapped end of an ordinary B battery may be used.

The honeycomb coils are mounted in the usual way so that the coupling between them may be varied.

Both tubes in the circuit should be 201As so that the full B battery voltage may be applied to both. The condenser C5 shown across the phones is a micadon .005 capacity. The rest is also standard apparatus. Care should be taken in making the connections and the apparatus should be arranged so that all leads may be made as short as possible.

The operation of the receiver is somewhat different from others although it is easily learned. Start by setting the honeycomb coils at right angles, with both tuning condensers at zero. Move the honeycomb coils together until a high-pitched whistle is heard. Ad-

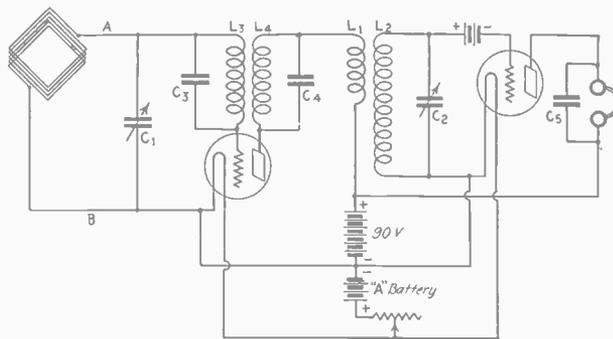


FIG. 1—Oscillation is utilized in this RF circuit, using two tubes that give loud-speaker volume. A loop is used and no radiation results. The operation of the set is somewhat different from that of the usual outfit, but is easily learned.

vance the condensers in step with each other until signals are heard.

If the proper adjustment has been made there will be a certain range of settings on condenser C2 where a squeal is heard. By moving the honeycomb coils a little closer together the range will be decreased to a few degrees. By careful adjustment of both the honeycomb coil and the second tuning condenser the grid circuit of the detector tube may be tuned to exact resonance with the incoming signal. When the adjustment of the honeycomb coils has once been made it need only be changed slightly when tuning to a different wavelength. Tuning is done entirely with the two condensers and settings may be recorded and returned to at will.

The tuning, while not critical enough to be troublesome, will separate local stations without difficulty.

If no large honeycomb coils are at hand, an audio-frequency transformer may be used to produce the low frequency oscillation. The writer has not done much work with the audio transformers but there is no reason why they should not work as well as the DL coils.

The parts necessary to build this receiver are as follows:

- One loop aerial.
- Two .005 variable condensers
- One R.F. transformer as described
- One DL 1500
- One DL 1250
- 90 volts B battery
- One rheostat
- Two sockets
- Two UV201A tubes
- One .001 micadon
- One .0025 micadon
- One .005 micadon
- One DL coil mounting
- Also necessary parts such as a panel, binding posts, etc.

## New Broadcasters

HEREWITH is published a list of newly licensed class A broadcasting stations. These are in the commercial group. A complete list of broadcasting stations was published in RADIO WORLD, issue of April 5, and a new and revised list will be published very soon.

Call	Station	Fre- quency	Wave Length	Power
		Keys	Meters	Watts
KFPY	Symons Investment Co., Spokane, Wash.....	1060	283	100
WDBA	Fred Ray, Columbus, Georgia .....	1270	236	20
WDBB	A. H. White & Co., Inc., Taunton, Mass. ....	1310	229	10
KFPH	Harold Chas. Mailander, Salt Lake City, Utah....	1240	242	50
KFPL	C. C. Baxter, Dublin, Texas.....	1240	242	20
KFPN	Missouri National Guard, Jefferson City, Mo. .	1240	242	10
KFPF	G. & G. Radio & Electric Shop, Olympia, Wash.	1270	236	20
WCBR	Charles H. Meester, (Portable Station) Providence, R. I. ....	1220	246	5
KFEZ	Transferred from Class C to Class A Associate Engineering Societies of St. Louis, St. Louis, Mo. ....	1210	248	250
WTAU	Ruegg Battery & Electric Co., Tecumseh, Nebr.	1240	242	10

# Which Circuit Do You Like Best?

MAKE YOUR DECISION, THEN WRITE, EXPLAINING WHY. ADDRESS TECHNICAL EDITOR

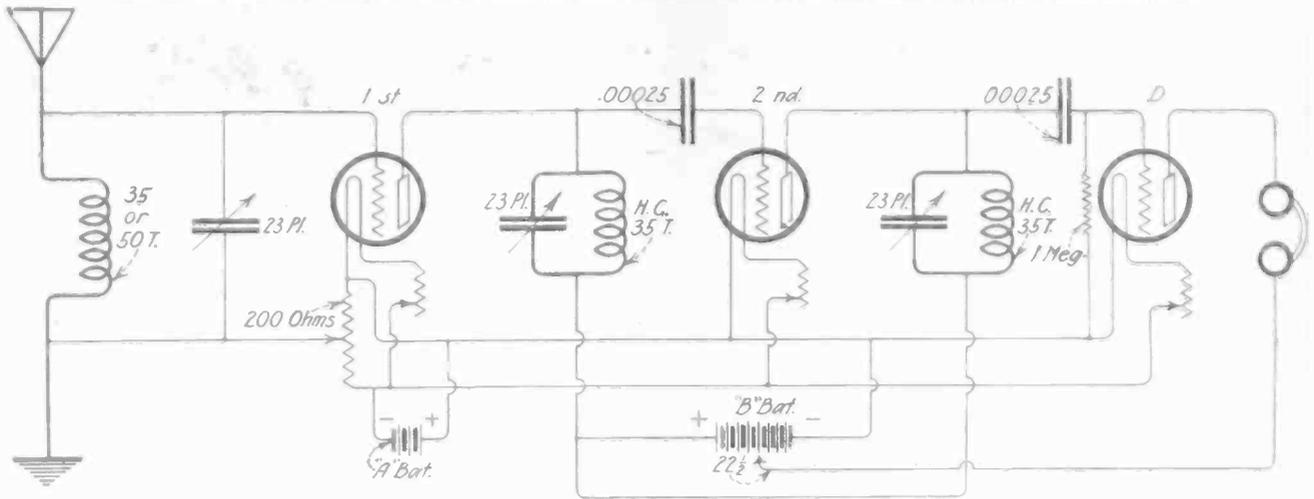


FIG. 1—Diagram of a three-tube tuned radio-frequency receiver. The first two tubes are the tuned radio-frequency stages, and the third tube a detector. Honeycomb coils are used in place of the usual radio-frequency transformers. The constants are all marked on the diagram and should be followed carefully. In the circuit a 200-ohm resistor is used to stabilize the grid potentials. D signifies the detector tube.

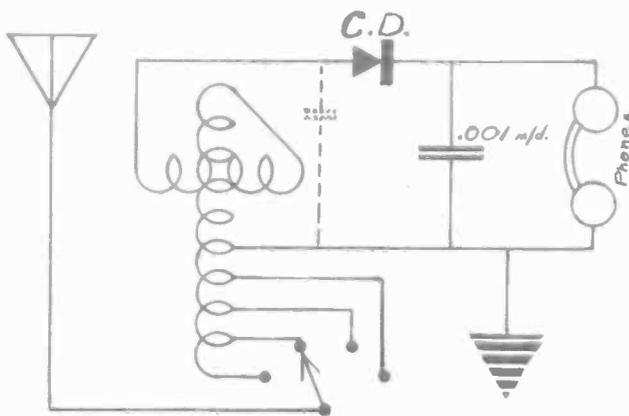


FIG. 2—A selective crystal circuit, embodying a special tuner in the form of a variometer with an extended primary. Both primary and secondary in this circuit are tuned to resonance with the incoming wave by using a large inductance and a small capacitance. The inductance is the variometer and the capacitance, represented by the dotted lines, is the distributed capacity in the windings of the variometer. If this variometer cannot tune up to the higher wavelengths, a capacity may be added by twisting together for about an inch or so two insulated wires connected to the points indicated by the dotted lines.

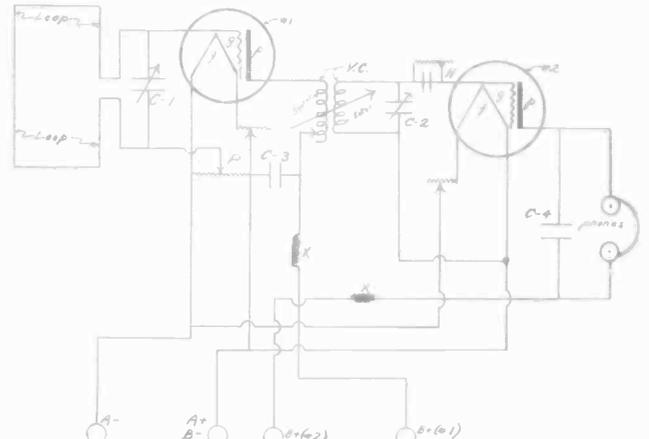


FIG. 3—Radio-frequency receiver using two tubes on a loop and capable of very sharp tuning. In this circuit a variocoupler is used as a radio-frequency transformer. The loop for this outfit should measure 3 feet on the diagonal of the square, and should have 10 turns of wire in all. An 11-plate condenser with a vernier should be used at C-1 to allow fine tuning. A grid condenser of .00025 mfd. (H) and a 5-megohm variable grid leak will aid greatly in getting clear detection. C-2 has a capacity of 1 mfd. Potentiometer P has a resistance of 400 ohms. The inductance choke coils (X) help to keep the high and low frequency currents where they belong.

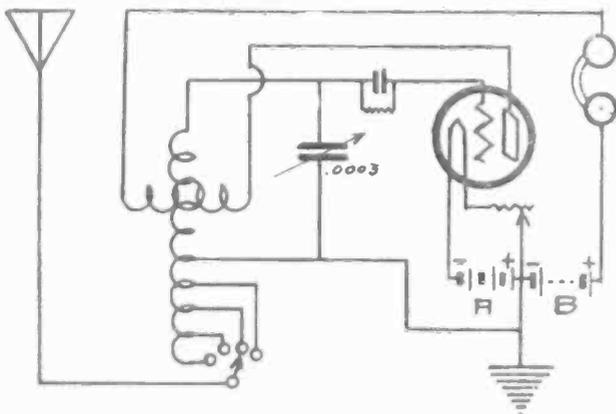


FIG. 4—This is the same tuner as used in Fig. 2, except that it is a one-tube set and that the secondary of the inductance is disconnected from the primary, and placed in the plate circuit. This combines the advantages of the single-circuit set and the three-circuit set, as well as eliminating most of their disadvantages. From the single-circuit set we get simplicity of tuning. From the three-circuit set we get the selectivity and sensitivity and eliminate the complicated tuning. The grid leak values are to be determined by experiment. Any type of tube may be used. This circuit is not a squealer if operated on a loop, as shown in diagram.

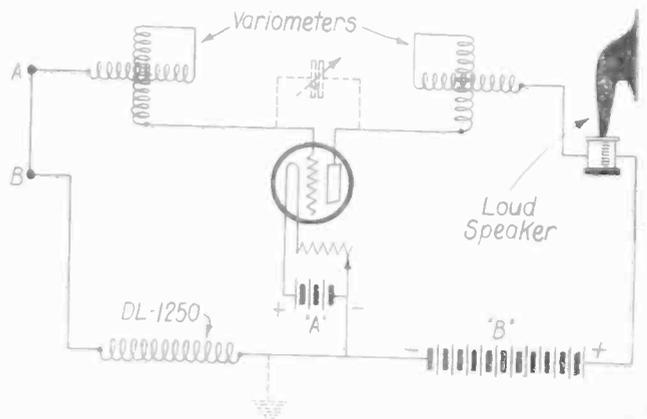
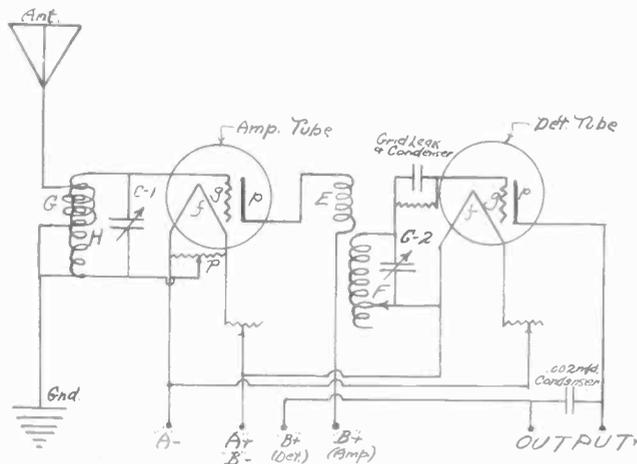


FIG. 5—A new variation of the super principle embodying two variometers and a high value inductance coil. Tuning for a given wavelength is accomplished by the grid variometer while the selectivity and volume are controlled by the plate variometer. Best apparatus should be used. If added selectivity is wanted, the optional condenser, shown by the dotted lines, should be used. This condenser also permits the use of small tubes such as WD's. The use of a ground in this circuit is optional. A loop usually does the trick for the antenna. In the diagram A and B denote the connections to the loop, or A and B may be connected together and the antenna connected to A.



# Adding RF at Little Expense



**CIRCUIT DIAGRAM** showing simple manner in which a regenerative receiver may be transferred into a non-radiating outfit. Tuning is sharpened and distant stations can be brought in with greater clarity than on the single circuit type of set. The first tube and component parts may be built into a separate small cabinet, and coil E connected to first tube by a length of double flexible cord.

By *Charles H. M. White*  
Consulting Engineer

ONE of the best methods to transform a regenerative receiver into a non-radiating receiver is to convert it into a radio frequency affair such as is outlined herewith. In addition, a most marked improvement in range and quality of reception is attained. The tuning is indeed made sharper and the ability to receive distance stations with much better volume is pronounced.

Few single circuit regenerative receivers have the faculty of receiving distance clearly. And still fewer have the ability to separate stations that are almost the same wave-length. This extra stage of radio-frequency can be added to any single circuit regenerative receiver of the tickler coil type of regenerative feedback. The radio-frequency tube and tuning system can be placed in a separate cabinet from the receiver.

The tuning unit E-F is the variq-coupler you already have with your regenerative receiver. The condenser C-2 is the same condenser you have been using but in a new position in the circuit. It is now placed in parallel with F instead of in series with F and the antenna. The grid leak and grid leak condenser are the same as used previously with your same detector tube.

There is very little extra apparatus to be purchased to complete this receiver. In fact, exclusive of the extra tube, the tuning unit G-H, the potentiometer P, the rheostat, the tube socket and the condenser C-1 are the only items.

The condenser C-1 is an 11 or 13 plate air variable with some type of vernier adjustment. The tuning unit G-H is wound on a three-inch tube with 55 turns of wire (No. 22 SCC.) for the bottom coil H, and, only eight turns of wire for the top coil G. All in all there is very little extra wiring and the changes are simplicity itself.

The terminal posts on your present set now used for "Ant." and "Gnd." can be used for the coil E if the amplifier unit is mounted in a separate cabinet.

In operating this receiver it will be found that the coupling between E and F is variable by means of the movement of the rotor shaft. This fact can be used to great advantage in stabilizing the circuit for general use over a rather broad wave band. By allowing the coupling to remain very loose, that is, with the rotor shaft or coil E with its axis at almost right angles with the axis of the stator coil F, it will be found that the selectivity is critical and tone quality pure.

This receiver is an excellent summer receiver, because it is very efficient on a short or improvised aerial. It is readily portable as well as a sensitive detector. In changing over your set you must take great care to see that all connections are made as they should be. A great deal of tube burn-outs are caused when radio wiring is changed. The best way to prevent this very possible loss is to protect each of your tubes with safety fuses. These fuses are a great boon to the radio experimenter especially. The fuses, which slip readily on the filament prong of the vacuum tube, offer complete protection no matter how many times you may switch your tubes from socket to socket and set to set.

## Britain to Hear America Twice Each Week

A N improved system of relaying will be installed near London, to facilitate the reception of concerts broadcast from the United States on a low wave-length. Once every two weeks British broadcast listeners will be afforded the opportunity of "hearing America" on their regular receiving sets—even with one-bulb outfits.

It is intended that the broadcasting will take place between 11 and 12 o'clock at night, which corresponds to between 6 and 7 o'clock in the United States.

The experimenters of the British Broadcasting Company have been listening for American signals every night of late, but the results have varied. Successful transmission and reception depend very much on the darkness.

Some nights the programs have been picked up with ease and efficiency, but at other times the results have been disappointing. Attention is called to the fact, however, that these were signals not specially transmitted for British reception, but were the ordinary programs intended for American receiving sets.

It has been found that a station working on a short-

wave length can be heard much better than a station working on a long-wave length. For instance, an American station working on a 100-meter wave length is usually louder than the ordinary American station operating on a wave length ranging from 300 to 500 meters. The explanation is that there is greater interference in the latter case because of the multiplicity of stations working on the higher wave lengths. When the American-British programs are transmitted from KDKA, East Pittsburgh, they are on a wave length of 100 meters or less.

The American programs are received at a station erected in an isolated place about fifteen miles from London. The ordinary type of receiver is used. The American signals are intensified to efficient strength and conveyed over a telephone line to the British Broadcasting Company's headquarters on the Embankment. Here the signals undergo more amplification, and they are then broadcast simultaneously across other telephone lines to the main stations throughout England and from them to a growing network of relay stations.

# A One-Tube Super-Regenerative Set

By Byrt C. Caldwell

**T**HE one-tube set which I am going to describe is the most sensitive one-tube set I have ever designed.

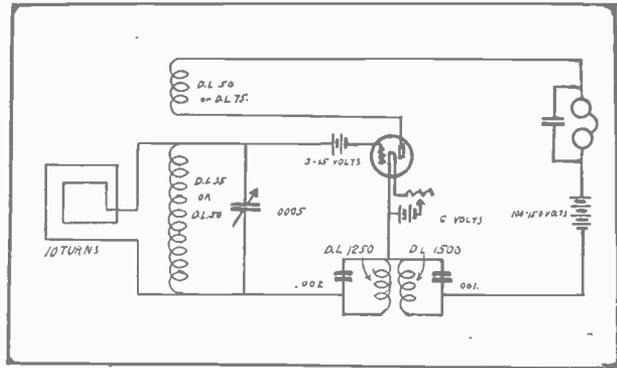
To understand why this set has such extraordinary sensitivity, I will give a simple explanation of its super-regeneration.

It is understood by most fans that in the ordinary regenerative receiver, when a voltage is impressed on the grid of the tube, the tube acts as a sensitive relay, and releases a much greater amount of energy in the plate circuit. A portion of this energy is fed back to the grid circuit by means of a tickler coil, by means of the capacity between the plate and grid of the tube, or by means of the capacity of the tuning condenser.

This energy releases more energy in the plate circuit, and so the initial signal is amplified a great deal.

In the super-regenerative receiver, the only method of regeneration which may be used is the tickler method, and so I will use this method in my description. When the tickler coil is brought close enough to the tuning coil, enough energy is fed back to have the effect of reducing the resistance of the grid circuit to zero. When the receiver is in this condition, the least disturbance will start a weak oscillation, which will build up to a definite value. This value is sufficient to keep the circuit oscillating despite grid resistance.

When the tickler coil is brought even closer, so much energy is fed back, that the resistance of the grid circuit becomes negative in value. If a signal is then impressed on the grid, no matter how small, it will, theoretically, build up to the capacity of the tube. The set is then evidently in an extremely sensitive condition. But the trouble with this arrangement is that the oscillations immediately build up to the carry-



THE Super-Regenerative one-tube circuit

ing capacity of the tube, and continue, rendering the tube insensitive to any other signals. In the super-regenerative receiver, the negative resistance is taken advantage of in building the signals up. But by means of a second tube in some cases, and by means of the same tube in this set, continuous oscillations are set up which alternately change the resistance of the grid circuit positive and negative. When the resistance is negative, the set is in the extremely sensitive state, and the signals build up to the capacity of the tube. But when the resistance is changed to a positive value, the oscillations are immediately destroyed. The super-regenerative receiver, therefore, prevents the continuous oscillations which are manifest in the ordinary regenerative receiver when the coupling is tightened. The frequency of these oscillations, for broadcast reception, is so high that they are inaudible.

These oscillations in the ordinary two- and three-tube super-regenerative receivers vary the resistance of the grid circuit in one of the two following ways. The negative resistance of the feed-back is varied, while the positive value of the grid resistance is held constant, or, the positive resistance of the grid circuit is changed, and the negative resistance of the feed-back is kept constant.

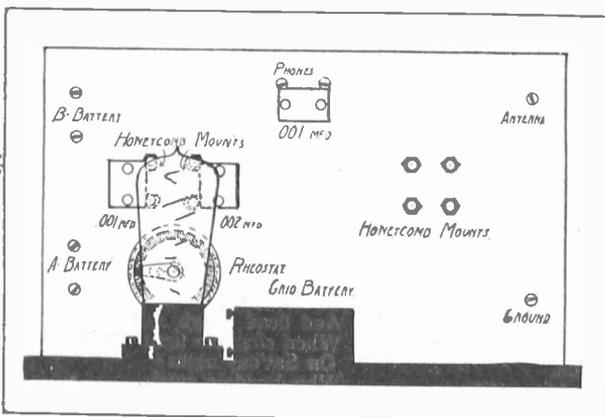
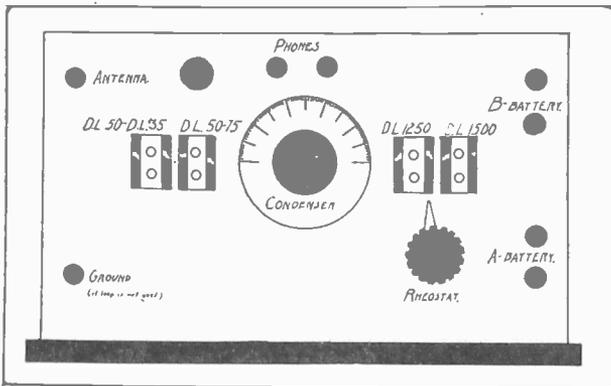
However, in this set, both methods are employed, and the resistance of both feed-back and grid circuit are varied in the correct phase relation to each other.

It is for this reason that this receiver is so much more sensitive than even the two-tube super-regenerator.

The construction of the receiver described here is about as easy as the construction of the ordinary one-tube regenerative set.

The apparatus required follows:

- One 35 turn D. L. coil, a D. L. 50, and a D. L. 75.
- One 1250 D. L. Coil, and a 1500 turn D. L.
- Two double mountings for the coils.
- One .0005 variable condenser.
- One phone condenser, .001.
- One mica condenser, fixed, .001.
- One tube socket.
- One mica condenser, fixed, of .002 capacity.
- One hard tube. Power tube if possible, or U. V. 201A.
- One rheostat.
- A battery, 6 volt.
- B. battery. 100 to 150 volts.
- C. battery 3 to 15 volts, variable.
- Phones, and loud speaker if desired.



FRONT of panel (at top) and the back (below)

The size of the panel used is 7 by 12 inches. The mounts for the small D. L. coils are mounted on the left hand side of the panel. The variable condenser is mounted in the center of the panel, and the two large coils are mounted on the right of the panel. The two mica condensers are connected directly to the back of the mount, and as close as possible. The tube is placed in back of the large coils. The grid battery is connected to the grid post of the socket.

