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# RADIO WORLD

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New Condenser Era Impends

By Feodor Rofpatkin

A 3-Tube, 2-Control DX Reflex

By Brewster Lee

An Inductively Tuned Circuit

By Charles H. M. White

Wiring the Pressley Set

By Thomas W. Benson



(Foto Topics)

## A 1-TUBE DX DIVIDED CIRCUIT

By  
LEWIS WINNER

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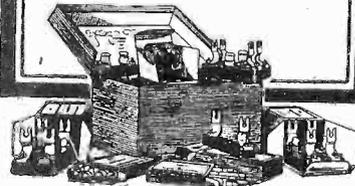
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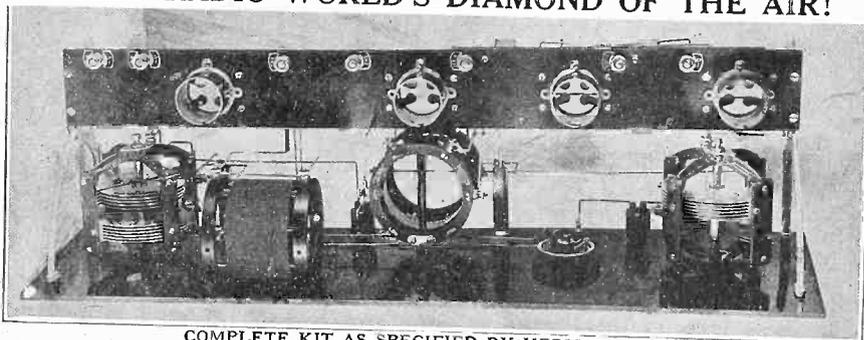
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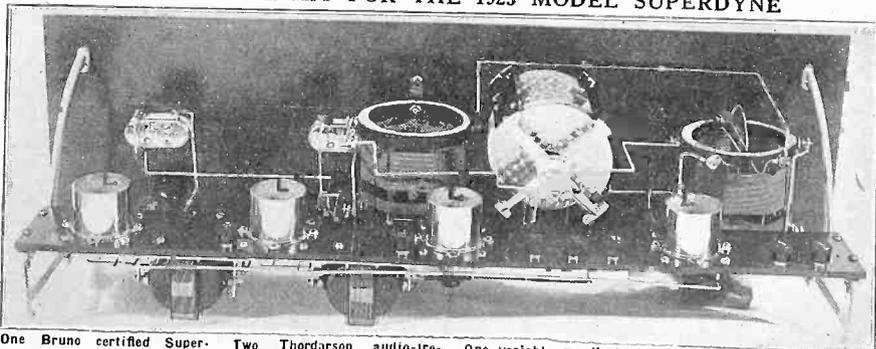
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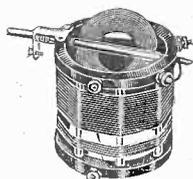
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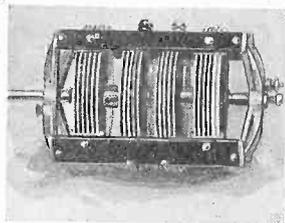
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# RADIO WORLD

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## A 1-Tube Divided DX Circuit

By Lewis Winner

A FEW years ago Major Armstrong startled the radio world with a new invention, which he termed "The Regenerative Radio Telephone Receiver". Since then this set has gained world-wide popularity, which by the way it deserves.

Double and triple circuit receivers came into popularity as the single circuit radiated too much. Of course the newer sets radiated to but not to so considerable an extent, on account of the loose coupling between the open oscillating circuit and the closed oscillating circuit. The signals are not as loud on the double or triple circuit as on the single circuit, but tubes are cheaper to-day and on extra stage of audio-frequency amplification will more than make up the difference.

The set Fig. 1, is of the double circuit type. It is a reliable, loud, selective and distance getting circuit.

The set is a little difficult to make and tune, but you will be greatly rewarded when you hear the amazing results.

### Parts To Use

Before attempting to build this set study all diagrams so that you may not make errors and be downhearted because the set will not function properly.

First, buy the best parts. Solder all connections securely, including antenna ground, etc. Put in B Batteries that are quiet. Place grid and plate wires at right angles and not near each other. Use any good hard tube (amplifier tube, such as the UV201A).

The two tuning controls are variometers. The stator end of one goes to the aerial, the stator of the other to one side of the .0005 mfd. fixed condenser. The ground goes to the lead joining the stator to the rotor of the variometer at left. Fig. 1. This is called a mid-tap.

The socket preferably should be of the

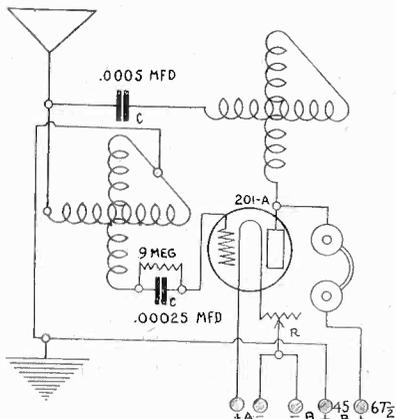


FIG. 1—Diagram of a 1-tube super-volume regenerative receiver, employing variometers for both plate and grid circuits. Note the peculiar way in which the B-45 volts is connected. A short antenna and short leads from the water pipe to ground rest of set should be employed.

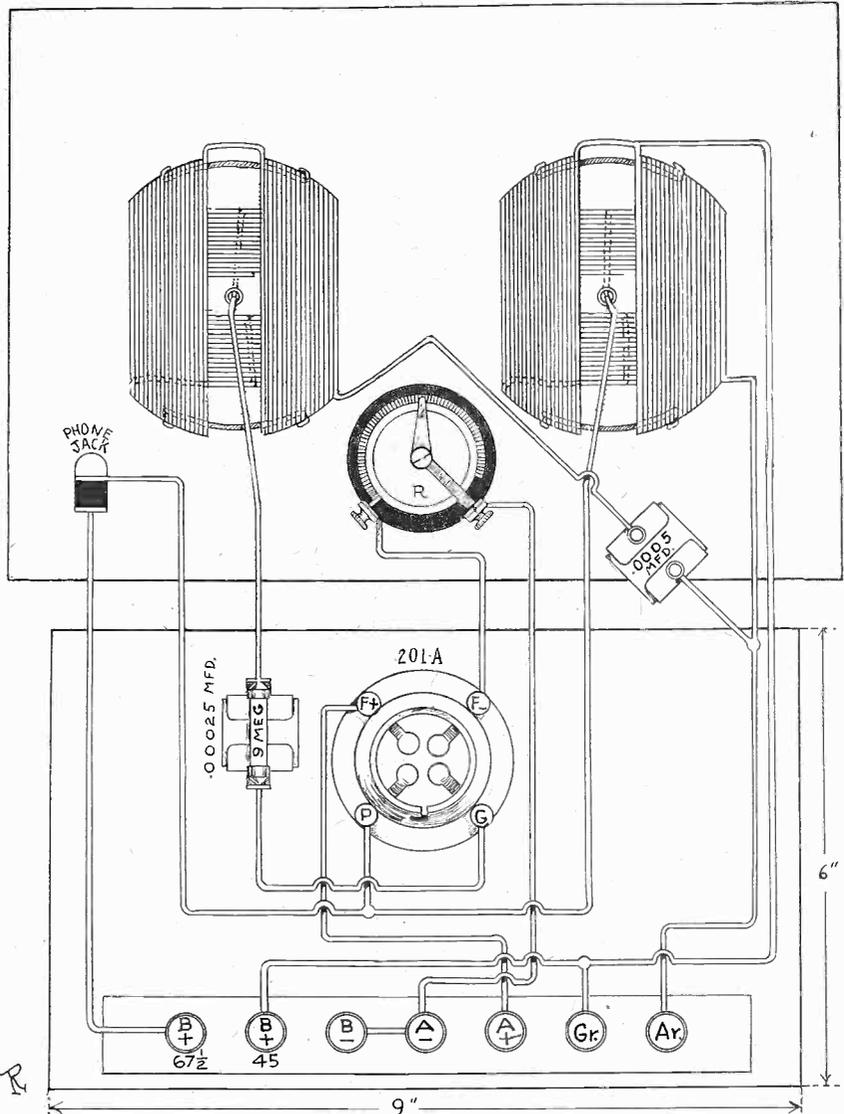


Fig. 3 Picture layout of the 1-tube super-volume receiver. The variometers are 2 1/4" apart at nearest points and should be placed no further apart as this determines the failure or success of the receiver.

porcelain base type. Bus wire may be used for wiring the set, but it is not recommended, as it has a high frequency resistance and also builds up capacity.