# RADIO WORLD

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MAY 10, 1924

## Problems in Radio

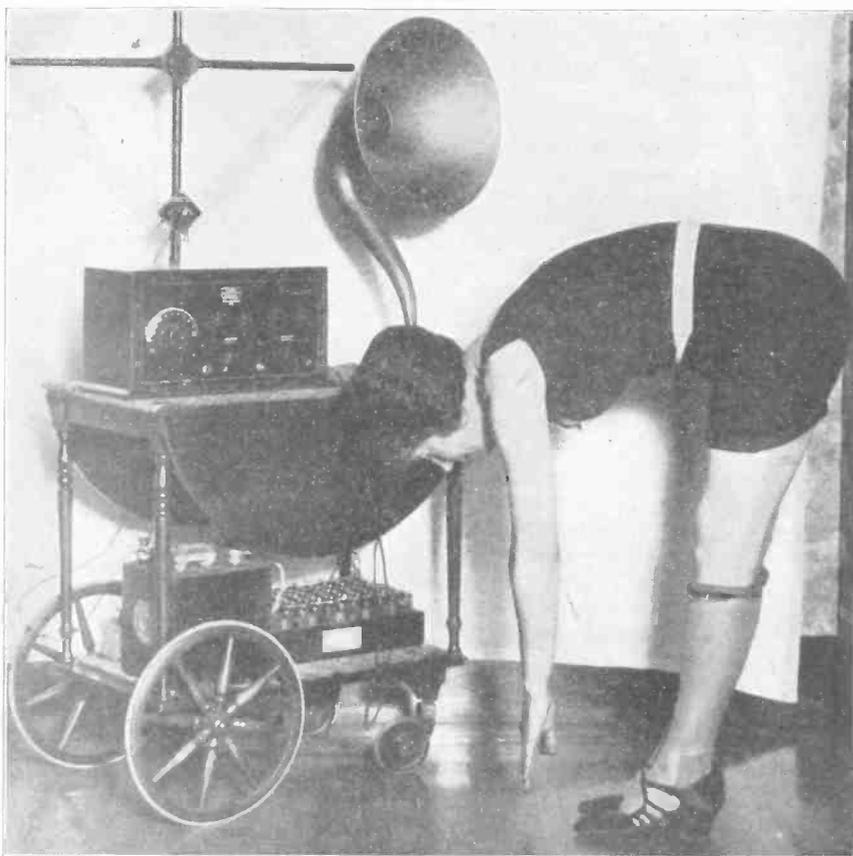
WILL radio merchandising de-  
 velop into sets almost ex-  
 clusively, or remain largely a parts  
 game? This is one of the para-  
 mount questions of the day.

The demand for factory-built  
 radio sets will continue to increase,  
 but still the many radio fans who  
 have obtained so much enjoyment  
 trying out new circuits are not go-  
 ing to stop, and the demand for  
 parts will always be an important  
 item.

Another great problem is what  
 is the future of all these sets in use  
 today that are poorly made? Eventually  
 and gradually these sets will be  
 passed out of service. It is not  
 altogether necessary that they be  
 junked, but they can be removed  
 from the pest class in three ways:  
 first, by proper operation; second,  
 by the use of a muffler tube in  
 front of the set, and, third, by a  
 simple transformation of the cir-  
 cuit arrangement to change it with  
 the minimum amount of extra ap-  
 paratus to a standard radio fre-  
 quency receiver.

RADIO WORLD is making a special-  
 ty of publishing diagrams and data  
 for the construction of non-radi-  
 ating receivers.

# The Radio Woman



(International Newsreel)

HOW Katherine Bonnet keeps fit.

## Fat Grow Thin, the Thin Gain, Due to Radio

THE broadcasting of music and  
 instructions for setting-up ex-  
 ercises, rapidly becoming  
 popular, and being taken up by more  
 and more stations, has made a big  
 hit with women.

Those who desire to reduce go  
 through the exercises faithfully.  
 Those who desire to put on more  
 weight perform their daily stunt  
 even more faithfully. And most  
 faithfully performed are the exer-  
 cises by those women who are  
 neither too fat nor too slim, but who  
 exercise solely to keep in trim.

Such an example is Katherine  
 Bonnet, San Francisco, who dons  
 her dapper bathing suit and pertly  
 prances out to where her perambu-  
 lating radio set happens to be. With  
 lots of wim, wigor and vitality, she  
 performs the calisthenics.

Miss Bonnet likes the idea of hav-  
 ing her radio set on a tea table. You  
 will see from the picture that the

lower shelf of the table contains the  
 storage A and storage B batteries.  
 The top of the table holds the set  
 which operates from a loop antenna.  
 Also, there's the loud speaker.

Miss Bonnet particularly prefers  
 such mobility, because sometimes  
 when the "awful hour" for calis-  
 thenics arrives she may happen to  
 be in bed and feel lazy. If the radio  
 set should be three or four rooms  
 away, she can press a button and  
 have the maid wheel the set in.  
 Then the exercises begin.

Another idea that Miss Bonnet  
 inaugurated in her family is to fol-  
 low up the setting-up exercises with  
 a dip in the briny.

## O! R-A-D-I-O!

O  
 Radio!  
 You're my best bet!  
 But why O let  
 Me hear a song  
 When all along  
 I've waited still,  
 To get my fill  
 Of fisticuff  
 And dead rough stuff,  
 When sluggers fight  
 On Sat'day night?  
 Why boudoir mush  
 Stead fighter's rush  
 O  
 Radio?

—M. I. T.

# Senate Jams Through Tax on Radio

No Roll Call, No Debate, and Only Twenty Members Present—Dill to Make Each Senator Assert Himself—Setback Does Not End Fight on the 10 Per Cent. Levy—House Hasn't Acted Yet

WASHINGTON

**T**HE ten per cent. tax on radio sets, parts and accessories, to be levied on the manufacturer or licensee, was jammed through the Senate.

With only twenty senators present, the Finance Committee, which originated the tax, got the resolution adopted without a roll call.

There was no debate, and a cloak of secrecy was thrown over the entire proceeding.

The fight on the tax is not over, however, and there is still a chance to kill it in the Senate. Then, too, the House can be appealed to, and finally, if necessary, President Coolidge himself.

Senator Dill, of the State of Washington, friend of the radio public and author of the bill to free broadcasters from paying copyright royalties, is leading the fight in the Senate. He said the tax resolution will be called up again, so there will be open debate and a recorded roll call.

## Here's What We're Fighting

WASHINGTON.

**T**HERE has been a great demand on the clerk of the Senate for copies of the bill containing the tax clauses relating to radio. The bill, as it now stands, changes the House bill in minor particulars, such as the stock ownership percentage that constitutes one corporation as affiliated with another. The important clauses of the bill follow:

### Title VII. Excise Taxes

Sec. 700. On and after the expiration of thirty days after the enactment of this act there shall be levied, assessed, collected and paid upon the following articles sold or leased by the manufacturer, producer, or importer, a tax equivalent to the following percentage of the price for which so sold or leased—

(10) Radio receiving sets 10 per centum.  
(11) Parts and accessories for radio receiving sets, sold or leased to any person other than a manufacturer or producer of such sets, 10 per centum.

If any manufacturer, producer, or importer of any of the articles enumerated in this section customarily sells such articles, both at wholesale and at retail, the tax in the case of any article sold by him at retail shall be computed on the price for which like articles are sold by him at wholesale.

Sec. 701. (a) If any person who manufactures, produces, or imports any article enumerated in section 700, sells or leases such article to a corporation affiliated with such person within the meaning of section 240 of this act, at less than the fair market price obtainable therefor, the tax thereon shall be computed on the basis of the price at which such article is sold or leased by such affiliated corporation.

(b) If any such person sells or leases such arti-

cle whether through any agreement, arrangement, or understanding, or otherwise, at less than the fair market price obtainable therefor, either (1) in such manner as directly or indirectly to benefit such person or any person directly or indirectly interested in the business of such person, or (2) with intent to benefit such person, the amount for which such article is sold or leased shall be taken to be the amount which would have been received for the sale or lease of such article if sold or leased at the fair market price.

Section 240 of this act, above referred to, says: Section 240. \* \* \* (C). For the purpose of this section two or more domestic corporations shall be deemed to be affiliated (1) if one corporation owns at least 95 per centum of the voting stock of the other or others, or (2) if at least 55 per centum of the voting stock of two or more corporations is owned by the same interests.  
(Note.—The house bill specified 85 per centum of the voting stock.)

Section 703. Every person liable for any tax imposed by section 700 \* \* \* shall make monthly returns under oath in duplicate and pay the taxes imposed by such sections to the collector for the district in which is located the principal place of business. Such returns shall contain such information and be made at such times and in such manner as the Commissioner with the approval of the Secretary, may by regulations prescribe.

The tax shall, without assessment by the Commissioner or notice from the collector, be due and payable to the collector at the time so fixed for filing the return. If the tax is not paid when due there shall be added as part of the tax interest at the rate of one per centum a month from the time when the tax became due until paid.

Section 705. (a) If (1) any person has, prior to January 1, 1924, made a bona fide contract with a dealer for the sale or lease, after the tax takes effect, of any article in respect of which a tax is imposed by section 700 or by this subdivision, and in respect of which no corresponding tax was imposed by section 900 of the Revenue act of 1921, and (2) such contract does not permit the adding, to the amount to be paid thereunder, of the whole of the tax imposed by section 700 of this act \* \* \*; then the vendee or lessee shall, in lieu of the vendor or lessor, pay so much of the tax imposed by section 700 of this Act \* \* \* as is not so permitted to be added to the contract price. If a contract of the character above described was made with any person other than a dealer no tax shall be collected under this act.

(d) The taxes payable by the vendee or lessee under subdivision (a), shall be paid to the vendor or lessor at the time the sale or lease is consummated, and collected, returned, and paid to the United States by such vendor or lessor in the same manner and subject to the same interest as provided by section 703.

(f) A vendee who purchases any article with intent to use it in the manufacture or production of another article intended for sale shall be included in the term "dealer" as used in this section.

CRAM'S RADIO MAP—Printed in colors. Best map on the market, 35c. The Columbia Print, 1493 Broadway, N. Y. C.

## Views of the News

**T**HE proposed ten per cent. tax on radio sets and parts, to be paid by the manufacturer or licensee, has been adopted by the Senate, rather hurriedly. Indications at this writing are that there is enough opposition in the Senate to bring the resolution back for a roll call. Therefore, continued attack on the tax is as necessary now as ever, since any sign of a weakening protest may be misconstrued. The opposition to the tax was splendidly voiced. It was immediate and almost overwhelming. The Senate Committee, which itself originated the idea of taxing radio, scarcely ever was deluged with such a nation-wide protest, and it is a tribute to the radio fans and the trade that such alertness was shown. The absurdity of taxing radio as a luxury, especially when it is not a luxury and is a business yet in its infancy, was quickly sensed throughout the length and breadth of the nation.

**J**EROME H. REMICK & CO., the New York music publishers, whose copyright infringement suit against the Crosley station was thrown out of court in Cincinnati, have started a similar suit against station WGY, operated at Schenectady, N. Y., by the General Electric Co. Such suits may be expected, one after another, with no end of confusion and delay, unless Congress acts. This difference between the two cases exists: the Crosley firm asserted that the songs broadcast from their station was selected by a performer and the infringement was inadvertent; the Remick concern alleges in its suit for an injunction and damages that the General Electric

Co. threatens to continue broadcasting the songs copyright by the plaintiff. But no solution ever will come by distinguishing whether the rendition over the radio was unwitting or intentional.

**C**ARDINAL HAYES, recently returned from Rome, where His Holiness invested him with the red hat, will broadcast from WEA, New York, tomorrow (Sunday) afternoon a plea for support of Catholic charities. This will be the first time the Roman Catholic Church has turned to radio to make an appeal and constitutes a recognition of which the radio industry may well be proud.

## That Great Superdyne Circuit, Fully Brought Up-to-Date, Will Be Published for Radio World Readers

**T**HE text and illustrations of the Superdyne Series that appeared in RADIO WORLD dated December 15, 22nd and 29th, 1924, have been so tremendously popular and valuable, that the entire editions of these three issues are now exhausted.

We shall, therefore, bring this article up-to-date and publish full

constructional data and diagrams in RADIO WORLD, beginning with our next issue, May 17, 1924. Special stress will be laid on how to tune the circuit.

Those who have swamped us with orders for these three issues, will receive copies containing the new Superdyne article to be published in RADIO WORLD.

# The Radio University

## A Question and Answer Department conducted by RADIO WORLD for its Subscribers by its Staff of Experts.

Address Letters to Radio University Department  
RADIO WORLD, 1493 Broadway, New York City

I HAVE a three circuit regenerative set and am desirous of adding the radio-frequency amplification hook-up as described by Leroy Western in RADIO WORLD for March 15. 1—I have a variocoupler in my detector circuit which has seven taps. Must I have the same number of taps on L-1? 2—In the last paragraph of the article reference is made to two stages of radio-frequency. Is the hook-up as shown considered one of the stages?—C. F. Crosby, 27 William Street, West Somerville, Mass.

1—Preferably you should have the same number of taps on L-1, but it is not absolutely necessary, as the antenna condenser will cover the wave-length range effectively. 2—Yes, the hook-up given is one of the stages. A second stage is added in exactly the same way.

I am very much interested in the receiver of tremendous power as per the article in RADIO WORLD of March 29, and would like a little more information. 1—How many A batteries are needed for the UV199 tubes, and how should they be connected? 2—How many B batteries should be used? 3—Would vernier rheostats and condensers be better than plain ones? 4—Will this receiver work all right with a loop?—R. B. Larson, care McCullough & Cheney, Browning, Ill.

1—You can use nine dry cells in series—parallel as shown on page 18 in RADIO WORLD for April 12. 2—45 to 90 volts on the plate may be used. 3—Verniers are always an improvement, enabling better tuning. 4—The set will work on a loop, but not with as much volume as when using the outside antenna.

1—Please furnish me details and data as to what should be incorporated on the RC Westinghouse receiver for long distance reception. 2—How would copper ribbon 100 feet long, 1 1/2 inches wide by 1-16th inch thick, do for an aerial? Would this ribbon be good for the lead-in also? 3—How would a copper disc, 10 inches in diameter, buried about four feet in the earth, do for a ground? Would it be better than connection to the water pipe?—J. Liten, 320 E. Randolph Street, Enid, Okla.

1—As an addition to your RC set, recommend Walt E. Thompson's Neutrad unit, details and construction data for which appeared in RADIO WORLD for May 3. This unit will give you added distance and selectivity in addition to making your set non-reradiating. 2—This copper ribbon will do excellently for the antenna. Care should be taken to have no kinks or turns in the strip. The lead-in, where it does not come near any structure, can be made of the ribbon also. 3—It would be better to bury the copper disc a bit deeper than four feet down. Also suggest that you use both water pipe and disc for the ground, as usually two grounds are better than one.

I have built a tuned-untuned radio-frequency three-tube receiver as described in RADIO WORLD for March 22. I have put a two-step amplifier to it. My trouble is that I cannot separate WJZ from WEAJ. What can I do to overcome this interference?—Fred Metzger, 1916 Palmetto Street, Brooklyn, N. Y.

You may be able to cut out the interference and separate the stations in this manner: Rewind coil E in the diagram on page 3 of RADIO WORLD for March 22 with 30 to 35 turns of the same size wire. Place a 43-plate condenser in series with the antenna and do the primary tuning with this condenser. WEAJ should come in louder with this arrangement. In case this fails to do the work rewind coil E, using only 5 turns of wire, but do not use the antenna condenser. Either one of these changes is sure to help you and it depends on circumstances which will serve you best.

1—In your article on the spiderweb neutrodyne in RADIO WORLD for April 12 you mention the primaries of the radio-frequency transformers as having 6 turns per Fig. 1. There is a figure 5 by the coil of the input transformer. Does this refer to turns of wire on this coil? 2—Would the 30-ohm and 6-ohm rheostats bear changing of position in the circuit? 3—Does the distance between the primaries and secondaries of the coils make a difference? How close should they be? 4—Are the taps in the secondaries of the second and third transformers for use only when neutrodons are to be used?

You mistook the letter S in the diagram for a figure 5. The S is the symbol for secondary. The number of turns of wire as called for in the text of the article is correct. 2—If you mean re-

versing, the rheostats so as to have the 30-ohm where the 6-ohm rheostat is, and vice versa, no. But if you mean to so place the rheostats in the circuit so that they will still control the same tubes, it is permissible. 3—The directions say the coils are wound over each other. 4—Yes, those taps are used only with the neutralizing condensers.

1—Please inform me if I can use All-American transformers in the three-tube reflex set described in RADIO WORLD for April 19. 2—How can I ground the cores. 3—I have a 10 to 1 and a 5 to 1 ratio transformer. Where would I place each in the hook-up given on page 5 of this issue.—W. F. Zepp, 212 North Maple Avenue, Martinsburg, W. Va.

1—You can use these transformers in the audio-frequency circuit of any hook-up. 2—To ground the core of a transformer, clean a spot on the iron core with a file and solder a length of bus bar wire to it. The wire is then run to the ground binding post. 3—The 10 to 1 ratio transformer is placed first; that is, it goes where the transformer on the left goes in the hook-up.

1—Regarding Amplidyne circuit on page 4 of RADIO WORLD for April 19, 1924, where does the detector tube get its negative A battery? Should tap C on the second amplifier be connected to the second .0005 variable condenser? 2—Can spiderweb coils be wound to the same number of

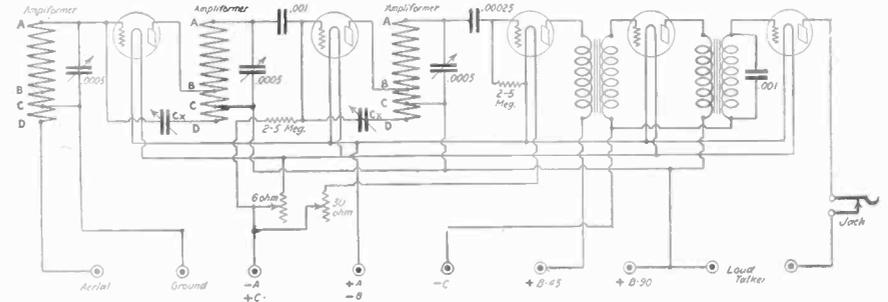


DIAGRAM of Thos. W. Benson's Amplidyne circuit asked for by Edw. H. Bittner.

turns and connections made as with the honey-comb coils?—Edw. H. Bittner, 1510 Catharine Street, Harrisburg, Pa.

1—Fig. 9 shows a reproduction of the amplidyne circuit with the connections. The detector tube negative lead is connected to A minus through the 30-ohm rheostat. Connections C on the second amplifier is made to the lower wire of the second .0005 variable condenser, which lead also goes to the positive B battery. 2—Yes, you may use the spiderweb coil as desired.

I have built a three-tube Ambassador set that worked to perfection at first, but now the stations are getting weaker all the time. Stations do not always tune in on the same dial reading, and the distant ones are falling out. Local stations are loud at times, and grow weak while the set is in operation. The A and B batteries have all been tested and they are O. K. There is also a continual grinding noise in the receivers. This was not apparent at first. What is the cause and remedy for

all this trouble? Can I add another step of audio-frequency amplification for greater volume?—A. J. Demmers, 127 Van Horn Street, Jersey City, N. J. Evidently the parts you used in the set were cheap and shoddy. The trouble you experience has happened to many radio fans. Cheap parts were used in the construction of sets, which at first work fine, but as humidity and temperature work their changes in the interior apparatus the signals become weaker and terrible scratchy noises are heard. Then, due to leakage in the various parts, the B battery runs down quickly. The only thing for you to do is to change your sockets, rheostats and jacks to ones of a good make, even if they do cost a little more. With the best parts the set will not lie down on you after a few months of operation. Do not advise the addition of another step of audio-frequency amplification, because when the set works right a third step is entirely unnecessary.

I am building the four tube Superdyne as described in RADIO WORLD, but wish you would help me out by giving a diagram showing the battery connections to the various binding posts. As I am a beginner in radio the diagrams are not very clear to me. I cannot get the full voltage of the B batteries.—T. N. Carnahan, Box 150, Sulphur, La.

A complete diagram such as you ask for will appear in an early issue of RADIO WORLD, together with a complete article on the Superdyne receiver.

One night recently I changed from dry cells to 4 volts of the storage battery for my filament lighting current. Signals were coming in fine. I threw the wave length switch to the high side and the set quit working altogether. Since that time I have tried new tubes and looked connections over thoroughly. The B batteries each register 20 volts. What do you think can be the trouble?—R. J. Patterson, 608 13th Street, Alexandria, La.

Evidently something happened when you threw the wave-length switch. It is quite possible that when you moved the switch the set was slightly jarred, thereby in some way causing internal trouble. The high voltage wires inside the set may have touched one another, thereby causing the burnout of a soldered connection. In order to find the trouble you will have to test all the leads with a battery and buzzer. You may find the trouble on the rear of a binding post. Perhaps a transformer burned out. Test the transformers

with head phones and battery for an open circuit. The connecting wire on the wave-length switch may have become loose and unnoticeable to the eye. An open circuit somewhere is the only trouble with your set.

I have an Autoplex receiver, as described in RADIO WORLD. How can I improve my set so as to take out the squeals and howls that annoy the listeners-in near me?—Royal Byar, Valhalla, N. Y. Suggest you incorporate the Neutrad unit as described in RADIO WORLD, issue of May 3, by Walt S. Thompson. In addition to preventing radiation this unit will increase your distance, volume and selectivity.

Would like to know where I can get more information on the Neutrad unit by Walt S. Thompson. Will this unit work with the Westinghouse RC set?—Wm. C. Schneppe, Box 955, Santa Fe, N. M. Yes, the Neutrad unit will work effectively with the RC set. See issue of RADIO WORLD for May 3 for complete information about the unit.

# Join RADIO WORLD'S University Club

And Get Full Question and Answer Service for the Coming 52 Weeks.  
RADIO WORLD, 1493 Broadway, New York City:

Enclosed find \$6.00 for RADIO WORLD for one year (52 Nos.) and also consider this as an application to join RADIO WORLD'S University Club, which gives me free information in your Radio University Department for the coming year.

Name .....  
Street .....  
City and State .....

# Four New Power Stations for N. Y. C.

NEW YORK CITY will have five more broadcasting stations, four of them power stations.

Arthur Batcheller, chief radio inspector in charge of the district, conferred with representatives of the five applicants and announced his favorable decision.

The Stations will be established in a few months. They are:

**City of New York**, wavelength undetermined yet.

**Famous Players-Lasky Film Corporation**, 360 meters.

**A. H. Grebe & Co.**, radio manufacturers, 360 meters.

**The Third Avenue Railway Company**, (Class A, wavelength undetermined yet).

**Gimbel Brothers**, department store, 316 meters.

Mr. Batcheller disclosed that he is swamped with applications for broadcasting permits from firms in New York City.

Representatives of Grover A. Whalen, the city's Commissioner of Plant and Structures, who is in charge of the arrangements for the city's station, refused to accept the 316 meter wave length offered, and said they would be satisfied only with a wave length of 492 meters, which is the one station WEAF of the American Telephone and Telegraph Company uses. The city representatives urged that WEAF be compelled to give up half of its broadcasting time to the city station, and spoke of an alleged "monopoly of the air" and against advertising by radio.

Mr. Batcheller explained that as station WEAF had started first it was entitled to have the wave length allotted to it available at any time. He added that, had the

## The Very Simple Life

PLYMOUTH, VT.

**JOHN C. COOLIDGE**, father of President Coolidge, walked half a mile to the home of Dick Brown, a neighbor, and "listened in" on the radio while the President delivered his address at The Associated Press luncheon in New York.

"I noticed that those newspaper men cheered him quite a bit," said Mr. Coolidge.

There is no radio installation in the Coolidge home in Plymouth. The President's father explained that his housekeeper objected to being "bothered with it." For the same reason a telephone which was installed in the house when Calvin Coolidge was notified last Summer at his father's home of his succession to the Presidency was removed soon afterward.

situation been reversed and the city station been established first, the Government would not think of dividing its time with another station.

The city representatives indicated that they would take an appeal from his decision. They informed Mr. Batcheller that the city station would use 1,000 watts for transmitting, which is what WEAF used for some time in recent experiments in high power transmission but which it has now abandoned to return to 500 watts.