### Theory of Operation

Why is this a double circuit type? If the plate variometer were connected to the antenna, then one should have a direct coupled receiver, but the condenser between the antenna and plate variometer has a capacity coupled effect upon the antenna and divides the circuit into the antenna grid circuit and the condenser-plate variometer circuit. The ground is connected to the 45 volt plus to by pass the high frequency

using a fixed condenser across the B Battery. The ground, the leads of which should be very short, may be attached to the water pipe for best results. A 75-foot antenna was used with a lead-in of about 50 feet, well insulated at both ends, and the lead-in being at least one foot away from the building, so that the iron which may be present in the building, would not attract and ground the feeble currents being fed into the wires.

### Tuning the Set

Turn the rotors of both variometers parallel to each other. Turn plate variometer to left until faint signal is heard.

# New Condenser Era Impends

By Feodor Rofpatkin

THE trend toward straight-line frequency or straight-line wavelength variable condensers is setting in. By the time the Fall season is in full swing these types of condensers will be all the vogue. The present popular type of condensers, having perfectly round plates and varying gradually according to capacity values, with no definite relationship to wavelength and frequency, will become swiftly passe. Even the low-loss condensers of the straight-line capacity sort, or varying according to the square of the capacity, will pass into the background.

## Much Improvement Made

Radio construction has undergone considerable change in the last thirteen months or so. The low-loss craze set in. It was somewhat overdone, but the net results are salutary. Condensers were greatly improved in mechanical and electrical efficiency, coils were made much better, losses were reduced. Then the point was reached where an attempt was made to reduce losses even below the safety point. As low-loss means resistance reduction, and as a certain amount of resistance is necessary in many circuits, even beyond the unavoidably present resistance, instability sometimes resulted, especially in regenerative sets.

For the time being, at least, it seems that satisfactory solutions have been reached as to elimination of stray couplings, reduction of resistance and allied losses in coils and condensers, establishment of good electrical contacts, etc. Now attention is turning to tuning.

## Low Waves Crowded

Under the system now in vogue the stations within the broadcast band of wavelengths are separated rather broadly on the dial on the upper waves but crowded fiercely on the lower waves. This is due to the use of variable condensers that,

for convenience, may be referred to as straight-line capacity instruments. If the dial settings are plotted against capacity the resulting graph will be near enough to a straight line to justify the expression, although there will no doubt be a curve, especially toward the lower end, where the curvature may be large. Anyway, dial settings mean approximately even separation as to capacity. Theoretically, zero setting represents minimum capacity, 100 represents maximum capacity, and the settings in between a proportionate percentage of capacity. Thus a reading of 25, provided the dial rotates to higher readings as the plates enmesh, would represent 25 per cent. of the total capacity. For the purposes of elucidation no attention will be paid to distributed and stray capacities, but only to the condenser capacity itself.

## Frequency Favored

Now, the higher the frequency the lower the wavelength, because frequency means cycles per seconds and represents a time element. If a pistol were fired once a minute, then again, ten times a minute, the distance between bullets as they sped through the air would be ten times shorter in the case of the greater frequency. In a radio set, if the tuning condenser varies on capacity lines alone, the variation is accomplished without direct bearing on wavelength or frequency. The Department of Commerce has assigned stations to certain frequencies. The air channels are so allocated that a minimum of 10 kilocycles (10,000 cycles) exists between two neighboring channels. But if a straight-line capacity condenser is used, the difference in dial settings represents a corresponding difference in capacity, while this has no direct bearing on the fundamental basis of station separation, which is frequency. That is proven by the fact that ten degrees of the dial at the upper end will separate stations 30 meters apart, or more, (or, 3 meters average per division) while

at the lower end, the same dial separation might represent nearer 150 meters (say an average of 15 meters per division). On the frequency basis there is greater difference between two stations 30 meters apart on low waves than two stations 30 meters apart on high waves, because when the meters are converted into frequencies the actual difference in frequencies is more on the short waves (higher frequencies). The lower the frequency, the higher the wave. Conversely, the greater the wavelength, the lower the frequency. And this of course means that the separation along capacity lines alone ignores the equal division on frequency lines and the nearly equal division, or at least more uniform separation, on wavelength lines. Why vary on capacity lines when capacity as such is not a determining factor in the actual separation or variation, but frequency is?

## What to Choose

Therefore the choice lies between straight-line frequency and straight-line wavelength. Probably the frequency plan is better, because that leads eventually to some system of tuning whereby a set may be so accommodated to needs that given settings for stations may be announced in advance, and the builder of the set or purchaser of the factory receiver will have his logging done for him. That point has almost been reached, but on account of varying aerial conditions, or immediate means for making them electrically uniform, the idea has not become a vogue, although I believe that will happen soon.

## How It Is Done

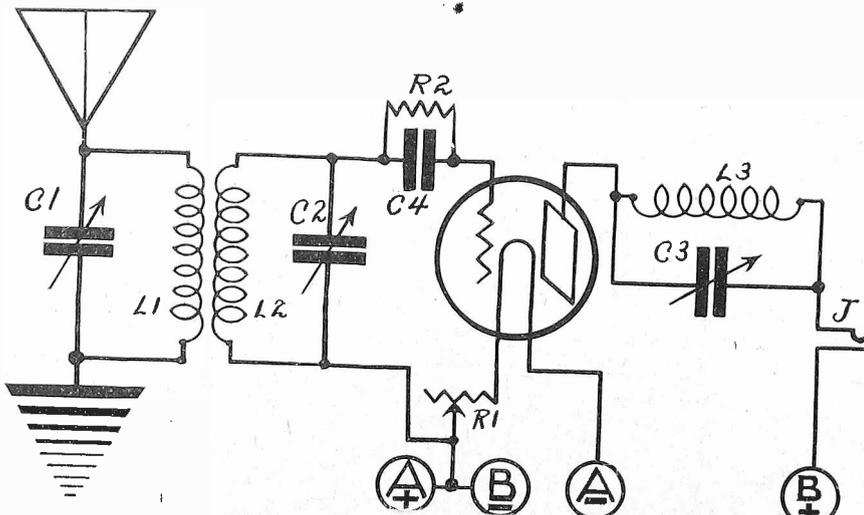
The condensers are accommodated to the needs of tuning by frequency or wavelength variation by cutting the plates in a particular style, not uniformly round, but so that enmeshing the plates will produce a variation of capacity that has a direct proportion to frequency or wavelength. Thus, on the low waves (higher frequencies) the same difference in dial settings would represent a smaller variation in capacity. The stations, so to speak, are spread out more at the lower end, while being spread out on about the same scale at the higher waves (lower frequencies). The separation is good on either the frequency or wavelength basis. Everybody who has used the perfectly round steady capacity variation condenser knows that the tuning is very critical on the low waves. Under such conditions the selectivity of the set must be judged on the higher waves, for all sets might be expected to tune "sharply" on the low waves without regard to inherent selectivity in the set itself, but only to the large capacity variation represented by a small movement of the dial tuning a straight-line capacity condenser.

## Virtues Retained

All the virtues of low-loss and good mechanical strength may be preserved in the straight-line frequency or straight-line wavelength condensers. It is well that straight-line capacity variation should pass into the realm of forgotten things, since the frequency basis of station separation seemingly is here to stay. Moreover, the Bureau of Standards for a long time has been trying to popularize the frequency designation, even as against wavelength but difficulty has been encountered, due to the rather technical aspect of the frequency plan, combined with the fact so many listeners have no technical knowledge of radio. But no

(Concluded on page 30)

## Tuning the Primary Improves Selectivity of Set



MORE selectivity may be obtained by tuning the primary, as shown in the above diagram. As L1 and L2 are in inductive relationship there will be compensated tuning. Different varieties of settings will bring in the same station, but only one setting will bring it in best. The three coils may be each 45 turns of 22 DCC wire on a 3½" diameter tubing. Cardboard will serve nicely. The variable condenser C1, C2 and C3 are .0005 mfd. each, normally 23 plates. R2 is a grid leak, about two megohms. Any oscillating tube will work in this circuit, although the 199 and 299 tubes, due to their small internal plate method. R1 is a rheostat to match the tubes, 35 ohms for 199 or equal, 20 ohms for 201A or equal, 6 ohms for the 11 or 12 type tubes. If lower capacity variable condensers are used, add more turns to the coils. For .00035 mfd. 57 turns will suffice; for .00025 about 63 turns.