## Broadcasting Coolidge Speech a Radio Feat

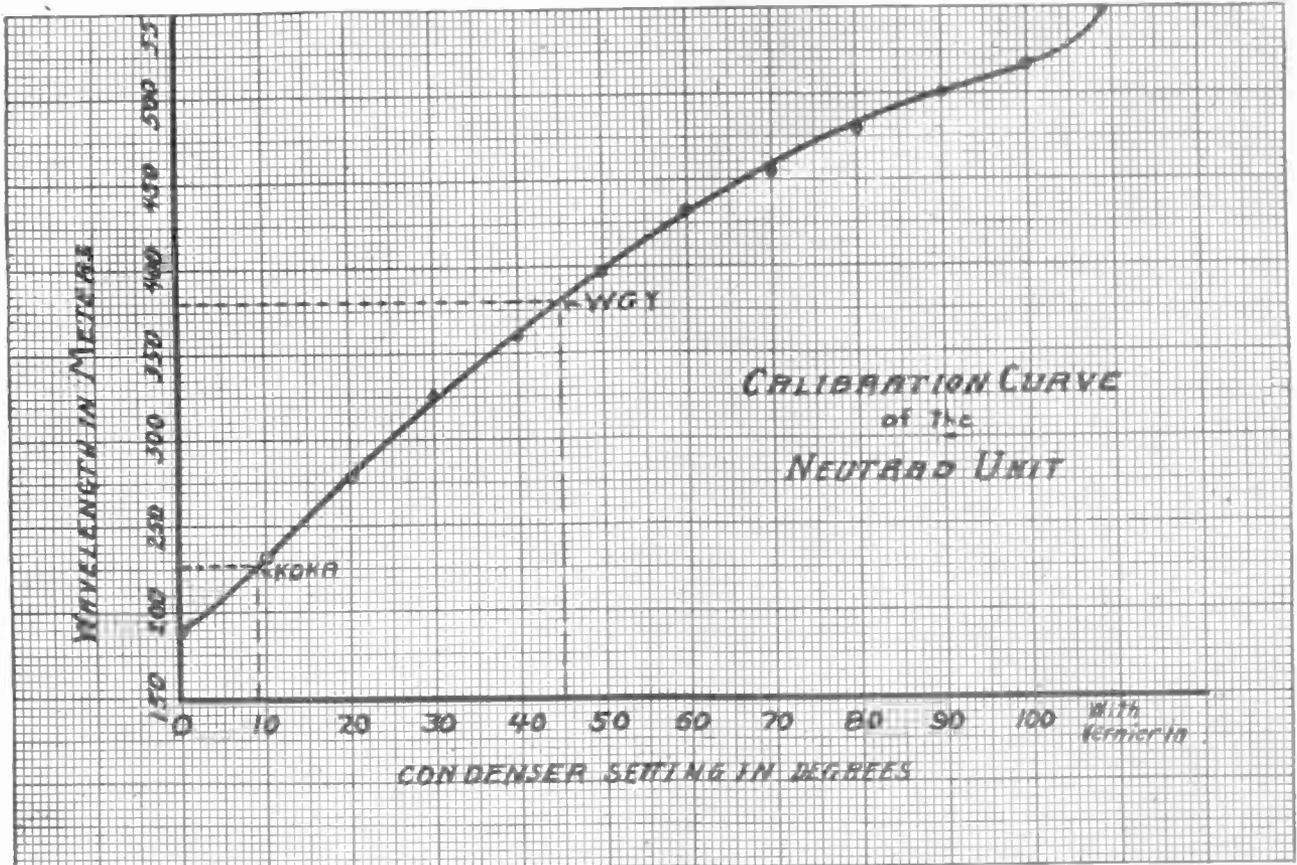
**PRESIDENT COOLIDGE's** recent speech at the luncheon of the Associated Press, Hotel Waldorf-Astoria, New York City, was heard over most of the United States because eleven stations co-operated in broadcasting and forty-two served as "repeaters." WEAF, New York City, made this possible, and the unified broadcasting set a landmark of achievement in broadcasting.

Nearly 7,000 miles of the American Telephone and Telegraph Company's land wires were used to broadcast President Coolidge's speech.

Eleven broadcasting stations east of the Rocky Mountains were linked directly or indirectly with New York City in this most elaborate experiment ever made with a President's utterance.

The land wires, or "long lines," over which the President's voice were carried from the Hotel Waldorf-Astoria to Station WEAF, were tapped by lines running to other broadcasting stations. On these lines there were forty-two repeaters, such as are used in long-distance telephony to compensate for weakness of current and to insure the carrying power of the voice over long distances. The repeaters and special amplifiers were installed at twenty-one stations.

The actual mileage of land wires used in the experiment was 6,793. The wires were connected in circuits which will be maintained for future broadcasting tests.



THE NEUTRAD UNIT'S calibration, charted by the author, Walt S. Thompson, Jr., shows the curve from less than 200 meters wavelength to 550. The condenser setting in degrees is shown at bottom. The Neutrad is a stage of neutralized RF and was fully described in RADIO WORLD, issue of May 3. It adds selectivity to any set and stops radiation.

# BROADCAST PROGRAMS FROM FAR AND NEAR

## Abbreviations Explained

G. M. T.—Greenwich Meridian Time  
 E. S. T.—Eastern Standard Time  
 C. S. T.—Central Standard Time  
 M. T.—Mountain Time  
 P. T.—Pacific Time  
 m.—meters  
 k.—kilocycles

[If the station you want comes under daylight saving time, add one hour to the time on the program.]

## Wednesday, May 7

**WBAP, Fort Worth, Texas, 476m. (620k), C. S. T.—7:30 P. M.,** monthly program by Mrs. Pearl Calhoun Davis, presenting pupil artists. 9:30 P. M., concert by Dick Gaines' Orchestra.

**KFI, Los Angeles, Cal., 469m. (640k), P. T.—4:45 P. M.,** Evening Herald news bulletins. 5:15 P. M., Examiner news bulletins. 8 P. M., Evening Herald concert. 9 P. M., Examiner concert. 10 P. M., Ambassador-Max Fischer's Coconut Grove Orchestra.

**KPO, San Francisco, 423m. (710k), P. T.—12 noon,** time signals from the Naval Observatory; reading of the Scriptures. 1 P. M., Rudy Seiger's Fairmont Hotel Orchestra. 2:30 P. M., Jack Falt's Estrella Cafe Orchestra. 4:30 P. M., Rudy Seiger's Fairmont Hotel Orchestra.

**WFAA, Dallas, Texas, 476m. (630k), C. S. T.—12:30 P. M.,** musical program presenting The Red-Head Girl of the Dallas Journal's editorial staff.

**KGO, Oakland, Cal., 312m. (960k), P. T.—1:30 P. M.,** New York Stock Exchange and U. S. Weather Bureau reports. 3 P. M., short musical program; address by Cora L. Williams on the subject of "Group Thinking." 4 P. M., Concert Orchestra of the St. Francis Hotel, San Francisco, Fermin Cardona, conductor. 6:45 P. M., final reading, stock exchange and weather reports and news items.

**WGY, Schenectady, N. Y., 380m. (790k), E. S. T.—7:45 P. M.,** musical program, Lydia Stevens, piano; Mrs. Leo K. Haines, soprano; Janet Lindsay Stevens, violin.

**WEAF, New York, 492m. (610k), E. S. T.—11 A. M.,** talk under the auspices of Richard Hellman, makers of Blue Ribbon Mayonnaise; talk on Nestle's Food. 4 P. M., Bruce L. Young, tenor; Issay Lukaszewsky, violinist; children's program. 7 P. M., Mid-week Services under the auspices of the Greater New York Federation of Churches; United Cigar Stores Daily Sport Talk by Thornton Fisher; Atlas Portland Cement Co. Mixed Quartette; talk by the Bank of America; musical program direct from Hunter College under the auspices of the Adolph Lewisohn Free Public Course in Chamber Music; Anca Seidlova, pianist; Howard Gilbert, tenor; Fred Ruzika, violinist; Vincent Lopez and his orchestra direct from the Grill of the Hotel Pennsylvania.

**WOO, Philadelphia, 509m. (590k), E. S. T.—11 A. M.,** grand organ. 11:30 A. M., United States weather forecast. 12 noon, luncheon music by the Tea Room Orchestra. 12:55 P. M., United States Naval Observatory time signal. 4:45 P. M., grand organ and trumpets. 5 P. M., sports results and police reports. 10:55 P. M., United States Naval Observatory time signal. 11:02 P. M., United States weather forecast.

**WAAM, Newark, N. J., 263m. (1140k), E. S. T.—9:15 P. M.,** Oscar Taylor and Al Wilson, singing. 9:30 P. M., Judith Roth, prima donna. 9:45 P. M., "Historic Traditions of America." Talk by the Rev. M. S. Waters. 10 P. M., Clarence Williams, Lawrence Lomax and Eva Taylor, Okeh recording artists. 10:15 P. M., Jimmy Doyle and George Roberts, song-writing vaudeville team. 10:30 P. M., Leo Friedman's weekly "Grab-bag of Celebrities," surprise offering of comedy and mirth.

**CKAC, Montreal, 425m. (700k), E. S. T.—1:45 P. M.,** Mount Royal Hotel concert orchestra. 4 P. M., weather, stocks, news. 4:30 P. M., Mount Royal Hotel dance orchestra.

**WIP, Philadelphia, 509m. (590k), E. S. T.—1 P. M.,** luncheon music. 1:30 P. M., official weather forecast. 3 P. M., recital by E. S. Littlehales, soprano; Laura T. Bast, contralto; Charles Krooks, violinist; Emilie Loeben, accompanist. 4 P. M., talk on Citizens' Military Training Camp. 6 P. M., official weather forecast. 6:05 P. M., dinner dance music. 6:45 P. M., U. S. Dept. of Agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories.

**KSD, St. Louis, 546m. (550k), C. S. T.—6:30 P. M.,** program of Aberg's concert ensemble. 9 P. M., concert by St. Paul's Church band. 11 P. M., dance music by Rodemich's orchestra.

**WLW, Cincinnati, 309m. (970k), E. S. T.—10:30 A. M.,** weather forecast and business reports. 12:45 P. M., language lesson. 1:30 P. M., business reports. 3 P. M., market reports. 4 P. M., program folk songs and colored rituals. Baseball results. 8 P. M., program by Big Four Athletic Association of Cincinnati.

**KDKA, Pittsburgh, 326m. (920k), E. S. T.—5:30 P. M.,** dinner concert by Pittsburgh Athletic Association orchestra. 6 P. M., baseball scores. 6:30 P. M., "Robin Hood." 6:45 P. M., news bulletins. 7 P. M., baseball scores. 8 P. M., concert by Mendelssohn choir. 9 P. M., concert from School



SUSAN DUNBAR, petite singer from the Sunny South, who is one of Roxie's gang at WEAF.

of Fine Arts. 9:55 P. M., Arlington time signals. weather forecast. Baseball scores.

**WBZ, Springfield, Mass., 337m. (890k), E. S. T.—6 P. M.,** results of Eastern, American and National league games. 6:30 P. M., bedtime story for kiddies. 6:40 P. M., dance music by Leo Reisman and his orchestra. 7:45 P. M., concert by Springfield Conservatory male quartet. 9 P. M., results of Eastern, American and National league games. 9:55 P. M., Arlington time signals. 10 P. M., torch light and spot light sing on State House steps, Boston.

**KYW, Chicago, 536m. (560k), C. S. T.—5:33 P. M.,** news, financial and final markets. 5:45 P. M., children's bedtime story. 6 P. M., dinner concert from Congress Hotel. 7 P. M., musical program. 8 P. M., "Good Roads" talk by Chicago Motor Club. 8:15 P. M., book reviews. 9 P. M. to 2:30 A. M., midnight revue.

**KGW, Portland, Ore., 492m. (610k), P. T.—11:30 A. M.,** weather forecast. 12:30 P. M., concert by Darby's Orchestra. 3:30 P. M., children's program. 7:30 P. M., baseball scores, weather forecast and market reports. 8 P. M., concert by Oregonian Plectra Quartet. 9 P. M., Alexander Hamilton Institute business talk. 10 P. M., dance music by Olsen's Metropolitan Orchestra.

**WJZ, New York, 455m. (660k), E. S. T.—1 P. M.,** Schrafft's Tea Room Orchestra. 2 P. M., N. Y. Board of Education program. 3 P. M., Frieda Williams, soprano. 3:15 P. M., Jean Prais, pianist. 3:30 P. M., School Art League. 3:45 P. M., Jean Prais, pianist. 4 P. M., baseball scores every 15 minutes. 4:05 P. M., Eleanor Gunn's fashion talk. 4:30 P. M., Hotel Commodore Tea Music. 5:30 P. M., lecture by Dr. Herman H. Horne. 7 P. M., story for boys and girls. 7:20 P. M., "Financial Developments of the Day." 7:30 P. M., Selzer's Cafe Boulevard Orchestra. 7:45 P. M., "The Progress of the World." 8:20 P. M., city official series talk. 8:50 P. M., Miriam Hoffman, violinist. 9:05 P. M., Marie Rose Kenney, soprano. 9:35 P. M., Narinska, pianist. 10 P. M., Hunter College Choral Society. 10:30 P. M., Coleman's Trocadero Orchestra.

**WOC, Davenport, Ia., 484m. (620k), C. S. T.—10:55 A. M.,** time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 12 noon, chimes concert. 2 P. M., closing stocks and market. 3:30 P. M., educational program. 6:30 P. M., sandman's visit. 6:50 P. M., sport

news and weather forecast. 7 P. M., educational lecture. 8 P. M., musical program. 9 P. M., weekly tourists' road bulletin.

**WOS, Jefferson City, Mo., 441m. (680k), C. S. T.—8 P. M.,** "How to Control Apple Blotch," by T. J. Talbert. 8:20 P. M., program of barn dance tunes by Bill Caton and Ola Gathright.

**KHJ, Los Angeles, Cal., 395m. (760k), P. T.—12:30 P. M.,** Lois Forrest, soprano, accompanied by Ethel Wilson. 2:30 P. M., program, courtesy Barker Bros. 7 P. M., children's program; bedtime story by Uncle John. 8 P. M., 160th Infantry Band; Florence Van Dyke, soprano; Anton Chris, Hawaiian guitar; Lyle Blake Milligan, the woman "Uncle Jost"; Dr. Mars Baumgardt, lecturer.

**WRC, Washington, D. C., 469m. (640k), E. S. T.—3 P. M.,** fashion developments of the moment. 3:10 P. M., song recital announced. 3:25 P. M., report of National Conference Board. 3:30 P. M., song recital. 3:45 P. M., piano recital by Eleanor Glynn. 3:50 P. M., current topics. 4 P. M., song recital. 5:15 P. M., instruction in international code. 6 P. M., stories for children. 6:15 P. M., talk under auspices of Smithsonian Institute.

**PWX, Havana, Cuba, 400m. (750k), E. S. T.—7:30 P. M.,** concert at Malecon Band Stand by Municipal Band of Havana, classic and national music.

**WWJ, Detroit, 517m. (580k), E. S. T.—10:25 A. M.,** weather forecast. 11:55 A. M., Arlington time. 12 noon, music by Jean Goldkette's Orchestra. 3 P. M., Detroit News Orchestra. 3:30 P. M., weather forecast. 3:35 P. M., market reports and baseball scores. 5 P. M., baseball scores. 8:30 P. M., Ralph A. Siebert, baritone.

**WHN, New York, 360m. (830k), E. S. T.—7:30 P. M.,** Marjorie Mandell, soprano, popular songs. 7:35 P. M., Hallett's Roseland Dance Orchestra. 8 P. M., London Shoe Orchestra and Entertainers. 8:30 P. M., Rabbi N. H. Ebin, Rabbi of Cong. Sons of Israel, in talk on "Civilization's Debt to Jewish Thought"; soloist. 8:50 P. M., H. Murray O'Neil, baritone. 8:55 P. M., Agnes Macpeake, soprano, classical selections. 9 P. M., Dan Gregory's Dancing Carnival Orchestra. 9:30 P. M., M. Witmark Black and White program.

**WNAC, Boston, 278m. (1080k), E. S. T.—10:30 A. M.,** WNAC women's club talks. 12:30 P. M., organ recital, broadcast from Cathedral of St. Paul. 1:15 P. M., concert by Shepard Associates. 4 P. M., Shepard Colonial Orchestra. 4:15 P. M., Gerald Gavini, violinist. 4:30 P. M., music, broadcast from Loew's State Theatre. 6 P. M., children's half-hour. 6:30 P. M., WNAC dinner dance, Checker Inn Orchestra. 8 P. M., Graquinta Trio. 9 P. M., Sinfonia Fraternity concert.

**WOR, Newark, N. J., 405m. (740k), E. S. T.—6:15 P. M.,** "Music While You Dine," Ernie Krickett's Paramount Record Orchestra. 6:55 P. M., resume of day's sports. 8 P. M., Sigmund Spaeth, Ph.D., and Godfrey Ludlow, second recital of "Common Sense of Music Series." 9 P. M., "Olympic Games," talk by Loren Murchison. 9:15 P. M., popular songs of long ago by their writers, Ted Morse, Charles K. Harris, Abe Holzman and Bob King.

## Thursday, May 8

**KFI, Los Angeles, Cal., 469m. (640k), P. T.—4:45 P. M.,** Evening Herald news bulletins. 5:15 P. M., Examiner news bulletins. 6:45 P. M., Y. M. C. A. concert; sales lecture. 8 P. M., Ambassador Hotel concert. 9 P. M., Examiner concert. 10 P. M., concert arranged by John Smallman, baritone.

**KPO, San Francisco, 423m. (710k), P. T.—5:30 P. M.,** Children's hour stories by "Big Brother" of KFO. 7 P. M., Rudy Seiger's Fairmont Hotel Orchestra. 8 P. M., Philip Lombardi, Argentine tenor, accompanied by Sylvia Begri. 9 P. M., Miss Sue Hill, soprano, accompanied by Mildred Stubbs; Miss Ethel Guyon, flutist. 10 P. M., E. Max Bradford's Versatile Band.

**WFAA, Dallas, Texas, 476m. (630k), C. S. T.—12:30 P. M.,** address, Judge Eugene B. Muse, on "There Ain't Nobody That's Anybody in Particular." 8:30 P. M.—M. J. P. Boone and assisting musical talent from North Texas Junior A. & M. College, Arlington, Texas. 11 P. M., the Circle Theatre Orchestra, George W. Caldwell, director.

**KGO, Oakland, Cal., 312m. (960k), P. T.—1:30 P. M.,** New York Stock Exchange and U. S. Weather Bureau reports. 4 P. M., Concert Orchestra of the St. Francis Hotel, San Francisco, Fermin Cardona, conducting. 6:45 P. M., final reading, stock exchange and weather reports and news items. 8 P. M., program of classics from the old masters, featuring Trio Tartini.

**WGY, Schenectady, N. Y., 380m. (790k), E. S. T.—7:45 P. M.,** address, "Facts and Fallacies about Heredity" by Dr. James Mavor, associate professor of biology, Union College, Schenectady. 8 P. M., program by Musloff's Symphonion Orchestra and Miss Merwitz, reader.

**WEAF, New York, 492m. (610k), E. S. T.—11 A. M.,** Roy King, tenor; talk by Col. H. Edward Bullis under the auspices of the Board of Education; motion picture forecast by Adele Woodard; market and weather reports by the United States and New York State Departments of Agriculture and American Agriculturist. 4 P. M., Evelyn Gill Smith, coloratura soprano; Lowy's Capitol City

Celebrities Orchestra; children's program. 7:30 P. M., United Cigar Stores Daily Sport Talk by Thornton Fisher; Charles Mertens, baritone; talk by Sophie Irene Loeb, woman writer; the Mazola Orchestra; Brooklyn Daily Eagle Weekly Digest by H. V. Kaltenborn, associate editor; talk by Lt. Col. Henry Breckenridge under the auspices of the American Olympic Committee; talk under the auspices of Richard Hellmann, makers of Blue Ribbon Mayonnaise. Helen DeWitt Jacobs, violinist, accompanied by Marjorie Jacobs; "Eveready Battery" Entertainers.

**WOO, Philadelphia, 509m (590k), E. S. T.—11:30 A. M.**—United States weather forecast. 12 noon, luncheon music by the Tea Room Orchestra. 12:55 P. M., United States Naval Observatory time signal. 4:45 P. M., grand organ and trumpets. 5 P. M., sports results and police reports. 10:55 P. M., United States Naval Observatory time signal. 11:02 P. M., United States weather forecast.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.—6 P. M.**, every child's story hour, by Grace Sorenson. 6:30 P. M., dinner program by Ladden's Army Serenaders. 9 P. M., piano recital by artists pupils of Mr. and Mrs. Cecil W. Berryman.

**WHN, New York, 360m (830k), E. S. T.—9:30 P. M.**, Harry Hock Entertainers. 9:40 P. M., dance music by Wigwam Club Orchestra. 10 P. M., operatic and classical program by All Nations Ass'n. 11 P. M., Victor Wilbur, baritone. 11:10 P. M., Hatsu Kume, Japanese prima donna. 11:15 P. M., program to be announced. 11:40 P. M., Dorothy Clarke, sensational girl pianist of the Montmartre. 11:50 P. M., Ross Fowler, baritone, singing "Somebody Stole My Gal," and "Floating Down the Mississippi."

**WNAC, Boston, 278m (1080k), E. S. T.—10:30 A. M.**, WNAC women's club talks. 12:30 P. M., organ recital. 1:15 P. M., Shepard Colonial Orchestra. 4 P. M., Shepard Colonial Orchestra, music broadcast from Loew's State Theatre; selections on Mehlin Welte reproducing piano. 6:30 P. M., WNAC dinner dance. 8 P. M., Salvation Army Band and soloists. 10 P. M., dance music, Lambert Bros. Orchestra.

**WOR, Newark, N. J., 405m (740k), E. S. T.—6:15 P. M.**, Albert E. Sonn, in weekly talk on "Radio for the Layman." 6:25 P. M., "Music While You Dine," Frank Dailey's Meadowbrook Dance Orchestra. 7:20 P. M., resume of day's sports.

**WGY, Schenectady, N. Y., 380m (790k), E. S. T.—5:30 P. M.**, adventure story, courtesy "Youth's Companion."

**WEAF, New York, 492m (610k), E. S. T.—11 A. M.**, "Young Mothers' Program" under the auspices of the Health Speakers Service Bureau; Consolidated market and weather reports. 12 noon, Chapel Services direct from Columbia University Chapel, with address by Chaplain Raymond Knox and musical program. 4 P. M., Billy Wynne and his Greenwich Village Orchestra; Irene Jacques, soprano. 7 P. M., Synagogue Services under the auspices of the United Synagogue of America; talk under the auspices of American Agriculturist. United Cigar Stores Daily Sport Talk by Thornton Fisher; "Introductions to Psychology," the first of a series of ten lectures on the subject by Gardner Murphy, under the auspices of Columbia University. Concert by the Delta Upsilon Glee Club; the Chieftan Orchestra; "Eveready Battery" Hawaiian Entertainers.

**WOO, Philadelphia, 509m (590k), E. S. T.—7:30 P. M.**, police reports and sports results. Dinner music by the Havana Casino Orchestra. 8:15 P. M., grand organ recital, Mary E. Vogt. 8:45 P. M., address, "Golf," Alexander H. Finley, the father of golf in America. 9 P. M., WOO Orchestra, Robert E. Golden, director. Louise Belcher, contralto. Harriette G. Ridley, accompanist. 10 P. M., Walter Miller and his Ritz-Carlton Dance Orchestra. 10:55 P. M., United States Naval Observatory time signal. 11:02 P. M., United States weather forecast.

**WAAM, Newark, N. J., 260m (1140k), E. S. T.—8:45 P. M.**, weekly sport talk. 9 P. M., Times Square Entertainers. 9:15 P. M., The Rev. Dr. Arthur W. Brooks, scientific astrologist and vocational guidance expert, continuing weekly lecture on "The Turn of the Wheel of Events." Radio reading of horoscopes and brief counsel in vital personal problems. 9:30 P. M., E. M. Shoemaker, radio doctor, topic: "Superhydrodines and Their Construction." 9:45 P. M., Victor Wilbur, baritone, and Joseph Macy, pianist. 10 P. M., Charles J. Sanders' Sterling dance orchestra.

**CKAC, Montreal, 425m (700k), E. S. T.—4 P. M.**, weather, news, stocks, music. 8:30 P. M., Canadian National Railway special concert and talk.

**WIP, Philadelphia, 509m (590k), E. S. T.—1 P. M.**, luncheon music. 1:30 P. M., official weather forecast. 3 P. M., recital by Ethel Niethammer, soprano; Sara A. Siffero, contralto; Ethelyn Selner Mack, pianist; Emilie Loeben, accompanist. 6 P. M., official weather forecast and final baseball scores. 6:05 P. M., dinner dance music. 6:45 P. M., U. S. Dept. of Agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call. 8 P. M., "Timely Talks to Motorists" by Gene Hogle. 8:15 P. M., direct broadcast from the Eastern Penitentiary prison band, glee club and soloists. 11:15 P. M., dance music by Ted Weems and his Victor Recording orchestra.

**WAAW, Omaha, Neb., 360m (830k), C. S. T.—8:9 P. M.**, educational program. Talks by the Rev. E. M. Brown, R. A. Smith, P. P. Purdham.

**KSD, St. Louis, 546m (550k), C. S. T.—8 P. M.**, concert by chorus, glee club and quartet of Eden Evangelical Seminary.