# Capitalizing Tube Distortion

By Dr. Peter I. Wold

Professor of Physics, Union College

IF YOU have followed the radio art for some time you have heard of vacuum tubes being used in different ways, as for audio-frequency amplification, radio-frequency amplification, detection, regeneration, reflex regeneration, any or all of these occurring in your receiving sets; and if your interest carries over to the broadcasting station you have heard, in addition, of oscillation generators and of modulation.

All of these terms may suggest a confusing variety of uses for the vacuum tube, but it may simplify matters if it is pointed out that this tube has two functions only, which are separate and distinct, and the various uses mentioned come under the one or the other. These two functions may be spoken of as the repeating function and as the distorting function. The two are present in every tube in an amount depending on the design of the tube, i. e., the relative sizes and spacing of the elements in the tube. By the way in which the tube is operated and by the circuit with which it is associated the one or the other of these functions may be emphasized.

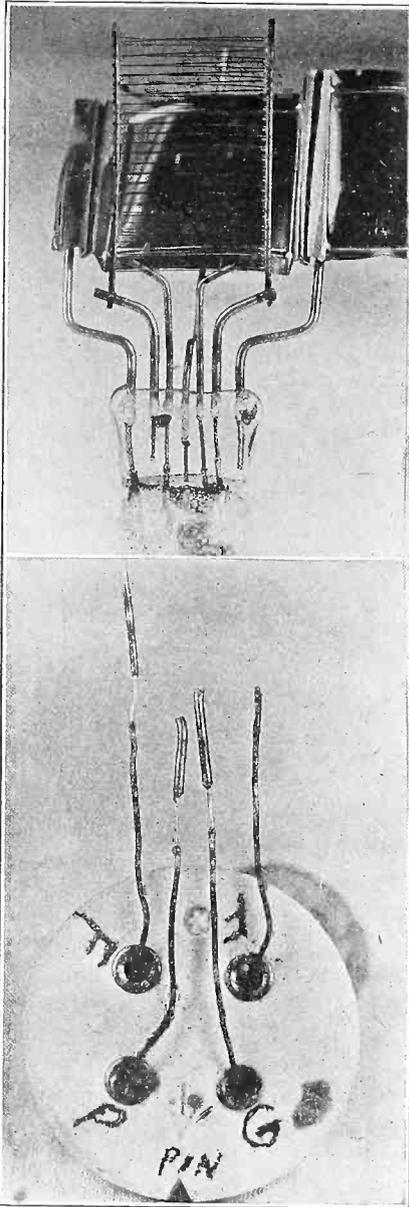
By the first of these functions, I mean that of repeating electrical variations impressed on the grid generally with amplification and, at least theoretically, faithfully—i. e. without any distortion. By the second, I refer to that property of the tube by which electrical variations on the grid result in variations, generally amplified, which are substantially different. As an example of the first we may take the relaying of telephone messages across a transcontinental line in which the greatest precautions are taken to make the repeating action as faithful as possible, i. e., to reduce distortion to a minimum. As an example of the second we may take the detection of a radio message in which electrical oscillations or variations of perhaps a million cycles—and therefore quite inaudible—are so distorted or converted as to give oscillations of an audible frequency.

## Repeating Action More Important

The repeating action of the tube and its circuit, with amplification, would probably be held to be the more important property, for it includes such applications as long distance telephony and all the actions in radio work mentioned above except that of detection and modulation. On the other hand, its property as a distortion device is the more interesting though not so generally understood.

What are the essential elements of the standard vacuum tube? There is a filament which may be raised to a high temperature, whereupon it may give off electrons—those smallest particles of matter or electricity which we have come to recognize as playing so important a part in all our affairs. Then there is a plate kept at a positive potential by the B battery and which therefore attracts the electrons from the filament, thus giving rise to an electric current to the plate. Finally, there is the grid placed between the two. When the grid is made more positive, a larger current flows to the plate and through its circuit, and when it becomes more negative a smaller current flows. It is possible thus to control a current by changing the potential of the grid and the important point is that the energy for exercising this control may be very much less than the energy of the controlled current. It is for this reason that the device acts as an amplifier.