**WLW, Cincinnati, 309m (970k), E. S. T.—10:30 A. M.**, weather forecast and business reports. 12:45



**GEORGE WRIGHT**, announcer at Station CKCH, the Canadian National Railway's broadcasting station at Ottawa, Canada. His voice with the smile wins the favor of radio audiences.

P. M., language lesson. 1:30 P. M., business reports. 3 P. M., market reports. 4 P. M., piano solos by Miss Adelaide Apfel. Talk by representative of League of Women Voters. Wurlitzer Social Service program. Baseball results. 10 P. P., concert by the ensemble classes of the Cincinnati Conservatory of Music, vocal quartet, string quartet and symphony ensemble. Popular dance program by Loherty's Melody Boys.

**KDKA, Pittsburgh, 326m (920k), E. S. T.—11:55 A. M.**, Arlington time signals. Weather forecast. United States Bureau of Market Reports. 2:30 P. M., baseball scores, inning by inning. 5 P. M., baseball scores. 5:30 P. M., KDKA Little Symphony orchestra. 6 P. M., baseball scores. Concert continued. 6:30 P. M., "King Midas." 6:45 P. M., news bulletins. 7 P. M., baseball scores. 7:15 P. M., farm program. 8 P. M., Apollo Male Chorus concert. 8:45 P. M., concert by Carnegie Steel Company chorus. 9:55 P. M., Arlington time signals. Weather forecast. Baseball scores. 10:30 P. M., concert by talent from Nixon Theatre.

**WBZ, Springfield, Mass., 337m (890k), E. S. T.—5:30 P. M.**, dance music by Leo Reisman and his orchestra. 6 P. M., results of Eastern, American and National league games. 6:30 P. M., bedtime story for kiddies. 7 P. M., concert of Spanish music folk songs and dances.

**KYW, Chicago, 536m (560k), C. S. T.—9:30 A. M.**, farm and home service. 10:35 A. M., table talk by Mrs. A. J. Peterson. 1:35 P. M., studio program. 5:02 P. M., news, financial and final markets. 5:45 P. M., children's bedtime story. 6 P. M., dinner concert from Congress Hotel. 6:35 P. M., talk on "Sports." 7 P. M., "Twenty Minutes of Good Reading." 7:20 P. M., musical program.

**KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M.**, weather forecast. 12:30 P. M., concert by Seiberling Lucas Music House. 3:30 P. M., woman's story program. 7:30 P. M., baseball scores, weather forecast and market reports. 8:15 P. M., dance music by George Olsen's Metropolitan Orchestra. 10 P. M., George Olsen's Metropolitan Orchestra.

**WJZ, New York, 455m (660k), E. S. T.—4 P. M.**, baseball scores every 15 minutes. 4:05 P. M., Eleanor Gunn's fashion talk. 4:10 P. M., "The Romance of Fish Marketing." 4:25 P. M., "Proper Nutrition for Children," by Winifred Stuart Gibbs. 4:5 P. M., Harper's Bazaar fashion talk. 5 P. M., Emeline Barse, soprano. 5:30 P. M., state and federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations. 7 P. M., Jack Rabbit stories. 7:20 P. M., "Financial Developments of the Day." 7:30 P. M., "Stamps," E. B. Power. 7:45 P. M., Harry J. Caffrey, tenor. 8 P. M., "Problems of Crime," by Dr. Henry P. Fairchild. 8:30 P. M., Wanamaker organ recital. 9:15 P. M., "Current History," by Robert McElroy. 9:35 P. M., Rose Covello, soprano; Estelle Sparks, accompanist. 10:30 P. M., Hotel Majestic Dance Orchestra.

**WJY, New York, 405m (740k), E. S. T.—7:45 P. M.**, Max Kalfus, tenor; Paul Haenssler, composer-pianist. 8 P. M., "Golf," by Innis Brown. 8:15 P. M., choral society concert, from Waldorf-Astoria. 9:30 P. M., ninth annual meeting and navy dinner of National Security League, speakers, Secretary of Navy Curtis D. Wilbur; Theodore Roosevelt, Jr.

**WOC, Davenport, Ia., 484m (620k), C. S. T.—12 noon**, chimes concert. 2 P. M., closing stocks and markets; weekly report of wool market. 3:30 P. M., educational program. 5:45 P. M.,

chimes concert. 6:30 P. M., Sandman's visit. 6:50 P. M., sport news and weather forecast. 7 P. M., educational lecture. 9 P. M., orchestra program.

**KFIX, Independence, Mo., 240m (1250k), C. S. T.—9 P. M.**, the L. D. S. Radio Orchestra; tenor solos by Mr. George Anway.

**KFKX, Hastings, Neb., 286m (1050k), C. S. T.—9:30 P. M.**, local programs and rebroadcasting from KDKA.

**KHJ, Los Angeles, Cal., 395m (760k), P. T.—12:30 P. M.**, program, courtesy Fitzgerald Music Co. 2:30 P. M., program courtesy Fitzgerald Music Co. 7 P. M., children's program; bedtime story by Uncle John. 8 P. M., program, courtesy Barker Bros.

**WRC, Washington, 469m (640k), E. S. T.—5:15 P. M.**, instruction in international code. 6 P. M., stories for children by Peggy Albion. 7:30 P. M., dance program by the Better 'Ole Orchestra. 8:15 P. M., talk on motoring. 8:30 P. M., song recital by Lucian Marsh, baritone. 8:45 P. M., dance program by L'Aiglon Orchestra. 9:30 P. M., song recital by Elizabeth Dayton, lyric soprano. 9:45 P. M., "The Question Box." 10 P. M., time signals and weather forecasts.

**WWJ, Detroit, 517m (580k), E. S. T.—8 A. M.**, setting-up exercises. 9:30 A. M., tonight's dinner. 9:45 A. M., public health service bulletins. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 3 P. M., Detroit News Orchestra. 3:30 P. M., weather forecast. 3:35 P. M., market reports and baseball scores. 5 P. M., baseball scores. 8:30 P. M., Detroit News Orchestra; Jean Redd, soprano; Waldemar Engberg, basso. 10 P. M., dance music by Jean Goldkette's Orchestra. 11 P. M., Detroit News Orchestra.

## Friday, May 9

**KFI, Los Angeles, Cal., 469m. (640k), P. T.—4:45 P. M.**, Evening Herald news bulletins. 5:15 P. M., Examiner news bulletins. 6:45 P. M., concert by Myra Belle Vickers. 8 P. M., Evening Herald concert. 9 P. M., Examiner concert. 10 P. M., Trinity Broadcast Orchestra. 11 P. M., Ambassador-Max Fischer's Coconut Grove Orchestra.

**KPO, San Francisco, 423m. (710k), P. T.—12 noon**, time signals from the Naval Observatory; reading of the Scripture. 1 P. M., Rudy Seiger's Fairmont Hotel Orchestra. 2:30 P. M., organ recital by Theodore J. Irwin. 4:30 P. M., Rudy Seiger's Fairmont Hotel Orchestra.

**WFAA, Dallas, Texas, 476m. (630k), C. S. T.—12:30 P. M.**, address, Dr. Robert Stewart Hyer, president emeritus of Southern Methodist University, on the Sunday school lesson. 8:30 P. M., varied program by talent from Josephine, Texas. D. G. Coffman in charge.

**KGO, Oakland, Cal., 312m. (960k), P. T.—1:30 P. M.**, New York Stock Exchange and U. S. Weather Bureau reports. 3 P. M., short musical program. A discussion of art. 4 P. M., Concert Orchestra of the St. Francis Hotel, San Francisco, Fermin Cardona conducting. 6:45 P. M., final reading, stock exchange and weather reports and news items.

**KFAE, Pullman, Wash., 330m. (910k), P. T.—8:30 P. M.**, "Bobbed Hair," one-act play. Soprano solos, Edith Wooddy. "Purpose of Livestock Club Work," C. M. Hubbard. Agricultural talk. Instrumental solos. Review of New Books, Alice L. Webb.

**KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M.**, weather forecast. 12:30 P. M., Peck Holton's Orchestra. 3:30 P. M., talk for women. 7:30 P. M., baseball scores, weather forecast and market reports. 8 P. M., lecture by University of Oregon Extension Service. 10:30 P. M., Hoot Owls.

**WJZ, New York, 455m (660k), E. S. T.—5:45 P. M.**, state and federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Evening Post News. 7 P. M., "Jack Rabbit Stories." 7:10 P. M., "Motor Camping." 7:20 P. M., "Financial Developments of the Day." 7:30 P. M., French lesson. 8:15 P. M., Fordham University Glee Club. 9:15 P. M., American Legion Night. 10:45 P. M., Paul Specht's Alamac Hotel Orchestra.

**WJY, New York, 405m (740k), E. S. T.—7:30 P. M.**, "Income Taxes," Frank Shevit. 7:45 P. M., Ruth Worburton, soprano. 8 P. M., loose-leaf current topics. 8:20 P. M., Columbia University Instrumental Club Concert. 10 P. M., joint recital, Sam Roberts, tenor; Veni Warwick, contralto.

**WOC, Davenport, Ia., 484m (620k), C. S. T.—2 P. M.**, closing stocks and markets. 3:30 P. M., educational program. 6:30 P. M., Sandman's visit. 6:50 P. M., sport news and weather forecast. 7 P. M., educational talk. 8 P. M., organ recital.

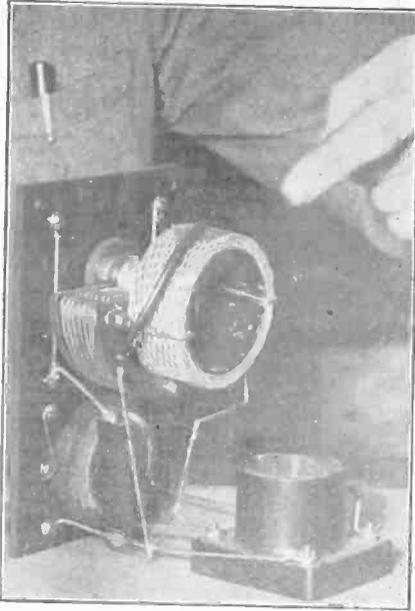
**WOS, Jefferson City, Mo., 441m (680k), C. S. T.—8 P. M.**, program of Jefferson City Rotary Club. Addresses and musical numbers.

**KHJ, Los Angeles, Cal., 395m (760k), P. T.—12:30 P. M.**, program of music and news items. 2:30 P. M., program, courtesy Barker Bros. 7 P. M., Arthur Blakeley, organist. 7:15 P. M., children's program; bedtime story by Uncle John. 8 P. M., appreciation program, courtesy Ray F. Chesley.

**WRC, Washington, 469m (640k), E. S. T.—3 P. M.**, fashion developments of the moment. 3:10 P. M., song recital by Arthur McCormick, baritone. 3:20 P. M., "Beauty and Personality" by Elsie Pierce. 3:25 P. M., current topics. 3:35 P. M., piano recital by Ethel Grant. 3:50 P. M., the Magazine of Wall Street. 4 P. M., song recital

(Continued on page 18)

# Little Gets Much



(Photonews-Foto Topics)

ON ONE DIAL this set got 2,000 miles, using earphones. A .00025 mfd. condenser (23 plates) was used, on which was mounted a 75-turn honeycomb coil. The panel is only six inches high, although standard-size parts are used.



(International Newsreel)

WEEK END BAG? Not a bit of it. Notice the loud speaker output, perforated. John Shepard, 3rd, Boston merchant, is carrying his portable set—three stages of RF, detector and two steps of AF. Doesn't he look like Jesse L. Lasky?

# Here Are Roxie and His Gang Before



(International Newsreel)

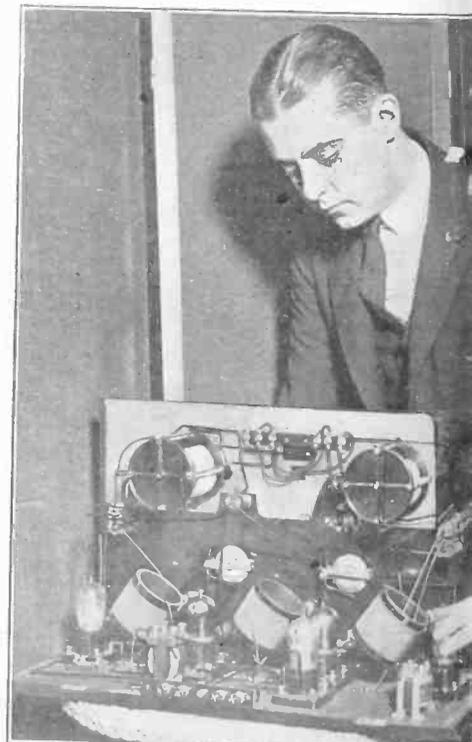
J. E. DALRYMPLE, vice-president, Canadian National Railroad, with the Neutrodyne he used on his private car.



(Kadel & Herbert)

ALFRED M. CADDELL, executive secretary of the American Radio Association, offering \$500 for the most practical solution of the question, "Who is to pay for broadcasting?"

THE MERRY AGGREGATION that enters New York City, every Sunday through Station W are shown before the microphone. Bottom row: Maria Gambarelli (Gamby), Susan Dunbar and Harcum, Gladys Rice, Evelyn Herbert, S. Ayres, Marguerite McKee, Florence Mulholland, Eugene Ormandy Blau (the Blue Blond), A. David Mendoza, conductor of the orchestra, Arden and Alexander Koszcki. The three men are James Parker Coombs, Clark Robinson and Count 'er



(Kadel & Herbert)

A THREE-CIRCUIT honeycomb set for long wave and a neutrodyne for short wave work is the product perfected by Rutledge R. Mayo (above)

the Microphone

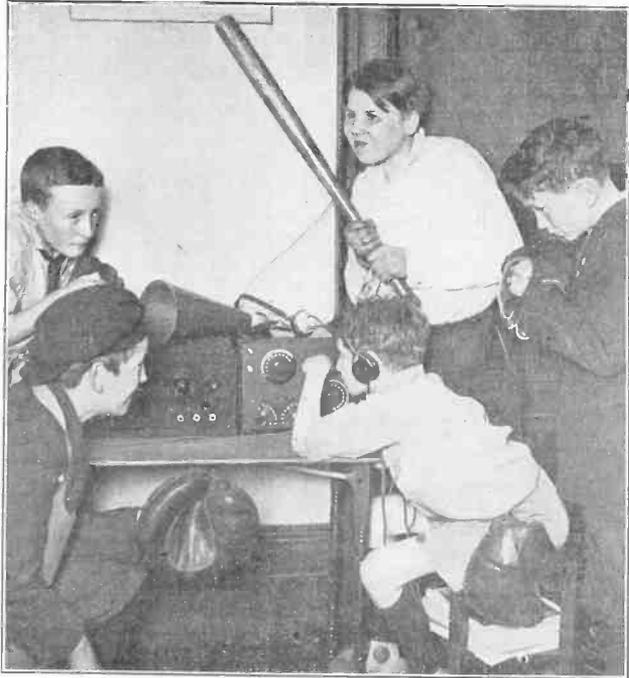
Uses Fishing Line as Aerial and Ground



from the Capitol Theatre, New York, famed as Roxie and his gang, Tommy Dowd, Douglas Stanbury, Billy Robyn. Second row, Marjorie Rothafel (Roxie himself), Betsy and Yasha Bunchuk. Third row, Eric, Joe Wetzel, Ava Bombarger, Billy Axt, Phil Ohman, Victor with their backs against the wall and Peter Harrower. Total, 25.



(Kadel & Herbert)  
**HERE** is Sidney Kasendorf again, this time with a summer product, a two-tube portable reflex, with even the batteries enclosed in the neat case. Sidney, otherwise 2ATV, uses a fishing line for aerial and ground. This line is wound on a regular fishing reel, and he says it is about the easiest coil winding he ever attempted.



(Kadel & Herbert)  
**WHEN** it rains this indoor baseball club uses its imagination and the radio to provide an afternoon's sport.



(Wide World)  
**ANOTHER** freak crystal set. Policeman Charles Morley, Dudley Street Station, Roxbury, Mass., displaying his product.



(Miller-Fotograms)  
**ERVINE HOLLANDER**, amateur radio engineer, shown with the set with which he won the silver cup at a radio show in Washington, D. C.



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# Programs

## Friday, May 9 (continued from page 15)

announced. 5:15 P. M., time signals and weather forecasts. 6 P. M., stories and songs for children.

**WWJ, Detroit, 517m (680k), E. S. T.—** 8 A. M., setting-up exercises. 9:30 A. M., tonight's dinner. 9:45 A. M., Public Health Service bulletins. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 12 noon, dance music by Jean Goldkette's Orchestra. 3 P. M., Detroit News Orchestra. 3:30 P. M., weather forecast. 3:35 P. M., market reports and baseball scores. 5 P. M., baseball scores. 8:30 P. M., Detroit News Orchestra; Anne Campbell, Detroit News poet; Miss Margaret O'Connor, soprano.

**WGY, Schenectady, N. Y., 380m (790k), E. S. T.—** 7:45 P. M., comedy, "Dangerous People," by Oliver White, presented by WGY Players. 10:30 P. M., WGY Quintet, Joseph Derrick, piano, and Ida Mae Paul, soprano.

**WEAF, New York, 492m (610k), E. S. T.—** 11 A. M.—Musical program to be announced; talk under the auspices of Garden Magazine; Consolidated market and weather reports. 4 P. M., special club program of interest to women, with music by Alexander Dellerson, baritone; Mildred Gray, soprano, and Irving Klass, violinist. 7:30 P. M., United Cigar Stores Daily Sport Talk by Thornton Fisher; Florence Balmano, mezzo contralto, accompanied by Edna Rothwell; talk on Crisco; the Happiness Boys, Billy Jones and Ernest Hare; talk and music by the World Mutual Automobile Casualty Insurance Company. B. Fischer and Company's Astor Coffee Orchestra.

**WOO, Philadelphia, 509m (590k), E. S. T.—** 8:30 P. M., special program from the Fox Theatre Studio. 9:10 P. M., Jean Masters, pianist; John Harrington, Jr., tenor; Charles Silverthorn, baritone; Harriette G. Ridley, accompanist; Joseph Earnshaw, pianist-accompanist. 9:30 P. M., grand organ recital, Mary E. Vogt. 10 P. M., dance program by Earl Gresch and his orchestra from the Hotel Adelphia. 10:55 P. M., United States Naval Observatory time signal. 11:02 P. M., United States weather forecast. 11:03 P. M., continuation of dance program.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.—** 6 P. M., speakers half hour. 6:30 P. M., dinner program, Parakeet Orchestra. 9 P. M., program by Tabor (Iowa) College Autolykus Club.

**WHN, New York, 360m (830k), E. S. T.—** 9:30 P. M., Hotel Carlton Terrace Orchestra and Entertainers. 11 P. M., K. I. K. Entertainers. 11:10 P. M., Fred Whitehouse, songs. 11:20 P. M., S. S. City of Seattle Orchestra. 11:50 P. M., Jack Manion singing "Counting the Days." 11:55 P. M., Alex Cantor singing "Hula-Hula Dream Girl."

**WNAC, Boston, 278m (1080k), E. S. T.—** 10:30 A. M., WNAC women's club talks. 12:30 P. M., organ recital. 1:15 P. M., Shepard Colonial Orchestra. 4 P. M., Ralph Besse, tenor; John Allen Farnham, pianist; Edith Ross, soprano. 6 P. M., children's half-hour. 6:30 P. M., WNAC dinner dance. 8:15 P. M., New England Conservatory Orchestra.

**WOR, Newark, N. J., 405m (740k), E. S. T.—** 6:15 P. M., Agnes Leonard, songs for children. 6:30 P. M., "Man in the Moon" stories for children. 7 P. M., Krautzyer String Trio. 7:25 P. M., resume of the day's sports.

**WAAM, Newark, N. J., 263m (1140k), E. S. T.—** 11 A. M., program instrumental and vocal numbers. 12 noon, luncheon concert. 12 P. M., agricultural and health notices, stock market reports, hints to housewives.

**CKAC, Montreal, 425m (740k), E. S. T.—** 1:45 P. M., Mount Royal Hotel concert orchestra. 4 P. M., weather, news, stocks. 4:30 P. M., Mount Royal Hotel dance orchestra.

**WIP, Philadelphia, 509m (590k), E. S. T.—** 1 P. M., luncheon music. 1:30 P. M., official weather forecast. 3 P. M., recital by the Boulevard Trio. 4 P. M., lesson in Mah Jong by Mr. and Mrs. Wei Lum Wong. 6 P. M., official weather forecast and final baseball scores. 6:05 P. M., dinner dance music by the Jordan-Lewis dance orchestra. 6:45 P. M., U. S. Dept. of Agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call.

**WAOW, Omaha, Neb., 526m (570k), C. S. T.—** 8:05 P. M., bridge lesson by Mrs. Guy U. Purdy.

**KSD, St. Louis, 546m (550k), C. S. T.—** 8 P. M., program by Mathilda Erickson, soprano; Mrs. Jas. S. Newell, mezzo-soprano; Howard Wilhelmj, baritone; June Weybright and R. E. Murphy, accompanists.

**WLW, Cincinnati, 309m (970k), E. S. T.—** 10:30 A. M., weather forecast and business reports. 12:45 P. M., language lesson. 1:30 P. M., market reports. 3 P. M., stock quotations. 4 P. M., special program. Lecture on "Journalism."

**KDKA, Pittsburgh, 326m (920k), E. S. T.—** 5:30 P. M., organ recital by Paul Flegler. 6 P. M., baseball scores. Concert continued. 6:30 P. M., "Little Red Riding Hood." 6:45 P. M., news bulletins. 7 P. M., baseball scores. "The Violin Maker of Cremona," one-act opera. 7:40 P. M., National Stockman and Farmer market reports. 8 P. M., concert by ladies chorus of Pittsburgh Musical Institute. 9:55 P. M., Arlington time signals. Weather forecast. Baseball scores.

**WBZ, Springfield, Mass., 337m (890k), E. S. T.—** 11:55 A. M., Arlington time signals; weather reports; Boston and Springfield market reports. 5

P. M., results of Eastern, American and National league games. Dinner concert by WBZ Orchestra. 6 P. M., "Pep Smith, Pinch Hitter." 6:30 P. M., bedtime story for kiddies. 7 P. M., Jazz Symposium illustrated by Leo Reisman and his orchestra. 9 P. M., results of Eastern, American and National league games. 9:55 P. M., Arlington time signals.

**KYW, Chicago, 536m (560k), C. S. T.—** 11:30 A. M., "The Progress of the World," furnished by Review of Reviews. 5 P. M., Spanish lessons. 5:33 P. M., news, financial and final markets. 5:45 P. M., children's bedtime story. 6-6:30 P. M., dinner concert broadcast from Congress Hotel. 9:15 P. M., talks broadcast from Orchestra Hall. 9:45 P. M. to 1:30 A. M., midnight revue.

## Saturday, May 10

**KFI, Los Angeles, Cal., 469m (640k), P. T.—** 4:45 P. M., Evening Herald news bulletins. 5:15 P. M., Examiner news bulletins. 6:45 P. M., closing Music Week concert. 8 P. M., Florentine Redon, mezzo-soprano. 9 P. M., Examiner concert. 10 P. M., popular concert. 11 P. M., Ambassador-Max Fischer's Coconut Grove Orchestra.

**KPO, San Francisco, 423m (710k), P. T.—** 12 noon, time signals from the Naval Conservatory; reading of the Scriptures. 1 P. M., Rudy Seiger's Fairmont Hotel Orchestra. 2:30 P. M., Mill Valley Junior Musical Club, directed by Mary Melrose Gardner. 3:30 P. M., tea dansant; E. Max Bradford's Versatile Band. 8 P. M., dance music by Art Weidner and his popular artists.

**WFAA, Dallas, Texas, 476m (630k), C. S. T.—** 12:30 P. M., address, Jack Lockett, blind assistant business manager of Dallas Painters' and Paperhangers' Union. 8:30 P. M., varied program by talent from East Texas State Teachers' College, Commerce. 11 P. M., music of the Adolphus Hotel Orchestra, Lawrence Morrell directing.

**KGO, Oakland, Cal., 312m (960k), P. T.—** 12:30 P. M., New York Stock Exchange and U. S. Weather Bureau reports. 4 P. M., Concert Orchestra of the St. Francis Hotel, San Francisco, Fermin Cardona conducting. 8 P. M., chorus of First Presbyterian Church, Berkeley, and soloists. 10 P. M., St. Francis Hotel Dance Orchestra, San Francisco, Henry Halstead, leader.

**WGY, Schenectady, N. Y., 380m (790k), E. S. T.—** 9:30 P. M., dance music by Ramano's Orchestra, New Kenmore Hotel, Albany, N. Y.

**WEAF, New York, 492m (610k), E. S. T.—** 4 P. M., dance program by the Carolinians Orchestra; Ruth M. Donaldson, soprano. 7:30 P. M., bedtime story by the G. R. Kinney Shoe Company; dance program by Eddie Elkins Orchestra; Bess Barkley, contralto; Francis Moore, pianist; Philip Steele, baritone; Dettbarn and Howard, banjo and Hawaiian guitar players; Mary Burns, soprano; Vincent Lopez and his orchestra direct from the Hotel Pennsylvania.

**WOO, Philadelphia, 509m (590k), E. S. T.—** 11 A. M., grand organ. 11:30 A. M., United States weather forecast. 12 noon, luncheon music by the Tea Room Orchestra. 12:55 P. M., United States Naval Observatory time signal. 4:45 P. M., grand organ and trumpets. 5 P. M., sports results and police reports. 10:55 P. M., United States Naval Observatory time signal. 11:02 P. M., United States weather forecast.

**CKAC, Montreal, 425m (700k), E. S. T.—** 7 P. M., kiddies' stories in French and English. 7:30 P. M., Mount Royal Hotel concert orchestra. 8:30 P. M., special entertainment. 10:30 P. M., Joseph C. Smith and Mount Royal Hotel dance orchestra.

**WIP, Philadelphia, 509m (590k), E. S. T.—** 1 P. M., organ recital. 1:30 P. M., official weather forecast. 3 P. M., "Bigger Houses or Better Homes," talk by Mrs. Ellis A. Schnabel. 3:15 P. M., recital by Peerless Male Quartet. 6 P. M., official weather forecast and final baseball scores. 6:05 P. M., dinner dance music by Harold Leonard's Red Jackets. 6:45 P. M., U. S. Dept. of Agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call. 8 P. M., "A Night in a Broadcasting Station," presented by Station WIP at Metropolitan Opera House. All the regular features from Station WIP's main studio and remote control stations will broadcast before the public.

**KSD, St. Louis, 546m (550k), C. S. T.—** 8 P. M., Missouri Theatre orchestra concert, specialties broadcast direct from theatre.

**WLW, Cincinnati, 309m (970k), E. S. T.—** 10:30 A. M., weather forecast and business reports. 1:30 P. M., market reports.

**KDKA, Pittsburgh, 326m (920k), E. S. T.—** 12:30 P. M., concert by Daugherty's Orch. 2:30 P. M., baseball scores, inning by inning. 5 P. M., baseball scores. 5:30 P. M., dinner concert by Westinghouse band. 6 P. M., baseball scores. Concert continued. 6:30 P. M., "Little Boy Blue, Come Blow Your Horn." 6:45 P. M., "Last Minute Helps to Teachers," Carman Carver Johnson. 7 P. M., baseball scores. 7:05 P. M., "The Constitution," winning declamation of the Western Pennsylvania Oratorical Contest. 7:15 P. M., organ recital by Dr. Charles Heinrich. 8 P. M., concert by Westinghouse band.

**WBZ, Springfield, Mass., 337m (890k), E. S. T.—** 5:30 P. M., dance music by Leo Reisman and his orchestra. 6 P. M., results of Eastern, American and National league games. 6:30 P. M., bedtime story for kiddies. 6:40 P. M., concert by the Hotel Kimball Trio. 7 P. M., program from General Conference of the Methodist Episcopal Church. 9 P. M., results of Eastern, American and National league games. 9:55 P. M., Arlington time signals.

**KYW, Chicago, 536m (560k), C. S. T.—** 5:45 P. M., children's bedtime story. 6 P. M., dinner concert broadcast from Congress Hotel. 7 P. M., musical

program. 8 P. M., talk by Vivette Gorman. 9:10 P. M. to 12:30 A. M., late show.

**KGW, Portland, Ore., 492m (610k), P. T.—** 11:30 A. M., weather forecast. 3 P. M., special musical program. 3:30 P. M., children's program. 10 P. M., baseball scores, weather forecast and dance music by George Olsen's Metropolitan Orchestra (2 hours).

**WJZ, New York, 455m (660k), E. S. T.—** 3 P. M., Miriam Waller, soprano and pianist; Thomas Waller, baritone. 3:30 P. M., Chet Frost's Bostonians. 4 P. M., baseball scores every 15 minutes. 4:05 P. M., Hotel Belmont Stringed Ensemble. 5 P. M., Landau and his Harbor Inn Serenaders. 5:30 P. M., state and federal agricultural reports; farm and home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Evening Post news. 7 P. M., soccer football, by Dr. G. Randolph Manning. 7:10 P. M., Mary Ellis and Rudolf Friml, "Songs." 7:30 P. M., Harry Puck, original songs and tap dance, ukelele, piano and voice. 7:45 P. M., "Waldorf-Astoria Grill Orchestra." 8:45 P. M., "What Is Professional Radio?" by Dr. Alfred N. Goldsmith. 9 P. M., Alma Milstead, soprano; E. Boardman Sanchez, tenor. 9:20 P. M., Mary Heidkamp, pianist. 9:30 P. M., Beulah Ladon, violinist; Mabel K. Embrie, accompanist.

**WOC, Davenport, Ia., 484m (620k), C. S. T.—** 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 12 noon, chimes concert. 12:30 P. M., closing stocks and markets. 3:30 P. M., educational program. 6:30 P. M., Sandman's visit. 6:50 P. M., sport news and weather forecast. 9 P. M., orchestra program.

**KHJ, Los Angeles, Cal., 395m (760k), P. T.—** 12:30 P. M., Albert Broad, tenor, and Emma Wippert Ahlswede, pianist. 2:30 P. M., program by Barker Bros. 7 P. M., children's program; Jeanne De Bard, 5 years old, singer and pianist; bedtime story by Uncle John. 8 P. M., program, of Cauldron Club of Pasadena.

**WRC, Washington, 469m (640k), E. S. T.—** 5:15 P. M., instruction in international code. 6 P. M., children's hour by Peggy Albion. 7:45 P. M., Bible talk. 8 P. M., dance program by McWilliams' Orchestra. 8:45 P. M., talk by Hon. Curtis D. Wilbur, Secretary of the Navy. 9 P. M., song recital by Gretchen Hood, soprano. 9:15 P. M., concert by Navy Band. 9:55 P. M., time signals and weather forecasts. 10:15 P. M., concert by U. S. Navy Band.

**PWX, Havana, 400m (750k), E. S. T.—** 7:30 P. M., dancing audition at studio of Station PWX, by Professor Gumersindo Garcia.

**WWJ, Detroit, 517m (580k), E. S. T.—** 8 A. M., setting-up exercises. 9:30 A. M., "Tonight's Dinner" and a special talk by Woman's Editor. 9:45 A. M., Public Health Service bulletins and talks on subjects of general interest. 10:25 A. M., official weather forecast. 11:55 A. M., Arlington time. 3 P. M., Detroit News Orchestra. 3:30 P. M., weather forecast. 3:35 P. M., market reports and baseball scores. 5 P. M., baseball scores.

**WOR, Newark, N. J., 405m (740k), E. S. T.—** 6:15 P. M., Dr. Edward Stitt, associate superintendent of schools, N. Y. C. 6:25 P. M., "Music While You Dine," Paul Van Loan's Cinderella Orchestra. 7:20 P. M., resume of the day's sports. 8 P. M., instrumental brass quartette, Salvation Army National Staff Band. 8:15 P. M., Rudolph Friml, famous composer, in program of Bohemian music. 8:30 P. M., Geoffrey O'Hara, composer-baritone. 10 P. M., Bell Record Symphony Orchestra and artists.

**WAAM, Newark, N. J., 263m (1140k), E. S. T.—** 8:15 P. M., Marjorie Beyer and Spence Kohler, singing and playing. 8:30 P. M., Leo Friedman and Ray Klages, song writers. 8:45 P. M., Burton's Ambers Serenaders. 9:15 P. M., Jean Herbert's "Radio Reel." 9:30 P. M., Wells and Fain, harmony hounds. 9:45 P. M., Jean Herbert, singing.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.—** 6 P. M., speakers half hour. 6:30 P. M., dinner program by the Blackstonians. 9 P. M., program by Monday Musical Club.

**WHN, New York, 360m (830k), E. S. T.—** 7:30 P. M., Peter Wells and Sammy Fain, popular songs. 7:35 P. M., Al Reiser and His Dancing Carnival Orchestra. 8 P. M., Jimmy Flynn, tenor. 8:10 P. M., Robert King, singing. 8:20 P. M., Russ Dalzell, baritone. 8:35 P. M., Three Ormande Sisters. 8:45 P. M., Hatska Kuma, Japanese prima donna. 9:15 P. M., L. B. Curtis, tenor. 9:30 P. M., Ban Joe Wallace and Beaux Arts Grill Orchestra. 10 P. M., Fitzpatrick Bros., singing. 10:15 P. M., Bob Emmerich, piano selections. 10:30 P. M., Avy La Skere, double-voiced vocalist. 10:40 P. M., Marguerite Veloise, singing. 10:45 P. M., Jackie Harrell, singing. 10:50 P. M., Master John Frohman, singing. 10:55 P. M., O'Connor Sisters, singing. 11 P. M., Jimmy Clarke, piano selections. 11:05 P. M., Berte Gilbert, singer of Beaux Arts Review. 11:15 P. M., Florida Hutchison of Monte Carlo. 11:30 P. M., Rubey Cowan and His Entertainers.

**WNAC, Boston, 278m (1080k), E. S. T.—** 10:30 A. M.—WNAC women's club talks. 12:30 P. M., organ recital. 1:15 P. M., Shepard Colonial Orchestra. 4 P. M., tea dance. 6:30 P. M., WNAC dinner dance. 8 P. M., concert by Massachusetts Auto Operators. 9 P. M., dance music, State Ballroom Orchestra. 10 P. M., dance music, Copley Plaza Orchestra.

## Sunday, May 11

**KGW, Portland, Ore., 492m (610k), P. T.—** 6 P. M., church services, auspices Portland Council of Churches. 7 P. M., George Olsen's Orchestra in dinner program; baseball scores.

**KFIX, Independence, Mo., 240m (1250k), C. S. T.**—11 A. M., L. D. S. church services. 7:30 P. M., L. D. S. church program by Auditorium Orchestra.

**WOS, Jefferson City, Mo., 441m (680k), C. S. T.**—7:30 P. M., religious services of First Presbyterian Church; Mrs. Mary Armstrong, organist.

**WWJ, Detroit, 517m (580k), E. S. T.**—11 A. M., services at St. Paul's Episcopal Cathedral. 2 P. M., Detroit News Orchestra.

**KPO, San Francisco, 423m (710k), P. T.**—11 A. M., radio church services. Speaker will be Dr. Frank Boyel; soloist, Agusta Hayden, soprano. 8 P. M., talk on "Music Week," Chester Rosekrans. 8:30 P. M., concert by Rudy Seiger's Fairmont Hotel orchestra.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.**—9 A. M., radio chapel service, conducted by the Rev. R. R. Brown, pastor of the Omaha Gospel Tabernacle. 6 P. M., Bible study hour, personal direction of Mrs. Carl R. Gray. 9 P. M., musical chapel service by Kountze Memorial Lutheran Church.

**CKAC, Montreal, 425m (700k), E. S. T.**—4:30 P. M., vocal and instrumental concert.

**WIP, Philadelphia, 509m (590k), E. S. T.**—4:30 P. M., services conducted by Dr. W. B. Wilkinson. 7:30 P. M., evening service from Holy Trinity Church. 9:30 P. M., symphonic program by Ben Staud and his WIP Symphony orchestra.

**KFI, Los Angeles, 469m (640k), P. T.**—10 A. M., L. A. Church Federation service. 4 P. M., Vesper service. Concert by Sol Cohen. 6:45 P. M., string quartet and vocal quartet. 8 P. M., Ambassador Hotel concert. 9 P. M., Examiner concert. 10 P. M., Packard Six orchestra.

**KGO, Oakland, Calif., 312m (960k), P. T.**—3:30 P. M., concert by KGO Little Symphony orchestra and soloists.

**KYW, Chicago, 536m (560k), C. S. T.**—10 A. M., Central Church service from Orchestra Hall. Musical program. 2:30 P. M., studio chapel service. 6 P. M., preliminary service of Chicago Sunday Evening Club. 7 P. M., regular meeting Chicago Sunday Evening Club.

**WBAP, Fort Worth, Texas, 476m (620k), C. S. T.**—11 A. M., services of First Christian Church. 4 P. M., organ concert from Rialto Theatre. 5 P. M., concert by Bowie Quartet. 11 P. M. to 12 midnight, popular program by Crockett's Texans orchestra.

**WEAF, New York, 492m (610k), E. S. T.**—2:45 P. M., "Sunday Hymn Sing" auspices Greater New York Federation of Churches. 3:30 P. M., Interdenominational Services auspices Greater New York Federation of Churches. Music by Federation Mixed Quartet, Federation Radio Choir. Address by Dr. John McNeill, pastor Fort Washington Presbyterian Church. 7:20 P. M., program from Capitol Theatre, New York City. 9 P. M., program auspices Catholic Charities of the Archdiocese of N. Y. Organ solos by Maurice Garbrant; selections by St. Stephen's Roman Catholic Church Choristers; violin solos by Karl Klein; vocal solos by Everett Clark; address by His Eminence Patrick Cardinal Hayes.

**Monday, May 12**

**KGW, Portland, Ore., 492m (610k), P. T.**—11:30 A. M., weather forecast. 3:30 P. M., Liberty program. 7:30 P. M., baseball scores, weather

forecast and market reports. 8 P. M., concert by MacManus String Quartet. 9:30 P. M., program of old songs by Beaux Arts Society.

**WHAZ, Troy, N. Y., 380m (790k), E. S. T.**—9 P. M., concert by Russell Sage College Girls' Glee Club. 10 P. M., concert by Merrill Ham, blind pianist, orchestra and assisting artists. 12 midnight, transcontinental and international program by Rensselaer Polytechnic Students' Symphony Orchestra.

**WOS, Jefferson City, Mo., 441m (680k), C. S. T.**—8 P. M., musical program announced in advance.

**KFKK, Hastings, Neb., 286m (1050k), C. S. T.**—9:30 P. M., local programs and re-broadcasting from KDKA.

**KPO, San Francisco, 423m (710k), P. T.**—2:30 P. M., matinee of Russian music. Paul Alexandroff Grey, baritone; accompanied by Theodore J. Irwin; Mischa Lhevinne, pianist; Mr. Wesleder, violinist; Mrs. Pearl Hassock Whitcomb, soprano. 4:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories by "Big Brother" of KPO. 7 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 P. M., organ recital by Theodore J. Irwin. Mrs. Raymond Marshall, soprano. 9 P. M., program by San Francisco Conservatory of Music. 10 P. M., Max Bradford's Versatile band.

**WFAA, Dallas, Texas, 476m (660k), C. S. T.**—12:30 P. M., Dr. A. D. Laugenour, president Dallas Astronomical Society, on "The Moon and Things Mundane." 8:30 P. M., Sanger Bros.' Choral Club.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.**—6 P. M., program by members of the Bert Smith comedy players. 6:30 P. M., dinner program by Randall's Royal orchestra. 9 P. M., program by Oakland (Ia.) concert band.

**CKAC, Montreal, 425m (700k), E. S. T.**—1:45 P. M., Mount Royal Hotel concert orchestra. 4 P. M., weather, news, stocks. 4:30 P. M., Mount Royal Hotel dance orchestra.

**KFI, Los Angeles, 469m (640k), P. T.**—4:45 P. M., Evening Herald and Examiner news bulletins. 8 P. M., Evening Herald and Examiner concert. 10 P. M., Ambassador-Max Fisher's Coconut Grove orchestra.

**KGO, Oakland, Calif., 312m (960k), P. T.**—1:30 P. M., New York Stock Exchange and U. S. Weather Bureau reports. 3 P. M., musical program. Address on subject relative Parent-Teacher Association activities. 4 P. M., St. Francis Hotel dance orchestra. 6:45 P. M., stock exchange, weather reports, and news items. 8 P. M., educational program, with musical numbers.

**WAAW, Omaha, Neb., 360m (830k), C. S. T.**—7:30-9 P. M., Melody Jazz orchestra.

**WBAP, Fort Worth, Texas, 476m (670k), C. S. T.**—7:30 P. M., concert by Guy Pitner, pianist, and Brooks Morris, violinist. 9:30 P. M., concert by Valley View Barn Dance orchestra.

**WEAF, New York, 492m (610k), E. S. T.**—1 P. M., Joseph R. Ganci, pianist; Ernest Cutting and his James Boys' band; talk auspices American Olympic Committee. Women's program auspices of the Women's League of United Synagogue of America. 7:30 P. M., United Cigar Stores sport talk by Thornton Fisher; Harry Jentes, pianist; talk on "Motion Pictures for the Amateur" Charles G. Willoughby; George Hirose, baritone; Arline Thomas, dramatic soprano, accompanied

by Lucille Blake; Edna Stuyvesant Crowe, pianist; music by the A. and P. Gypsies.

**Tuesday, May 13**

**KGW, Portland, Ore., 492m (610k), P. T.**—11:30 A. M., weather forecast. 12:30 P. M., concert by Civic Music Club of Portland. 3:30 P. M., talk by Jeanette P. Cramer. 7:30 P. M., baseball scores; weather forecast; market reports. 7:45 P. M., talk for farmers.

**WOS, Jefferson City, Mo., 441m (680k), C. S. T.**—8 P. M., proceedings of "Annual Journalism Week," broadcast from Columbia, Mo.

**KPO, San Francisco, 423m (710k), P. T.**—2:30 P. M., matinee of Welch music. 4:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories. 6:30 P. M., "Cleveland Six" orchestra. 7 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 P. M., Elwood Hart, pianist. 10 P. M., E. Max Bradford's Versatile band.

**WFAA, Dallas, Texas, 476m (660k), C. S. T.**—12:30 P. M., address, DeWitt McMurray, in a melody of humor, pathos and wisdom. 8:30 P. M., Waxahachie Choral Club. 11 P. M., G. Haydn Jones, director, First Presbyterian Church choir. 12 P. M., operatic program by leading Dallas musicians.

**WOAW, Omaha, Neb., 526m (570k), C. S. T.**—6 P. M., speakers half hour. 6:30 P. M., dinner program by Ken Baker's Omahans. 9 P. M., program from vocal studio of Walter B. Graham. Miss Regina Franklin, accompanist.

**CKAC, Montreal, 425m (700k), E. S. T.**—4 P. M., weather, news, stocks, music. 7 P. M., kiddies' stories in French and English. 7:30 P. M., Rex Battle and his orchestra. 8:30 P. M., latest English popular numbers by White Star Dominion liner "Megantic" orchestra. 10:30 P. M., Joseph C. Smith and his orchestra.

**KFI, Los Angeles, 469m (640k), P. T.**—4:45 P. M., Evening Herald and Examiner news bulletins. 6:45 P. M., vocal concert. 8 P. M., Ambassador-Max Fisher's Coconut Grove orchestra. 9 P. M., Examiner concert. 10 P. M., Don Meany night.

**KGO, Oakland, Calif., 312m (960k), P. T.**—1:30 P. M., New York Stock Exchange and U. S. Weather Bureau reports. 4 P. M., concert orchestra of St. Francis Hotel. 6:45 P. M., stock exchange, weather reports, and news items. 8 P. M., Booth Tarkington's play, "Seventeen." Music by Arion Trio. 10 P. M. to 1 A. M., St. Francis Hotel dance orchestra.

**WAAW, Omaha, Neb., 360m (830k), C. S. T.**—8 P. M., Lutheran Church service.

**WBAP, Fort Worth, Texas, 476m (670k), C. S. T.**—7:30 P. M., concert by Leah and Rachael Parker. 9:30 P. M., concert by Fort Worth Trades Assembly. Orchestra and solo numbers.

**WEAF, New York, 492m (610k), E. S. T.**—11 A. M., Elsie S. Stewart, soprano, accompanied by Elizabeth Boyer; talk by Adele Woodard—Forecast of Motion Pictures; market and weather reports. 4:50 P. M., the Banjo Trio; Harriet Youngs, soprano, and Emelie Goetze, pianist. 7:30-10 P. M., United Cigar Stores sport talk by Thornton Fisher; Fannie Todd, soprano; The Mazola Orchestra; Brooklyn Daily Eagle Weekly Digest by H. V. Kaltenborn; Bernice Kazounoff, pianist.

**Readers Ask for Literature**

The following readers request that manufacturers, dealers and jobbers send them literature:

- Kenneth P. Herrick, 2063 Vermont Ave., Toledo, Ohio.
- Edw. H. Schlader, 7754 So. Union Ave., Chicago, Ill.
- John Barry, Box 225, Cape Porpoise, Me.
- Chas. F. Routh, 78 Ferguson Ave., Niagara Falls, Ontario, Canada.
- Charles F. Wide, 5502 Sierra Vista avenue, S. Hollywood, Cal., exporter.
- Douglas R. R. Coates, Station CKY, Sherbrooke St., Winnipeg, Can.
- J. B. Keene, 1162 Ingersoll St., Winnipeg, Can.

**New Corporations**

- Greater Atlantic and Pacific Radio Corp., New York City, radio sets, \$20,000; M. Schreiber, S. Wieser, C. Mahler. (Attorney, H. Nathan, 299 Broadway.)
- Argus Radio Corp., New York City, radios, 25 shares preferred stock, \$100 each; 100 common, no par value; M. Wallace, P. Segaller, M. R. Ziegler. (Attorney, D. Bayton, 299 Broadway.)
- Bonded Radio Products, manufacture, \$100,000; Norman F. Ralph, John C. Hooker, Joseph R. Unger, New York City. (Corporation Guarantee and Title Co.)
- Franzblau Radio Corp., New York City, \$10,000; J. and A. and M. Franzblau. (Attorney, J. S. Spiro, 1 Union Square.)
- Carl Brand, Bronx, New York City, radio sets,

\$20,000; S. and A. and C. Brand. (Attorney, E. A. Eichner, 1545 Broadway.)

Radiola Sales Co., New York City, 100 shares common stock, no par value; H. Wisan, J. R. Newton. (Attorney, W. A. Sands, Jr., 61 Broadway.)

**DELAWARE CHARTERS**

Empire Electric Products Corp., Dover, radio sets, \$100,000. (U. S. Corporation Co.)  
Radio Security & Finance Corp., \$50,000; Clarence S. Ashley, Harlan E. Cecil, John J. Coyle, New York City. (Capital Trust Co. of Delaware.)

**Did You Get Anniversary Number?**

Anniversary Number of Radio World, dated April 5. A few copies left. Larger than usual. Special features. 15 cents per copy. Mailed on receipt of price, or start your subscription with that number. Radio World, \$6.00 per year (52 nos.), \$3.00 six months, \$1.50 three months. Radio World, 1493 Broadway, N. Y. C.

A New List Showing Total Vote Cast Will Be Published in an Early Issue

**Who Is America's Most Popular Radio Entertainer?**

Everybody is interested in this query: Who is America's most popular radio entertainer? You have your favorite. Who is she or he? Let us know your choice whether a comedian, an opera singer, a jazz band, or a story-teller.

RADIO WORLD wants to be able to tell the world the name of the entertainer who stands highest in the regard of listeners-in.

Use the accompanying blank and mail to Broadcasting Manager, RADIO WORLD  
Cut off. **FIN** out. **Mail** today.

**BROADCASTING MANAGER, RADIO WORLD,**  
1493 Broadway, New York City.

Dear Sir:

My favorite entertainer is.....Station.....

Name.....  
Street Address.....  
City and State.....

A complete list of broadcasting stations was published in the April 5 issue of RADIO WORLD. Another list, corrected to the new date of publication, will be printed in an early issue.

# Wired Wireless Used in Making the Mines Safe

WASHINGTON.

**E**XPERIMENTS with line radio and carrier currents in mines indicate that this method is feasible for two-way conversations between miners below the surface and the mouths of mines, both for every-day use and in emergencies, according to the Bureau of Mines.

The difficult problem of communicating with underground workers and surface stations of mines, especially after severe disturbances or accidents have taken place, will be solved, according to Assistant Engineer J. J. Jakosky, of the Interior Department, by the development of the "wired wireless" telephone, utilizing existing "carriers," such as trolley wires, mine tracks, water and compressed air pipes, and cables. In tests, which he supervised at the Pittsburgh experimental mine, no difficulty was experienced on the surface in receiving the messages from a transmitting set on a mine locomotive, 400 feet below the surface, as long as the apparatus was near any metallic carriers.

Efforts to utilize radio in mines in the interests of humanity have been many and experiments have been undertaken in Illinois, Pennsylvania, Arizona, Utah, Idaho, Colorado, Michigan, Wyoming, Kentucky, New York, and Cincinnati, as well as in Great Britain, France, and Germany. Other countries are taking it up.

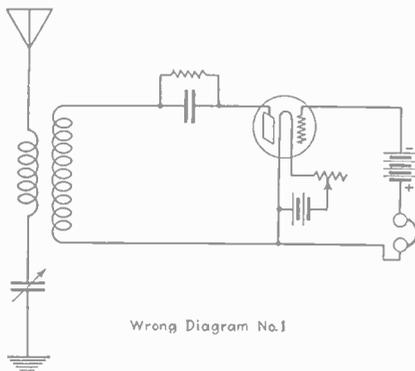
## Photos Via Ether Called Success

**T**HE French government announces that the teleautograph which it set up between Strasbourg and Paris and Lyons and Paris for the wire transmission of photographs or drawings is working excellently, giving complete satisfaction to all those who use it.

Communication by this same Belin system of teleautography has been set up also between Lyons and Strasbourg direct.

## WHAT'S WRONG HERE?

**E**VERY radio amateur and fan is clever. But how clever? That's what we are going to find out. The wiring in the ac-



Wrong Diagram No. 1

companying diagram is wrong. If you have built a set yourself, you will find the mistake if you follow the diagram closely, taking note of all the connections. If you find what you think is the error, write us about it. Refer to Wrong Diagram Number 1. Send your answers to Wrong Diagram Editor, RADIO WORLD, 1493 Broadway, New York City. The names of those sending in the right answer will be published in RADIO WORLD.

Wrong Diagram No. 2 will be published next week.

# Experience

**R**EADERS tell of their dramatic or humorous adventures in radio. Address Experience Editor, RADIO WORLD, 1493 Broadway, New York City.

EDITOR, RADIO WORLD:

**I**HAD just purchased a new radio set and was well pleased with the results. Every evening I would tune in the Kansas City Star at 6 o'clock and listen to the interesting talks. Everything went well until one evening a most distracting noise set in and drowned out everything. It was a noise like a carpet sweeper and a high frequency buzzer combined. I couldn't tune it out. I got it all over the scale and on the horn it nearly drove us out of the house. I thought I knew who was responsible for that noise—a fellow down the street who had just finished a 5-watt CW transmitter, and he is somewhat out of tune. I was almost certain it was he because he was the only fellow in town who had a transmitter.

Well, I thought I'd wait a few days before challenging him to a duel, because maybe he would get it tuned properly in that time.

The noise persisted and finally died out in about 20 minutes. But the talk I had been listening to was over.

Everything went lovely until the next evening at the same time. That infernal noise again. I shut off the set. I jumped to the phone and called Mr. Amateur up. His sister answered the phone. I asked her if John was monkeying with his sending set. She informed me that he was not, that he was eating supper. I thanked her and flopped over in a chair.

The next day I scoured the neighborhood for carpet sweepers and faulty transmission lines. Results, none found. There was no arc light in town, so I knew better than to look for one.

A week passed and I had not found the trouble. I began to cast suspicious glances at my set. I tore it apart, without finding anything unusual.

One evening a few days later as I sat

listening for the noise to begin, I asked my wife if she knew of any violet rays or vibrators or motors or anything besides electric lights that were run by electricity in the neighborhood.

She thought a minute, and tore out of the door. She was on her way to a neighbor's house. A few minutes later the noise started. Then she came back, her face beaming.

"That's it," she piped. "Know what it is?"

I admitted I didn't. Then she proceeded to tell me that our neighbor had a vibrator to massage his arms for rheumatism. Every evening when he came home from work he took a massage.

EARL A. WRIGHT.

Cole Camp, Mo.

## Enterprising Girl Is Radio Editor

**A** GIRL as radio editor of a newspaper? Yes, indeed! And here she is—Sarah Strier, of the Brooklyn (N. Y.) Times.

She knows radio from the very ground up to the aerial. Also she can build a set. And besides, she writes weighty (though not dull) editorials, on radio, of course. All in all, she finds her work fascinating, and her co-workers find her the same way.

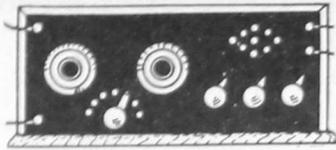


SARAH STRIER

# Stations the Country Over

(Paste this on the inside of your cabinet lid for reference)

Station	Wave Length	Frequency Kcys	On the air during the week, except Sunday.
WDAP Chicago, Ill.....	360	830	7:00-2:00 Tuesday to Saturday.
KSD St. Louis, Mo.....	546	550	9:00-11:00 Except Wednesday.
WGY Schenectady, N. Y.	380	790	7:50-11:00 Mon. Tues.-Thurs.-Fri.
WHB Kansas City, Mo..	411	730	9:00-11:00 Tuesday-Thursday.
WOC Davenport, Iowa..	484	620	8:00-9:30 Monday-Thursday-Friday.
			11:00-12M. Wednesday.
			10:30-11:00 Saturday.
WLW Cincinnati, O.....	309	970	8:00-10:00 Monday-Wednesday.
			10:00-12M. Tuesday-Thursday.
WSB Atlanta, Ga.....	429	700	9:00-1:00 Monday-Tuesday - Wednesday - Thursday - Friday-Saturday.
WOAW Omaha, Neb.....	526	570	10:00-11:00 Every night but Wednesday
PWX Havana, Cuba....	400	750	9:00-11:30 Wednesday-Saturday.
WBAP Ft. Worth, Tex....	476	630	10:30-11:30 Monday to Friday.
KFI Los Angeles, Calif.	469	640	9:45-2:00 Every night.
KHJ Los Angeles, Calif.	395	760	9:45-1:00 Every night.
KYW Chicago, Ill.....	345	870	8:00-10:00 Tuesday to Saturday..
WFAA Dallas, Tex.....	476	630	9:30-10:30 Except Wednesday.
WJAX Cleveland, O.....	390	770	7:00-9:30 Tuesday and Thursday.
WMC Memphis, Tenn....	500	600	9:00-10:30 Monday - Thursday - Saturday.
			9:00-1:00 Tuesday-Thursday.
WCX Detroit, Mich.....	517	580	8:30-10:00 Monday - Wednesday - Thursday-Friday.
			8:30-1:00 Tuesday.



# The Radio Primer

Information and Instruction for the Beginner

## The Mysteries of the Tube, Transformer and Jack Explained

By Herman Bernard

THE vacuum tube used in radio sets is known as a three-element tube. These consist of A plus and A minus, the common filament element, the two other elements being the grid and the plate.

The filament is nearly always referred to as A plus and A minus, the connection of which through the socket posts (which are marked with the symbols F+ and F-) constitute an electrical circuit. It is just the same as if you took these positive and negative leads and short circuited them. If a six-volt storage A battery were used there would be sparks and considerable heat. In the tube, however, the filament is lighted by the heat generated by the combination of the plus and minus.

F+ and F- are the symbols found usually on the socket, the A+ and the A- being used to designate exactly the same things either on diagrams or on batteries. The letters are sometimes omitted on the diagrams on the theory that the reader will fully comprehend that the inverted U in the tube represents the filament.

The grid is represented by a zig-zag symbol, nearly the same symbol used for representing a resistance. The plate is symbolized by a parallelogram.

Some engineers in designing a circuit use the socket to represent the plate, grid and filament connections. When you are facing the socket, with the filament connections on the front, the grid is at the left, on the back of the socket, and the plate is on the right of the back.

By consulting the diagram published here-with (Fig. 1), you will see that the conventional tube symbol verifies the position of the filament, grid and plate as explained, and that the tube socket and diagram of the tube itself are merely different ways of showing the same thing.

If these facts are understood the connections for installing radio-frequency or audio-frequency transformers, to get greater distance and more volume, become very simple.

The primary of any transformer, either audio or radio, has two connections, P and B. These correspond with the output of the preceding tube, in the case of audio-frequency transformers. Where radio-frequency transformers are used, the P and B are connected to the antenna and ground, when the RF transformer is used before the first tube as the antenna tuning circuit. When the RF transformer is used between tubes, it is connected in the same way as an AF transformer.

Take for example the connection of an AF transformer to a detected circuit. The P and B represent the connections that go to the plate of the detector tube and the plus of the B battery. These are the very same connections that are made when the Jack is plugged into the detector circuit, or, if no Jack is used, when the phone tips are inserted in the individual binding posts.

In other words, so that you may hear a program, you have to connect the cords of your headphones to the receiving set. The connection to the audio frequency

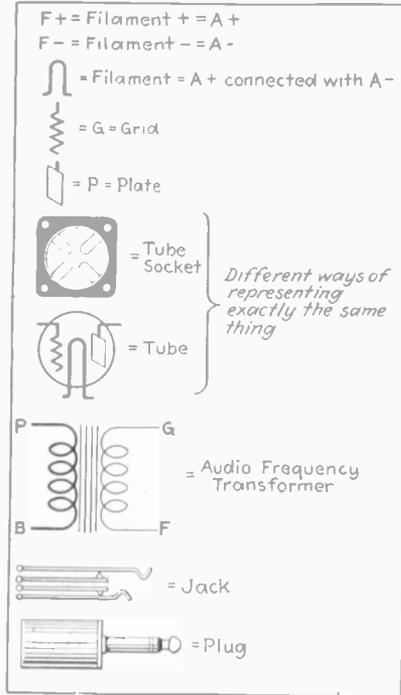


FIG. 1—Symbols of tube, transformer, jack and plug.

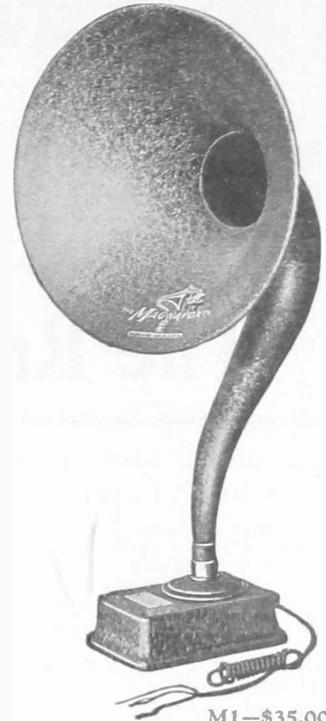
primary, instead of being made to the headphones, is made to the P and B of the transformer.

The secondary of the transformer is represented by a coil, the terminals of which are G and F. G stands for grid, and F for the filament minus. You may have noticed that the grid of the first tube already is connected, and you may wonder if the G of the transformer is another connection to that grid. It is not. The G of the transformer is connected to the grid of the second tube, because for each additional transformer another tube is required.

The F minus, however, is a common lead, the same A minus that supplies the detector tube and any preceding or succeeding tube or tubes. The only difference in the F minus is that a separate rheostat should be used to light the detector tube, and another rheostat to light all the amplifying tubes.

The symbol for the complete transformer shows a coil of wire on the left, facing a coil of wire on the right, with perpendicular parallel lines separating them. The coils of wire are known as inductances. The parallel lines represent the core of the transformer. The induction amplifies the signal that the detector tube delivers to it. The core is almost always made of soft iron, although sometimes air is used. Its function is to widen the effective band of frequencies on which the transformer may function. This is a purpose similar to that of broadening the wavelength of a coupling coil.

MAGNAVOX  
Radio Products



M1—\$35.00

Magnavox Reproducer for dry battery receiving sets

THIS new semi-dynamic Magnavox Reproducer is particularly recommended for dry battery receiving sets where low voltage and low current consumption tubes are used. The M1 is supreme in its class.

Magnavox Reproducers

- R2 with 18-inch curvex horn \$50.00
- R3 with 14-inch curvex horn \$35.00
- M1 with 14-in. curvex horn. Requires no battery for the field \$35.00

Magnavox Combination Sets

- A1 R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 1 stage of amplification \$59.00
- A2-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 2 stages of amplification \$85.00

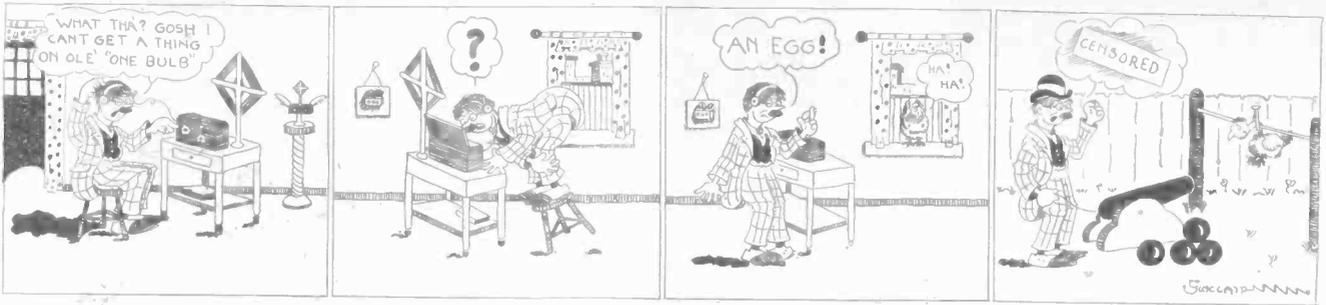
Magnavox Power Amplifiers

- A1—new 1 stage Power Amplifier \$27.50
- AC-2 C—2 stage Power Amplifier \$50.00
- AC 3 C—3 stage Power Amplifier \$60.00

Magnavox products can be had at Registered Magnavox Dealers everywhere. Write for new 32-page catalogue.

The Magnavox Company  
Oakland, California

New York Office: 350 West 31st Street  
Canadian Distributors:  
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# The Radio Trade

## Financial Statement of Federal T. & T.

FROM time to time we receive inquiries from our subscribers regarding the financial strength behind the performance guarantee offered by the Federal Telephone & Telegraph Company on all their radio receiving sets and radio parts.

As of January 1, 1924, Federal's financial statement reads:

FEDERAL TELEPHONE & TELEGRAPH CO., BUFFALO, N. Y.	
Assets	
Cash .....	\$ 129,191.01
Notes & Accounts Receivable .....	1,080,681.95
Real Estate & Inventory .....	2,548,155.05
Investments, Stocks & Bonds .....	7,969,774.30
Franchises, Patents, etc. ....	505,494.98
Repayments .....	106,555.33
	\$12,339,852.62
Liabilities	
Stock Issued .....	\$ 7,282,750.00
Notes & Accounts Payable .....	3,458,464.58
Accrued Accounts .....	44,400.68
Funded Debt .....	379,100.00
Surplus .....	1,175,137.36
	\$12,339,852.62

## Myers Won His Success In Uphill Fight

ELMAN B. MYERS, inventor of the Myers radio Vacuum Tube, assisted in designing the first audion tubes that made possible the present method of radio reception.

In 1908 Mr. Myers built the first Poulsen arc in America. In 1912, at a cost of \$35,000, he built and operated at Albany, N. Y., the first high-power broadcasting station.

When the German liner "Imperator" was on her maiden voyage Mr. Myers held wireless conversation with the operator.

While working on the further development of the vacuum tube Mr. Myers reasoned that an incandescent lamp, invented solely for illuminating purposes, could not be successfully used for radio reception because of the internal interference and large capacity for noise. Mr. Myers abandoned the incandescent lamp type because of an accident that befell him while working in his laboratory. At 4:30 one morning he was left in darkness due to the blowing of an electrical fuse plug. While replacing the fuse plug Mr. Myers suddenly realized that fuse plug construction was the very solution to the elimination of bunched leads and the great handicap of electrical interference, tube hisses and noises of all kinds. So he immediately abandoned the incandescent lamp type in favor of the fuse plug construction type.

Mr. Myers had to design new machinery, which took two years. During this period his family suffered privations.

In Mr. Myers' opinion the greatest future development in radio will be the achievement of some radio amateur. He believes that radio is even yet in its infancy.

## 105 Cards With Radex

THE dropping out of a type in our issue of May 3 made it seem that only 10 index cards were given with the useful radio log card index put out by S. T. Aston & Son. The fact is that 100 cards go with the set, but for good measure extra cards are included, bringing the number well over 100.

## Chas. Freshman Predicts Revolutions in Radio

CHARLES FRESHMAN, president of Charles Freshman Co., Inc., speaking at a trade meeting in New York City, predicted a revolution in radio entertainment. He said:

"My idea of the ideal radio act of the future will be an evening entertainment starting at about 8:30 and concluding about 10:30, which is only two hours, but during this period the entire program will be provided by one artist whose name will be featured by the station at which he broadcasts. This artist will have his own act, his own presentation of music, humor, pathos, instruction and inspiration worked out carefully to create the utmost realism among those who are listening to him."

He predicted also that "the ideal set" of the near future will have resistance or impedance coupled AF, with crystal detector. This followed his remark that "there is a new development pending in the radio art."

## A Handy Radio Log

THE "Radio-Log," a handy reference and data book which just fills the bill for many broadcast listeners is being put on the market by The Radio-Log Company, 3 West 29th St., New York City. Starting at the front cover, it devotes eight full pages to the log. The pages are ruled off and lined in a convenient manner, providing six columns for the date, call letters, city and dial setting for each broadcasting station.

A complete list of broadcasting stations, arranged by states, enables the radio fan to locate and log the stations with ease. One of the best features of the log is its Radio Pointer Department, which tells in simple language how to take care of your radio set.

## Tradiograms

THE BRISTOL COMPANY, Waterbury, Conn., manufacturer of recording instruments and distributor of radio equipment, has leased 2,740 square feet in the Larkin Building, 3617 South Ashland avenue, Chicago, to take care of the Middle West business, which has grown to large volume. Most of this area will be devoted to repairing and recalibrating Bristol instruments sold and used in Chicago territory, but some will be used for stocking made-up instruments for quick deliveries and various lines of radio merchandise. The present salesroom and offices of the Bristol Company will be maintained in the Monadnock Building.

ONE Chicago manufacturer of loud-speaker horns estimates the 1924 production will be 600,000 horns and 90,000 complete loud speakers. It is reported that there is an increasing demand for loud speakers colored to harmonize with color schemes or rooms.

M. MICHAELS, formerly connected with the Talking Machine World, is now radio engineer with Emerson Radio Corporation, 309 Sixth avenue, New York City.

A NEW radio manufacturing concern known as the Herzog Radio Corporation has been formed with C. P. Hugo Schoellkopf, president, and Special Deputy Police Commissioner John A. Harris, vice-president. A factory has been established in Brooklyn to manufacture a six-tube, non-radiating, untuned radio frequency receiver in a console type phonograph cabinet. The set employs a crystal detector and loop antenna.

THE New York office of The Maxnavox Company, of Oakland, California, is now at 350 West Thirty-first street. These quarters are much larger, enabling the company to render even more efficient service to the metropolitan area. W. R. Davis, Sales Manager, is in charge of the New York office.

## L. J. Selznick Enters Radio Business

LEWIS J. SELZNICK and Arthur S. Friend, pioneer film men, are now located at No. 345 Madison Avenue, New York City, where they are in the radio business.

The new company will be known as the General American Radio Manufacturing Corporation. Mr. Selznick is president and Mr. Friend is treasurer. David O. Selznick is one of the vice-presidents, and other associates are A. R. Claus, vice-president, and A. L. Grill, secretary. The board of directors includes R. D. Hickok and S. and F. Fox, all of Cleveland.

Mr. Selznick, up to the time the Selznick Film Company went into bankruptcy, was president.

Mr. Friend was formerly president of Distinctive Pictures Corporation, having resigned this office only a few months ago.

Mr. Selznick and Mr. Friend are the first big motion picture men to enter the radio field.

## DEALERS, HELP YOUR BROTHERS IN THE FIELD!

HAVE you tried any particular good advertising scheme of late? If so, why not drop a line to the Trade Editor of RADIO WORLD and tell him about it, so he can pass on the good word to other dealers throughout the country?

If you have any pictures of window or counter display, send them along with your name and address and a few words of explanation, and you may be surprised to find them reproduced later in RADIO WORLD.

Address, Trade Editor, RADIO WORLD, 1493 Broadway, New York City.

## Samson Tube Stands Test Very Well

THE Samson tube, UV201A type, functions as a detector or an amplifier.

In the detector circuit a tube submitted by the Phoenix Tube Company, 25 East Twenty-sixth street, performed well, with a plate voltage of 45. Distance was satisfactorily accomplished. A six-volt storage A battery was used, with a 1.1 voltage drop in the rheostat.

In the audio-frequency circuit, under a plate voltage of 90, fine volume was achieved in two stages, with no tube noises. The two tubes were controlled by one rheostat.

These tubes also produced good volume in the AF circuit when only 45 plate voltage was applied. Also, the tubes did not become too critical when put under a voltage test of 106, although the 90 volts produced such good results that any higher voltage than 90 was not advisable.

## Coming Events

MAY 12-17—First Rhode Island Radio Show, State Armory, Providence.

MAY 27—Inter-American Electrical Communication Conference, Mexico City.

MAY 26-31—National Outdoor Sports Exposition, Grand Central Palace, New York City. One feature will be a radio division.

AUG. 16 TO 21—Radio Exposition, San Francisco, conducted by Pacific Radio Trade Assn.

SEPT. 22 TO 28—First Annual International Radio Show, Madison Square Garden, New York City.

# First Full Text of Crosley Decision

**T**HE full text of the opinion by Judge Smith Hickenlooper, in Federal Court, Cincinnati, dismissing the complaint of Jerome H. Remick & Co., music publishers, against broadcasting station WLW, is published herewith. As told in RADIO WORLD, issue of May 3, the publishers sued for alleged infringement of copyright, because a song, published by them, was broadcast without payment of royalty. The victory of WLW (operated by the Crosley Radio Corporation, Cincinnati) has been hailed as of tremendous importance to the radio industry and public. The company formerly was part of the American Automobile Accessories Company.

## The Opinion in Full

This matter comes up upon motion to dismiss the bill of complaint. The defendant is a manufacturer of radio receiving sets and parts, and as a part of its business maintains and operates a radio broadcasting station for the transmission through space of intelligence and music.

Such radio broadcasting station is undoubtedly maintained for the purpose of stimulating interest on the part of the public, for the purpose of advertising the receiving sets and instruments of defendant's manufacture, and for the purpose of affording the owners of crystal and other sets of lesser range and power the opportunity of converting radio frequency waves produced by high-tension alternating electric current into audio frequency of direct current, and thus producing a reproduction of the sounds broadcast, by means of earphones or loud speakers, in the home. It must be kept in mind, also, that broadcasting stations are maintained throughout the United States by those who have no direct connection with the manufacture or sale of radio equipment, solely for the advertising value of such broadcasting stations. A notable example of this is the station maintained by the United States Playing Card Company in Cincinnati; other examples are those stations maintained by newspapers at various points.

## Cites Other Cases

The complainant is the owner of the copyrighted song entitled "Dreamy Melody." On or about October 22, 1923, between the hours of 9 and 10 P. M., the defendant is alleged to have caused the rendition of this composition, "Dreamy Melody," by means of singing and an orchestra, to be broadcast from its station in the city of Cincinnati. This act is alleged to have been a public performance for profit of the copyrighted musical composition, and the present action is to enjoin similar broadcasting of complainant's composition and to recover damages and profits under the Copyright Act.

As was said in the case of White-Smith Music Co. v. Apollo Co., 209 U. S. 1, 15: "In the last analysis this case turns upon the construction of a statute, for it is perfectly well-settled that the protection given to copyrights in this country is wholly statutory." By the Act of March 4, 1909, c. 320, § 1, 35 Stat. 1075 (U. S. Comp. Stat. §9517), any person entitled thereto, upon compliance with the provisions of the Copyright Act, is given the exclusive right "to perform the copyright work publicly for profit if it be a musical composition and for the purpose of public performance for profit." By the same act, as amended August 24, 1912 (37 Stat. 489; U. S. Comp. Stat. (1918) §9546), an infringer is made liable to an injunction restraining such infringement, and to pay to the copyright proprietor such damages as the copyright proprietor may have suffered due to infringement, as well as all the profits which the infringer shall have made from such infringement, or, we assume in the absence of proof of profits or damages, arbitrary fixed damages, but not less than \$250. This minimum is claimed in the instant case.

## Defines Plaintiff's Rights

Plaintiff's rights being entirely dependent upon the statute, and the recovery sought being an arbitrary penal sum not in any sense dependent upon proof of actual profits or damages to an equivalent amount, we are inclined to the opinion that the statute should be subjected to strict construction, notwithstanding that such arbitrary minimum recovery "shall not be regarded as a penalty." As to the earlier form of this section, wherein it was provided, as in the present form, that the infringer should pay one dollar for every infringing copy of the works enumerated in section 5 of the act, it has been repeatedly held by the Supreme Court that litigants are bound by the language of the act, and that the infringing copies must be found in the actual possession of the defendant. See *Bolles v. Outing Co.*, 175 U. S. 262, 268; approved, *Werckmeister v. American Tobacco Co.*, 207 U. S. 375, 382. This is but the equivalent of holding that, in order to justify recovery, the complainant must bring himself within the natural, and not a forced, construction of the act, and within the clear intent and purpose of the Copyright Act.

## How to Determine Intent

The same rule of construction is illustrated by the case of *White-Smith Co. v. Apollo Co.*, supra, in which it was held that a musical composition on piano roll was not a copy of a musical composition within the protection of the Copyright Act. While these statutes "should be given a fair and reasonable construction," with a view to pro-

## Dill Bill Backers Telegraph Senators In Record Volume

WASHINGTON.

**H**EARINGS on the Dill bill, amending the copyright law so that music publishers, authors and composers would not be able to charge a royalty to broadcasters, have been completed by the Senate Committee on Patents. The hearings lasted two weeks. Decision is awaited.

Senator Dill said he introduced the bill solely in the interest of the millions of radio listeners in this country, whom he felt sure wanted radio to be kept free from all kinds of taxation.

As evidence of this he referred to the unprecedented mass of letters and telegrams sent in by citizens favoring the passage of his bill.

He said:

"I am frank to say that I have been amazed at the proportions this thing has reached. I am informed by the Telegraph Company that more telegrams have come in here on this bill than have ever come on any bill, except that for the declaration of war in 1917. The people who have receiving sets want free radio programs continued."

texting the author in such manner that he may have the benefit of the property right conferred for a limited term of years (*American Tobacco Co. v. Werckmeister*, 207 U. S. 284, 291), it is clear that this protection should not be extended beyond the express language of the statute, nor a property right created which was clearly not within the mind of Congress when the act was passed.

And in determining this intent of Congress, as expressed in the act, it is the duty of the courts to read the enactment "according to the natural import of the words used"; and if the language used by Congress is unambiguous, there is no room for construction, nor can we speculate as to what Congress might have done, or might have intended, had the matter been specifically brought to its attention. As expressed by Mr. Sutherland in his work on Statutory Construction, "There can be no intent of a statute not expressed in its words." 2 Lewis' Sutherland Statutory Construction (2nd ed.), 745. See also *Treat v. White*, 181 U. S. 264, 267; *Dewey v. United States*, 178 U. S. 510, 521.

## Courts are Cautious

The unwillingness of the courts to extend the language of the act beyond its express provisions is further exemplified by the case of *Thompson v. Hubbard*, 131 U. S. 123, 151, in which case it is held that the failure to print notice of copyright prevents any right of action for infringement from coming into existence, even as against him who originally secured such copyright. Here the court says: "This right of action, as well as the copyright itself, is wholly statutory, and the means of securing any right of action in Hubbard are only those prescribed by Congress."

The question therefore resolves itself into a determination whether the broadcasting of a rendition of complainant's musical composition was a performance of it publicly for profit in the common, ordinary and reasonable acceptance of this phrase. We are familiar with the holding of the United States District Court for the District of New Jersey in the case of *M. Witmark & Sons v. L. Bamberger & Co.*, 291 Fed. 776, in which the court concluded that the rendition of a song for broadcasting purposes was a public performance of the musical composition, and that such performance was unquestionably for profit within the decision of *Herbert v. Shanley Co.*, 242 U. S. 591. While, considered seriatim, this opinion might be said to arrive at a logical conclusion, viz., that the singing was a performance, that it was public in the sense that those could listen who cared to and were equipped with receiving instruments, and that it was for profit because of its advertising value, and therefore every element of a public performance for profit had been disclosed, we have been unable to bring ourselves to the conclusion that such broadcasting was within what Congress had in mind when using the language "perform publicly for profit."

## Cites the Dictionary

*Funk & Wagnalls Standard Dictionary* (1911) defines a performance: "(2) Specifically, a representation on the stage or before an audience or spectators; an exhibition of feats; any entertainment at a place of amusement; as two performances daily." While not found in other standard dictionaries, it is just this idea which we think Congress had in mind in passing the enactment in

## R. C. A. Wins Patent Suit in Highest Court

WASHINGTON.

**T**HE Supreme Court refused to review a suit against the Radio Corporation of America and the De Forest Radio Telephone and Telegraph Company, brought by Alfred Emerson and others, involving whether the American Telephone and Telegraph Company could, by contract, authorize the Radio Corporation to sue for infringement of patents on inventions relating to radio.

The American Telephone and Telegraph Company, as owners of the De Forest patent on audion tubes, entered into a license agreement with the Radio Corporation of America, under which the latter contended, with success in lower courts, that its rights were sufficiently broad to warrant it in bringing suits for infringements.

Emerson and others, including the La-France Import and Sales Company, contended in the lower courts that as the agreement did not authorize the Radio Corporation to manufacture the patented articles, it did not have the right to sue for infringement.

The lower Federal courts in New York City took a contrary view, and awarded judgment in favor of the Radio Corporation.

Radio fans had followed the case with great interest.

its present form. In order to constitute a public performance in the sense in which we think Congress intended the words, it is absolutely essential that there be an assemblage of persons—an audience congregated for the purpose of hearing that which transpires at the place of amusement. This is in no wise contrary to the case of *Herbert v. Shanley Co.* (supra), for there was there such audience congregated in a popular restaurant in New York, and it could make little difference whether the patrons paid for their entertainment in the form of an admission fee, a cover charge, or as an addition to the menu prices. Nor is our opinion in conflict with the case of *Kalem Co. v. Harper Bros.*, 222 U. S. 55, which simply holds that a copyrighted work may be infringed by dramatization through the use of moving pictures. We simply feel that the rendition of a copyrighted piece of music in the studio of a broadcasting station, where the public are not admitted and cannot come, but where the sound waves are converted into radio frequency waves and thus transmitted over thousands of miles of space, to be at last reconverted into sound waves in the homes of the owners of receiving sets, is no more a public performance in the studio, within the intent of Congress, than the perforated music roll which enables the reproduction of copyrighted music, by one without musical education, is a copy of such music.

## It is a Private Performance

A private performance for profit is not within the act, nor is a public performance not for profit. All contemplate an audience which may hear the rendition itself through the transmission of sound waves, and not merely a reproduction of the sound by means of mechanical device and electro-magnetic waves in ether. A parody upon the singing of a copyrighted song has been held not to infringe the copyright (*Bloom & Hamlin v. Nixon*, 125 Fed. 977). And by much the same token we think that the rendition of a song in the seclusion of a broadcasting studio and its subsequent reproduction by a radio receiving set, where the auditors are scattered over a vast territory, is not a public performance within the intent of Congress in enacting the Copyright Law. The auditor "listening in" at Indianapolis, Cleveland or Chicago, would be surprised to learn that he had, that evening, attended a public performance in Cincinnati. This illustrates the incongruity of such a holding. "The purpose of the amendment evidently was to put musical compositions on the footing of dramatic compositions so as to prohibit their public performance." *White-Smith Music Co. v. Apollo Co.* (supra). And the close association in the Act of provisions relating to the drama and to public performance of musical compositions would seem to demonstrate conclusively that Congress had in mind a place of such performance to which the public was admitted for the entertainment there of the senses; a congregating together for this purpose and the payment, in one way or another, of compensation for the entertainment provided. This would seem to be the whole extent of the exclusive privilege or property right granted, and the effect of the act should not be extended beyond such clear and unambiguous import of the words used.

The motion to dismiss must, therefore, in our opinion, be granted.

SMITH HICKENLOOPER, Judge.

# Broadcasting Increases Receipts at Two Chicago Shows

CHICAGO—When attendance at "Abie's Irish Rose" began to fall off here at matinees, Frank Gazzalo, manager of the Studebaker, where it is playing, put the entire show on the air. The response was immediate. Before noon the next day a line stretched from the Studebaker box office for 200 feet into the street.

Earl Carroll broadcast one of his shows here and the big box office receipts grew bigger.

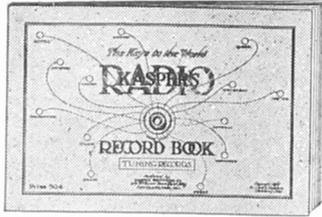
### New Novel Act

"By Radio" is the name of a new act in which Fein & Tennyson will be seen

shortly, and is from the pen of William K. Wells.

**WHAT IS AN INVENTION?**  
 How to obtain a patent and other valuable information is supplied in our FREE Booklet. Write for a copy today.  
**MANUFACTURERS PATENT CO., Inc.**  
 70 WALL STREET, NEW YORK

**DEFORREST'S WIRELESS IN THE HOME**—Mailed for 15c postpaid. The Columbia Print, 1493 Broadway, New York City.



## "SPIKE"

THE STATIONS YOU RECEIVE  
 IN A  
**KASPER RADIO RECORD BOOK**

Then you will know where to set the Dials, Switches and Rheostats to bring them back. This book is endorsed by thousands of professional Radio Fans in all parts of the country because it covers everything on the panel. (Copyrighted.) Can be used with any set. Contains up-to-date list of 1,100 Broadcasting Stations, Time of Principal Cities and instructions How to Record Stations. 24 Pages, Valuable Information. No set complete without one. 50c per Copy, Postpaid. For your convenience send a one dollar bill for two copies, otherwise send Money Order for one or more. No checks nor stamps.

We also furnish Kasper's "APPLAUSE CARDS," printed on stamped Postal Cards—25 mailed anywhere upon receipt of 50c.

### KASPER BROTHERS COMPANY

317 Lorain Street Bank Building

Cleveland, Ohio, U. S. A.

## VACUUM TUBES REPAIRED

WD-11, WD-12, UV-201A, UV-199 **\$2.50** and others for

Quick service. All tubes repaired by us guaranteed to work as good as new. Send your dead tubes. All you pay is \$2.50 plus postage to postman.

**THOMAS BROWN CO.**

511-519 ORANGE ST NEWARK, N. J.

## AN EXPERT SAYS: RESISTANCE COUPLED AMPLIFICATION



G. Y. Allen, of the Westinghouse Electric and Manufacturing Co., writes in the May RADIO BROADCAST:

"True, great improvements have been made, but the fact remains that fundamentally the transformer cannot ever give distortionless amplification. For those who demand quality at all cost, the resistance coupled amplifier is unquestionably the most desirable.

"Cost is no longer a draw-back! Daven specialized resistance coupled amplifier parts have cut the price to less than \$3.00 per stage!"



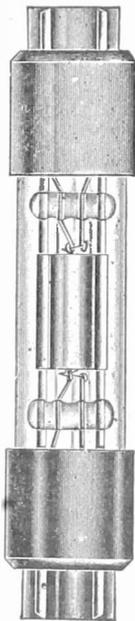
Special inexpensive resistors from 5,000 ohms up. Our RESISTO-COUPLER, to hold resistor, leak and condenser ..... \$1.50

Ask your dealer—or let us help you out.

### DAVEN RADIO COMPANY

"Resistor Specialists"

10-12 CAMPBELL STREET, NEWARK, N. J.



Actual Size

## PRACTICALLY UNBREAKABLE!

Their unique design makes Myers Tubes the sturdiest on the market. The elimination of bunched leads and the smaller capacity enables them to give your set a proper chance to produce real results.

## Myers Tubes

(practically unbreakable) give you distance with clarity. They add 50% to the efficiency of any set by reducing interference.

See that you get the New Improved Myers. Others are not guaranteed. Insist on Myers at your dealers—otherwise send purchase price and be supplied postpaid.

Two types: Dry Battery and Universal (for storage battery). Write for free circuit diagrams.

**\$5** EACH, complete with clips ready to mount on your set; no sockets or other equipment necessary.

**F. B. Myers Co. Ltd.**  
*Radio Vacuum Tubes*

240 CRAIG STREET, W. MONTREAL, CANADA

**10c** Brings You Our New 48-Page Radio Catalog. Includes thousands of unequalled Radio Bargains

Send a dime for your copy, today!



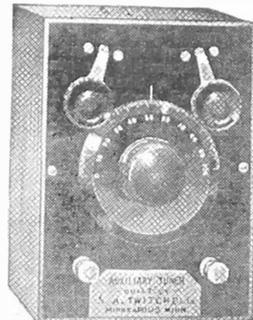
**CHICAGO SALVAGE STOCK STORE**  
 Dept. W6, 509 South State Street  
 CHICAGO

## TWITCHELL AUXILIARY TUNER

Patents Pending. Name Registered.

### CUTS OUT ALL INTERFERENCE

A TWITCHELL AUXILIARY TUNER connected to any make of tube receiving set will positively cut out any local broadcasting or code stations so you may tune in all long distance stations any time regardless of local conditions.



THE TWITCHELL AUXILIARY TUNER never decreases but in many cases increases volume from distant stations.

TWITCHELL TUNERS, however near large broadcasting stations, enable their owners to easily and completely cut out the local station and bring in distant stations at any time on a loud speaker.

This instrument will also enable you to bring in programs sent out on longer waves than you can tune in without it, thus bringing all the broadcasting stations within the wave length range of the many sets of limited range now in use.

Complete instrument, walnut cabinet..... \$15.00  
 All parts, unassembled, and diagram..... 9.00  
 Diagram of Twitchell Tuner..... .50

A New and Wonderfully Efficient Coil for the Reinartz circuit for those who want the best. Price \$4.00, or with blueprint for either one or three tubes, \$4.50.

This circuit brings in both coasts loud and clear and is the most successful Reinartz modification yet produced.

All goods prepaid. These instruments are easy to build, easy to operate. Everything clearly shown.

1930 WESTERN AVENUE

**S. A. TWITCHELL**

MINNEAPOLIS, MINN.

**COAST TO COAST**  
 Every Turn **STAR** No  
*A Tap* **COIL** *Soldering*  
**SEND FOR LITERATURE**  
**STAR RADIO PRODUCTS CO.**  
 711 S. DEARBORN ST. CHICAGO, ILL.

# Wine Permissible at Radio Communion?

R. Q. MERRICK, chief of the prohibition bureau in New York City, said there was nothing to prevent men and women of every religion holding communion services at home by radio and using sacramental wine to make the thing more realistic. The Rev. A. Edwin Keigwin, pastor of the West End Presbyterian Church, started the back-to-the-church movement by authorizing his

flock to tune in and have their wine right at home.

One woman wrote that it had been thirty years since she had been to Holy Communion, but that after "listening-in," she would partake of the Lord's Supper.

Dr. Keigwin said he did not receive one letter of criticism. He said he would broadcast the Holy Communion service again.

**TUBES REPAIRED \$2.50**

**GUARANTEED**

ALL STANDARD TYPES 24 hour service  
 WD-11-WD-12 Mail Orders  
 UV-199-UV-200-UV-201A Sent Parcel  
 Post C.O.D.

**RADIO TUBE SERVICE CO.**

239 Centre Street, near Grand New York City

### RADECO SAFETY FUSES

Complete Tube Protection  
 Slips on the Filament Terminal  
 "A fuse that doesn't go on the terminal doesn't protect the set."

50 CENTS EACH

Write for Booklet

**RADIO EQUIPMENT COMPANY**  
 20 STUART ST. BOSTON, MASS.

For Maximum Amplification Without  
 Distortion and Tube Noises

use the well known  
**Como Duplex Transformers**

Push-Pull

Send for literature.

**COMO APPARATUS COMPANY**  
 446 Tremont St. Boston, Mass.

### "GET HASTINGS, NEB."

We Will Mail Free the Hook-up of  
**"Killoch Kilo Koupler"**

Most Wonderful Coil

A CIRCUIT WELL WORTH WHILE!  
 Build a two-tube set, one stage of R.F.,  
 using neutrodyns principle, and detector  
 Full details in Radio World, issue April  
 12. Send 15 cents.

**David Killoch Company**

57 Murray Street New York

### YOUR "NEUT" WON'T "NEUT"?

If you used good parts, do like scores of others—use same panel, same layout, change around a little wire, take out a few parts, add some—and have a Kladag Coast-to-Coast on Loud Speaker set.  
 We'll send, prepaid, everything you need—extra part, 22 feet real gold sheathed wire, blue print and four pages of "dope" for \$5.00. If you want further details send 10c. for data sheet.

**KLADAG RADIO LABORATORIES**  
 KLINE BLDG., KENT, OHIO

## GUARANTEED "B" BATTERIES

Large	45	Volt	\$3.60
"	22½	"	1.80
Medium	45	"	2.75
"	22½	"	1.60
Small	22½	"	1.00

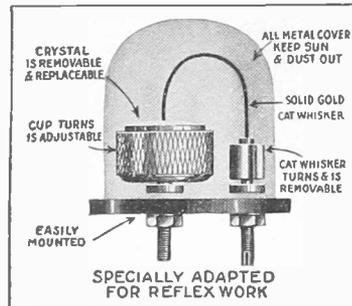
All Variable—POSTAGE FREE  
 anywhere in U. S.

Satisfaction Absolutely Guaranteed

**S. & H. BATTERY SUPPLY CO.**  
 41 Nevins Street Brooklyn, N. Y.

**CRAM'S RADIO MAP**—Printed in color. The best map on the market. Mailed on receipt of 35c. The Columbia Print, 1493 Broadway, New York City.

"KILLS REFLEX TROUBLES"



### "LINCOLN" DETECTOR

Operating tremendous sensation. Enclosed, fixed, adjustable. New. Brings in distant stations loud and clear. You need it. Ask your dealer or write—today. Price only \$2.00. Absolutely guaranteed for one year.

Jobbers, Dealers: Wire or write. Mention this ad.

**LINCOLN MFG. COMPANY**  
 Dept. S-5 Los Angeles, Calif.

# A \$200,000.00 COMPANY STANDS SQUARELY BACK OF EVERY PHONE

WEIGHS ONLY 8oz

**TOWER'S Scientific**  
 Perfect Tone Makes

\$2.95

Plus a few cents postage

## SEND NO MONEY

Order by mail if your dealer cannot supply you and we will ship immediately. Written 5-day money back Guarantee with each set.

Our next year's production schedule of two million phones UNDOUBTEDLY places us as the

WORLD'S LARGEST HEADSET MAKERS

**THE TOWER MFG. CO.**

D98 BROOKLINE AVE. BOSTON MASS.

## WORLD'S GREATEST HEADSET VALUE

Five-Day Money-Back Guarantee If Not Fully Satisfied. We Guarantee the Scientific to be

1. One of the finest phones on the market regardless of price.
2. The most comfortable—weight only 8 oz.
3. Perfect tone mates.
4. Made of standard double pole construction (no single pole nonsense to save expense.)
5. Made of the best materials money can buy. Powerful magnets, genuine tinsel cords, aluminum cases.
6. Manufactured under ideal working conditions.

# Hoover to Call New Parley as Stations Crowd Air

Wavelengths Duplicated by Too Many Stations, He Seeks to Avoid Confusion

By Carl H. Butman

WASHINGTON.

SECRETARY OF COMMERCE HOOVER will call a general radio conference in Washington soon after the adjournment of Congress to get co-operation of all radio interests in solving the problem of distributing wavelengths, he announced.

A conference will be called whether or not new legislation is enacted. In general, it will be similar to the conferences held here in the spring of 1922 and 1923 at which representatives of the manufacturers, broadcasters, engineers, amateur commercial operators and broadcast listeners aided in drawing up voluntary regulations under which radio has been supervised ever since. In this manner the distribution of wavelengths for broadcasting and other interests was assigned.

Indications are that broadcasting stations, now numbering 577, will continue to increase, although wavelengths available for this use are practically exhausted and stations are doubling up. Time allotments in congested sections are becoming difficult to make, especially in New York,

Hoover said conditions and interference are getting worse.



## FOR DISTANCE OUR THREE SUNBEAM LEADERS

- The Air-King, 3 Circuit Tuner.....\$16.50
  - The Wonderful Ambassador, 1 tube....\$16.50
  - The Famous Journal, 1 Knob Set.....\$12.50
- All three assembled and wired in handsome Cabinet. Each of these sets has brought in WOC from New York City.

SUNBEAM ELECTRIC CO.  
71 Third Avenue New York City

## SAVE 25% WHOLESALE TO THE PUBLIC

### ALLOW US TO QUOTE ON ANY PARTS OR STANDARD SETS

Mail Order Department

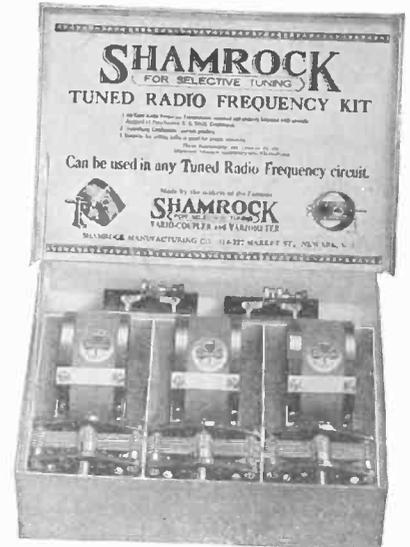
**BROOKLYN RADIO SERVICE CO.**

577 Myrtle Avenue  
BROOKLYN, N. Y.

Send 5c. in Stamps for Catalogue

**NEUTRODYNE**  
FADA, complete .....\$69.45  
BUILT FOR YOU FREE  
FADA Sealed Kit, 5-tube....\$54.75  
PERFECTION RADIO CORP.  
119 W. 23rd Street 59 Cortlandt Street  
118 Nassau Street 78 Cortlandt Street  
NEW YORK CITY

**RADIO MAP FREE**  
Big Broadcasting Station List.  
Also Radio Bargain List. Just Out.  
**The RADIO-SHACK**  
America's Largest Radio Dealers  
Dept. RW-510  
55 Vesey St. New York



"37 distant stations heard in one night"

"IF ANYTHING is good, I sure believe in praising it—and I can't begin to praise your Shamrock Kit enough. I threw out a high priced regenerative set because of poor selectivity. . . .  
"I am enclosing original list taken Thursday, February 28th, 1924. At all times at least two Chicago stations were on.  
"The month of February I received 377 stations outside Chicago. Of course, these are not all different. So far in March (17 days) have received 390 stations."

A few of the stations tuned in :  
WOR, Newark; WSB, Atlanta; WEAP, Ft. Worth; CKCK, Regina, Can.; KHJ, Los Angeles; KGW, Portland; WKAQ, San Juan, P. R.

The above is only one of hundreds of letters that we have received, praising the wonderful efficiency of the Shamrock Kit. Inspect this kit at your dealer's today. If he hasn't it in stock, send us the coupon below.

Kit, list price \$20

SHAMROCK MANUFACTURING CO.  
Dept. 8, Market Street, Newark, N. J.

## SHAMROCK FOR SELECTIVE TUNING

SHAMROCK MFG. CO.,  
Dept. 8, Market St., Newark, N. J.  
Gentlemen:—Please send me detailed information on the Shamrock Kit.  
Name .....  
Address .....  
Dealer's Name .....

**RECEPTRAD KIT SH-8-1** Consists of  
3 R. F. Trans.—5000-25000 meters—R. F. 1716  
1 Audio Trans. 1st Stage ATX  
1 Audio Trans. 2nd Stage AT3  
2 1 Mfd. By Pass Cond. C 1000  
1 Tuned Filter Coupler Type H34  
1 Oscillo-Coupler Type SW21  
1 Super-Heterodyne Manual **\$55**

**SUPER-HETERODYNE KIT**  
1 R. R. KIT  
3 10 ohm Kolsner  
2 6 ohm Kolsner  
2 D. Jacks  
1 S. Jack  
1 Stop Switch  
2 Cond., 23 plate  
1 .002  
1 .006  
3 .00025  
47 Length Bus Bar  
1 Base Board, 34"  
1 Panel  
1 4 1/2 "C" Bat.  
7 Binding Posts  
1 Binding Post Strip  
3 Grid Leak. 1 meg-ohm  
2 Dials, 4"  
8 Nald Sockets  
1 400 ohm Kolsner  
16 Wood Screws, No. 5, 1"—Sockets  
19 Wood Screws, No. 5, 1/2"—Trans.  
6 Wood Screws—Panel  
2 Brass Angles—Cond.  
2 Mechanical Verniers **\$90**

**5 TUBE NEUTRODYNE SET BUILT FOR YOU FREE**  
using Fada Licensed Neuroformers consisting of:  
1 7x26 Baseboard 1 Fada Power Rheostat  
3 Fada Neuroformers 1 Fada Six-ohm Rheostat  
2 Fada Neurodons  
2 Single Bakelite Sockets  
1 Triple Bakelite Socket  
1 High Ratio Thordarson Tr.  
1 Low Ratio Thordarson Tr.  
1 Single Jack  
1 Double Jack  
1 Cut-out Switch  
Bus wire, spaghetti, screws  
1 Mahogany Finish Cabinet **\$60**

**D. C. Charger with meter \$10**

Charge your own batteries

SEND FOR PRICE LIST.

**E. SINGER COMPANY**  
187 GREENWICH STREET, NEW YORK CITY

# COSMOPOLITAN PHUSIFORMER

The Missing Link in Radio

15-17 WEST 18th ST. NEW YORK

## S. HAMMER RADIO CO.

303-A Atkins Ave. Brooklyn, N. Y.

### GENUINE 4 TUBE SUPERDYNE

More powerful than a 6-tube naval receiver. Easy to build. Complete parts:

- |  |                                  |
|--|----------------------------------|
| 1 Superdyne Coupler                        | 4 Switch Stops                   |
| 2 25-Plate Variable Condensers, .0005 mfd. | 4 V. T. Sockets                  |
| 1 Variable Grid-Leak                       | 2 Acme Audio Transformers        |
| 1 .00025 mfd. Fixed Condenser              | 1 Single Circuit Jack            |
| 3 Rheostats                                | 1 Double Circuit Jack            |
| 2 Switch Levers                            | 7"x24" Panel                     |
| 4 Switch Points                            | Bus Wires, Spaghetti and Diagram |

Special ..... \$27.50

Orders Over \$5.00 Shipped Prepaid  
Money Orders or C. D. D.—Write for Price List  
Not Insured Unless Insurance Charges Included

"Can't Lose 'Em"

# BINDING POST



Bakelite, Engraved, Nickel-Plated, With Lugs, \$1.20 Postpaid

PANELS CUT,  
DRILLED, ENGRAVED

Cortlandt Panel Engraving Co.  
81 Cortlandt Street New York City

# Daylight Saving Causes Confusion to Fans

THE hour of daylight saved in New York April 27 meant a dead loss to the radio fans of Washington.

At 7:20 p. m. New York time, WCAP in Washington was connected by land wire with WEAf to share in broadcast-

ing a special musical program arranged by S. R. Rothafel at the Capitol Theatre. Where the hands of the fan's clock had been pushed ahead the radio listeners were waiting, but in Washington and other places where daylight saving is regarded as an eccentricity the music took the ether an hour ahead of expectations and went over unattended receivers.

When the Washingtonians tuned in at 7:20, their own time, they found the program almost ended and heard a gentle voice make an intermission in order to explain daylight saving.

No matter what dwellers in other parts of the East may think of daylight saving time, they will have to observe it.

### THE ROBERTS "B" BATTERY

Everlasting, rechargeable "B" BATTERY made of Edison elements. Best for Neutrodyne, Superdyne, Superheterodyne and all high powered circuits. Superior in quality, durability, workmanship and finish. Satisfaction absolutely guaranteed. Insist on your dealer showing you ROBERTS "B" BATTERY before buying any other.

Dealers write for terms.

ROBERTS "B" BATTERY COMPANY  
1120 Myrtle Avenue Brooklyn, N. Y.

Build a BETTER  
**ULTRADYNE**  
from  
"L-RA-CO"  
Parts



The IMPROVED  
**SUPER-HETERODYNE**  
Kit Only \$25.00

OR

### COMPLETE PARTS FOR 8 TUBE ULTRADYNE

- |  |  |
|--|--|
| 1 L-RA-CO special parts kit consisting of:             | 1 Cutler Hammer Battery Switch                                     |
| 1 LC1 Tuning Inductance                                | 3 Double Closed Bakelite Jacks                                     |
| 1 LC2 Oscillator Coupler                               | 1 Single Open Bakelite Jack  |
| 1 LC3 R. F. Filter Coupler                             | 8 General Radio Sockets  |
| 3 LC5 Intermediate R. F. Transformers                  | 2 General Radio Audio Transformers                                 |
| 1 7" x 30" x 3/16" Formica Panel, drilled and engraved | 3 .001 Dubilier Mica Condensers                                    |
| 1 Baseboard  | 2 .006 Dubilier Mica Condensers                                    |
| 1 .001 43 Plate Condenser                              | 1 .00025 Dubilier Condenser with 4 Meg Leak                        |
| 1 .0005 23 Plate Condenser                             | 5 Extra Heavy Bakelite Eby Binding Posts                           |
| 2 4" Vernier Dials                                     | 35 Ft. Heavy Square Bus Wire                                       |
| 1 7 ohm General Radio Rheostat                         | 1 Frost Radio Plug   |
| 1 20 ohm General Radio Rheostat                        | Necessary screws   |
| 1 400 ohm General Radio Potentiometer                  | Blue prints of wiring diagrams, panel layout and baseboard layout. |

\$82.22

THE ONLY SUMMER SET—ORDER NOW

1614 Tenth St.—LEWIS RADIO CO.—Wichita Falls, Texas

## SAMSON

201 A TYPE 1/4 AMP. 5V

# TUBES

\$3.50

Ideal for DX Reception  
Good volume, and clear-  
ness. Tested and ap-  
proved by high au-  
thorities. Mail Orders  
Promptly Attend-  
ed To With Money  
Back Guarantee.

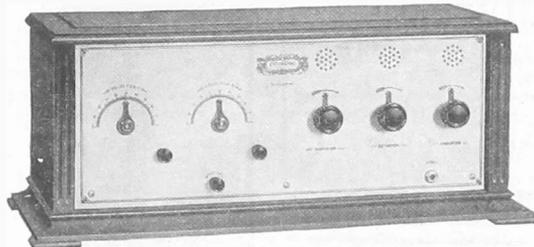
### PHOENIX TUBE CO.

23 East 26th Street  
New York City  
Dept. W.

Dealers and Agents trade solicited.

# Announcing the New Goldcrest Clearodyne Models

Model 70



\$75.00

Cleartone engineers have perfected a new circuit, embodying the desirable features of SELECTIVITY, LOG-ABILITY, EXTREMELY SIMPLE TUNING AND PERFECT CONTROL in the new GOLDCREST CLEAR-O-DYNE FOUR TUBE MODELS.

The beautifully etched, gold-finished panels and the distinctive, solid mahogany cabinets combine to give you a receiving set which is a valuable addition to any home, and a source of amusement, education and great pleasure for the entire family.

Long distance records are being established with these new models on which testimonials are being received daily. We want you to see and be convinced. Write today for free illustrated circulars, showing all of our beautiful cabinet models.

DEALERS and JOBBERS: Look at the prices below—then at the distinctive design and characteristics above. Write for our interesting proposition—a business builder.

- |                |         |                             |         |
|----------------|---------|-----------------------------|---------|
| Model 60 ..... | \$60.00 | Clear-O-Dyne Model 70 ..... | \$75.00 |
| Model 61 ..... | 75.00   | Clear-O-Dyne Model 71 ..... | 90.00   |
| Model 62 ..... | 120.00  | Clear-O-Dyne Model 72 ..... | 135.00  |

The Cleartone Radio Co., Cincinnati, Ohio

M. B. SLEEPER RADIO DESIGN & CONSTRUCTION FOR EXPERIMENTERS, REFLEX & RADIO FREQUENCY, \$1.00. The Columbia Print, 1493 Broadway, N. Y. C.



# Join the A. B. C. NOW

Membership Is Free and All Fans Are Asked to Enroll—  
List of Members Will Be Published Soon

THE American Broadcast Club, formed under the auspices of RADIO WORLD, has for its object the promotion of the welfare of the broadcast listeners of the United States and Canada.



Membership is open to all interested in radio in any way, either as broadcast listener, dealer, manufacturer, wholesaler or jobber.

A novel feature of the A. B. C. is that membership entails no duties or obligations whatever. There are no dues. All you have to do is enroll. That will signify your interest in radio and make you one of the thousands unselfishly united in a common interest.

All you have to do to join is to send in your name and address on a postcard or in

a letter. A list of names of members will be published soon.  
Address, A. B. C. Editor, RADIO WORLD, 1493 Broadway, New York City.

**SOMETHING NEW**  
Green Radio Applause Cards  
Bound in Book Form

With stubs on which records of Radio Artist are kept after card is detached and sent, a Log Book and Card combined, all for 1c. 25 CARDS 25c.  
Sent by mail postpaid. No stamps. Address  
**PLATTSBURGH RADIO SUPPLY CO.**  
PLATTSBURGH, N. Y.  
DEALERS: Write for sample and terms.

For best reception you need  
**The Goodman**

The niftiest short wave tuner on the market. Great for present broadcasts, local and DX. Used in all parts of the world. Certificates of merit from testing laboratories. Pamphlet on request.  
L. W. GOODMAN, Mfr., Drexel Hill, Pa.

# ACME

for amplification

**GUARANTEED**

**8-Tube Super-Heterodyne**  
Assembled in beautiful Mahogany Cabinet. List price \$225.00. Net **\$98.00**

**5-Tube Neutrodyne**  
Completely assembled in attractive Mahogany Cabinet. List price \$125.00. Net **\$69.00**

**M. H. Kleinfeld & Co.**  
Dept. P  
161 West 64th Street, New York City

**AT LAST!**  
**THE MOST PERFECT ONE-TUBE REFLEX**  
ever built

**CLARITY—VOLUME DISTANCE**  
**Inductance or Capacity Tuning or Both**

**NO** Howling, Hissing, Squealing, Distortion, Rheostat, Potentiometer, Storage Battery (optional), Taps, Switches, or dead-end-losses.

Uses standard parts. A few cents changes your old reflex into this new one. Complete hook-up and all information.

**PRICE ONE DOLLAR**

Checks and stamps not accepted. Curiosity seekers please remit one dollar for complete information.

**MYERS RADIO SHOP**  
P. O. Box 694  
Oakland California

**Record Your Radio Stations**  
On RADEX Log Cards to Match Your Set

Copyright 1934 by S. T. Aston & Son

Telephone FRANKLIN 2119

100 Cards, Mahogany Finish or Oak Cabinet, and Index Dividers. Complete, \$3.00. A Useful Accessory to Any Set. Give Name of Your Set or Sketch of Dial Arrangement. Sent Postpaid on Receipt of Cash or Money Order.

**S. T. ASTON & SON**  
114 WORTH STREET NEW YORK CITY

**Nath. Baldwin Phones with**

**SHELTONE LOUD SPEAKER**

COMPLETE \$10.00

Postpaid. Use your headset for 2 purposes—Exceptional combination value—Every pair of phones tested—Guaranteed to give results.

**WALTER SCOTT**  
1157 B. Broad St.  
Newark, N. J.

**WE REPAIR RADIO TUBES**

WD-11 ... \$3.00	DV-2 ... \$3.00
WD-12 ... 3.00	DV-6A ... 3.00
UV-200 ... 2.75	UV-199 ... 3.00
UV-201 ... 3.80	C-299 ... 3.00
C-300 ... 2.75	UV-201A ... 3.00
C-301 ... 3.00	C-301A ... 3.00
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6 v. Plain Detector ... 2.75	
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Mall orders solicited and promptly attended to.  
Dealers and agents write for special discounts.

**H. & H. RADIO CO.**  
P. O. Box 22-B  
Clinton-Hill Station Newark, N. J.

*Thank Your Favorite Station—Request Your Favorite Selection*

THANK YOU  
Printed FREE On Every Card

YOUR OWN Name and Address  
"Thank You" cards are all the rage. Stations appreciate them. A pleasure to use. Be in style. Low introductory price. 100—\$1.50; 200—\$2.50; 300—\$3.50 POSTPAID. Order today.

**MONEY REFUNDED if Not Satisfied**  
Good quality cards—High grade printing. You will be DELIGHTED. Send order with check or money order today—NOW!  
**RADIO PRINTERS, Dept. 76 Mendota, Illinois**

**378 DX STATIONS**

DX fans, if you have not logged 300 stations in past six months you need a Kennedy Three Circuit Tuner. The Kennedy Tuner logged 378 stations from September 15th to March 15th, including 210, London; SWA Cardiff, Wales; CFCN Calgary, Alberta, Canada; KGW Portland, Oregon; KFI and KJL Los Angeles, California; KPO San Francisco, California; KGO and KLX Oakland, California.

**KENNEDY TUNER TAKES THE PLACE OF**

3 Honeycomb Coils at \$1.40	\$4.20
1 Honeycomb Coil Mounting	5.00
1 23-plate Vernier Condenser	5.00
	\$14.20

Kennedy Tuner, including Globe Trotter Diagram **\$5.00**

**T. J. KENNEDY**  
RADIO GLOBE TROTTER  
470 W. 159TH STREET NEW YORK, N. Y.  
GUARANTEE: If not satisfied after 30 days will cheerfully return your money.

**NEUTRODYNE PARTS**

Full set of Neutroformers, Variable Condensers with dials, and Neutrodons **\$13.25**

Above parts are Genuine Workrite Neutroformers, made under Hazelitine patents.

Complete parts for three tube Neutrodyne tuner, (tubes, batteries, or phones not included), drilled panel, tube sockets, rheostats, fixed condensers, lock, binding posts, wire, spaghetti, and blue prints.

**COMPLETE FOR \$19.95**  
Postage additional on all shipments.

Ask for our price list.  
Send no money—Order by postcard—Pay the Postman.

**RADIO SURPLUS STORES**  
HELENA, MONTANA

**FILL OUT AND MAIL NOW**  
SUBSCRIPTION BLANK

# RADIO WORLD

RADIO WORLD 1493 Broadway, New York City

Please send me RADIO WORLD for..... months, for which please find enclosed \$.....

**SUBSCRIPTION RATES:**

Single Copy	.....\$ .15
Three Months	..... 1.50
Six Months	..... 3.00
One Year, 12 Issues	..... 6.00

Add \$1.00 a Year for Foreign Postage; 50c for Canadian Postage.

# Fused Quartz Carries Light, Is New Discovery

LYNN, MASS.

**L**IGHT can be made to turn corners and even travel in a complete circle, Edward R. Berry, assistant director of the Thomson Research Laboratory of the General Electric Company, has found. He gave a demonstration.

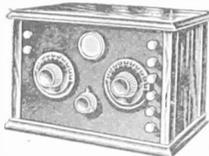
Fused clear quartz has the property of carrying rays of either light or heat, and Mr. Berry has succeeded after ten years of work in producing it.

He showed how a solid bar of this substance, bent in a semi-circle, carried light through it just as though the quartz were a hose and the light water. Possibilities for use in radio are under consideration. Heat worked the same way.

Applied at one end of the tube it could be felt at the other, but quartz in between was cool.

### "BROADCAST" IS THE WORD

**S**OME persons use the word "broadcasted." There is no such word. Say "broadcast" for all tenses, viz: "His speech was broadcast," "He will broadcast his speech," etc.



## RADIO

Long Distance 1-Tube Regenerative Set Complete. Nothing Else to Buy

Only **\$21.98**

Produces astonishing results. Receives music, speeches, information, instruction, sermons, etc. free to you, from broadcasting stations hundreds of miles away, often more than 1000. Easy to operate. Cheap means of entertainment ever devised. No knowledge of radio required. No electricity except supplied by dry battery included in offer. Satisfaction Guaranteed. Big bargain: only \$21.98 for all parts and accessories complete. No money in advance. SEND FOR RADIO BOOK FREE. Cramped full of offers of radio sets and parts at cut prices. Radio will help you. Investigate. Write today. Liberty M. O. House, Dept. 6818, 106 Liberty St., N.Y.C.

## RITTER COLLAPSIBLE

**\$6.50**  
List

**Cut Out That Static**

Leading Radio Engineers are unanimous in saying that only 2% of summer static can pass through a Ritter Collapsible. Whether it's a Superheterodyne Reflex, or ordinary radio frequency circuit, you can improve its reception with a Ritter Collapsible. And they bring in distance.

Ask your dealer or write us direct.

**RITTER RADIO CO.,**  
232 Canal St., N. Y.

## JOURNAL'S FAMOUS ONE KNOB SET!

REAL DX RECEPTION

Highest quality guaranteed parts, assembled on drilled panel ready for wiring, in beautiful mahogany, leatherette covered cabinet. **\$9.75**

Complete with Diagram. No Soldering Required

Guaranteed Tubes .....\$3.25

**GIBSON & GLAMZO**  
50 Park Place New York City

## RADIO

### BIG MONEY IN A BIG FIELD

Wanted — and wanted quick are men who can qualify for big pay positions in the enormous, fast growing Radio Industry. Once in a lifetime chance. Fast, easy to learn. No previous experience needed.

### Be A Radio Expert

### \$3,000 to \$10,000 a Year

Learn at home, by actual practice, to design, construct, install, operate, repair and sell Radio Equipment. Pleasant, fascinating, profitable. My methods are simple, clear and successful. Turn your spare time into cash. **FREE WONDERFUL 1000 MILE TUBE RECEIVING SET.** Write today for Booklet "Radio Facts" FREE. A. G. Mohaupt, Radio Eng., Radio Assn. of America 4513 Ravenswood Ave., Dept. 95, Chicago

*Supremacy Proven by Every Test*

## FILKO-STAT

**THE SCIENTIFICALLY CORRECT RADIO RHEOSTAT**

**SPECHT IN TALKING MOVIES**  
PAUL SPECHT, orchestra director and WJZ broadcaster, completed his first series of talking pictures for Lec de Forest, the noted inventor. The motion pictures will show the orchestra in action and the photographed sounds will be reproduced at the same time. These pictures will be shown in movie houses throughout the world.

## CROSLEY

### RADIO CATALOG FREE

Describes fully the complete line of radio frequency sets, regenerative sets (licensed under Armstrong U. S. Patent No. 1,113,145) and parts.

Write for Catalog Today

**THE CROSLEY RADIO CORPORATION**  
POWELL CROSLEY Jr., President  
5402 Alfred Street Cincinnati, Ohio

## \$15 Set Gets 2,000 Miles

The Essex Radio Special, the receiving set with a conscience, gets you more distant stations clearer and sweeter than sets costing ten times its price.

**\$15** SET COMPLETE WITH CABINET, WITHOUT TUBE OR BATTERIES

**\$20** SET COMPLETE WITH CABINET TUBE AND BATTERIES

## Essex Radio Service

617 West 125th St. New York  
Detailed information on request

## 1500 MILES FOR \$9.75

### BEN FRANKLIN AIR KEY, SINGLE TUBE KNOCKDOWN SET, \$9.75

This outfit consists of the following material, packed in an individual carton, necessary to build the famous Ben Franklin Air Key Triple Circuit Set:

- 1 Ben Franklin Air Key Coupler
- 1 Pausin 23-Plate Condenser
- 1 7x12 Hard Rubber Panel
- 1 Rheostat, 1 V. T. Socket
- 2 3-inch Dials, 1 Mica .00025 Condenser
- 1 Grid Leak, 4 lengths Bus Bar
- 8 Marked Binding Posts, 1 Phone Condenser
- 1 Wiring Diagram

These parts will build the famous Ben Franklin Triple Circuit Non-Radiating Set; has a receiving range of 1,500 miles.

### BEN FRANKLIN AIR KEY 3 TUBE KNOCKDOWN SET, \$19.75

This outfit consists of the same material as the 1 tube set with the addition of 2 audio transformers, 1 7x18 panel, 2 extra sockets, 2 extra rheostats, 3 jacks. Will bring in distance on Loud Speaker. Attractive discounts to dealers

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*What Happens  
 in the  
 Audio Transformer*  
 By N. N. Bernstein

WHEN a current is put through the primary of any transformer it has the effect of setting up a magnetic flux, or lines of force which impinge themselves through any insulating substance upon the immediate surroundings. It follows, then, that any adjacent substance, be it another coil of wire, or an iron core within the primary, will be affected electrically by those emitted lines of force, and a current of electricity will be set up in the coil or core.

In the case of audio-frequency transformers, an iron core within the primary coil takes up this energy and transfers it magnetically to the secondary winding.

Why is the current increased by this action, or even any current obtained in the secondary winding, since there is no metallic connection?

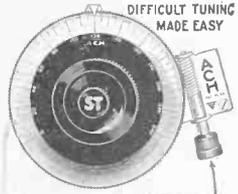
It is well known that transformers are rated according to their ratio, such as 10 to 1, 8 to 1, etc. This means that a certain number of turns of wire are wound on the secondary of the transformer which correspond inversely to the number of turns on the primary. For example, let us say that in a 2 to 1 ratio transformer for every turn on the primary side, there are two on the secondary side. This is not electrical magnification of current, but the stepping up of the voltage. That is, if a current of one ampere is carried by a potential of 10 volts through the primary, the voltage induced into the secondary will be increased, but the current of one ampere will not be increased. Then, by current we mean amperes, and by potential, commonly known as B battery potential, we mean voltage. The higher the voltage, the better it can push the signal through the various coils of the transformers and loud speaker. So the object of the audio-transformer is to increase the effective voltage available to increase the signal strength.

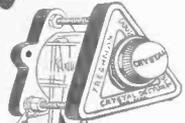
An audio transformer takes the potential in the primary and steps it up to a higher potential in the secondary, where it can again be put through the same process.

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 "Have you heard John McCormack lately?"  
 "No. You see, I haven't been out much."  
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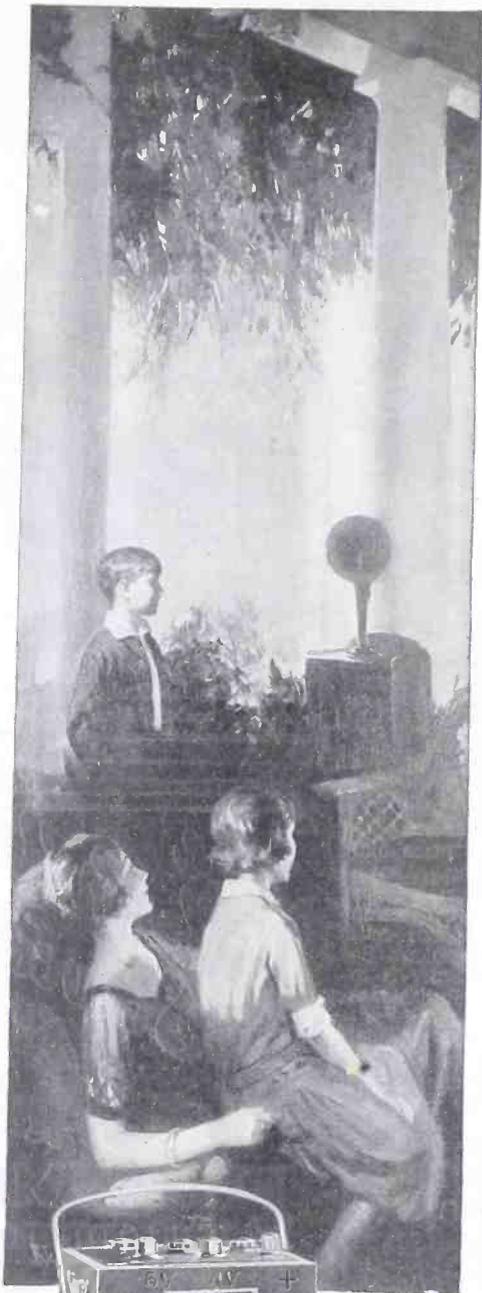
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