If, starting with a small current to the



A RADIO vacuum tube (top photo) with the plate opened up so as to show the grid, which is a nickle mesh. The grid thus acts as a device to control the amount of electrons which flows from the filament to the plate, which in turn varies the plate current and determines the amplification factor of the tube. Below the base terminal.

plate, you were to draw a line showing how this current changes as the potential of the grid increases you would find that the line is not a straight one, but becomes steeper and steeper over quite a range, there being a definite curvature. Such a line or curve is spoken of as the plate current-grid voltage characteristic of the tube and circuit. The more nearly straight it is, the more faithfully does it repeat the impulses put on the grid, i. e. the less distortion does it introduce. This is a condition to be desired. Then, however, the tube is to be used as an amplifier.

The curvature of the characteristic depends on the design of the tube and, in any given tube, may be emphasized by the circuit with which it is associated.

Suppose we have a tube circuit which has curvature and we impress on the grid two electric currents of different frequencies. It can then be shown theoretically and is found experimentally that there are present in the plate circuit currents of the original frequencies and also cur-

rents of frequencies equal to the sum and equal to the difference of these frequencies. In other words, the resultant current is not a faithful reproduction of the original impulses, but shows some distortion.

## Analysis of the Side Band

This is a very useful thing as may be seen if we apply the principle to a broadcasting station. Suppose, for example, that we combine in a tube circuit the radio frequency of 1,000,000 cycles with a musical frequency of 1,000. Then we would have set up in the plate circuit the original frequencies and the sum and difference frequencies, i. e. we would have in the plate circuit frequencies of 1,000; 1,000,000; 1,000,000 plus 1,000 and 1,000,000 minus 1,000. The first of these is of too low frequency to affect the radiating antenna of the station, but the other three, being of suitable high frequency, would be radiated. It is these three waves of slightly different frequency which would travel out to your receiving set. The middle one of these, one million, is called the carrier wave and the others may be called the upper and the lower side waves. The three together constitute the modulated wave, i. e. the wave on which has been impressed the message which is to be transmitted. The side waves or frequencies are the important ones and it should be noted that they were not originally present, but were brought in only by the distorting effect of the tube. The mixture of the original frequencies is a very intimate one. It is not a mere addition of the two, but a scrambling of the two. Let us now go to the receiving set where these waves are picked up. They finally reach a vacuum tube. If this tube shows no curvature or distortion, it will merely repeat the high-frequency waves which arrived, but these, in that form, are of no use, for they are inaudible. What is desired is a message of the same as the original frequency, i. e., 1,000 cycles. Obviously it is going to take something radical to get this from three frequencies, each one at or in the neighborhood of 1,000,000. Suppose, however, the tube and its circuit has distortion; then by the same principle there will appear in the plate circuit currents which are the same as the three high frequencies and in addition there will be all the possible combinations of sum and difference frequencies. If you will set these down yourself, as can be easily done, you will find quite an array; in fact there will be twelve of them in the simplest case. Most of these will not be of use, but you will find two which are of the frequency 1,000, the original signal frequency. They represent the difference between the carrier of 1,000,000 and the side waves of 1,000,000 plus 1,000 and 1,000,000 minus 1,000.

## Detector Unscrambles Waves

Thus we see that it is as a result of its distorting characteristic that a tube can first modulate the carrier frequency with a message frequency, i. e., "scramble" the two together so that one carries the other, and then at the receiving station "unscramble" them and give us the original message.

While we have applied this to the case of a simple message of constant frequency, it holds equally well if the message is highly variable in frequency, as is true in the case of the complex telephone currents which we use for broadcasting of music and speech.

[This discussion was broadcast by WGY, Schenectady, N. Y.]

HOW TO MAKE A VARIABLE GRID LEAK  
Send 15c for Maxrad #1

# An Inductively-Tuned Set of High Efficiency

By Charles H. M. White

Consulting Engineer

A VACUUM tube works most efficiently when a certain capacity is shunted across its grid-filament circuit.



CHAS. H. M. WHITE

In other words if we varied the inductance in the grid-filament circuit and kept the capacity fixed to this certain efficient value it would be far better than the customary method of a fixed inductance and a variable capacity. Hence inductive tuning is more efficient than capacity tuning, but harder to put into practice. With a little pains, however, it can be done very successfully and you will feel amply rewarded for your efforts.

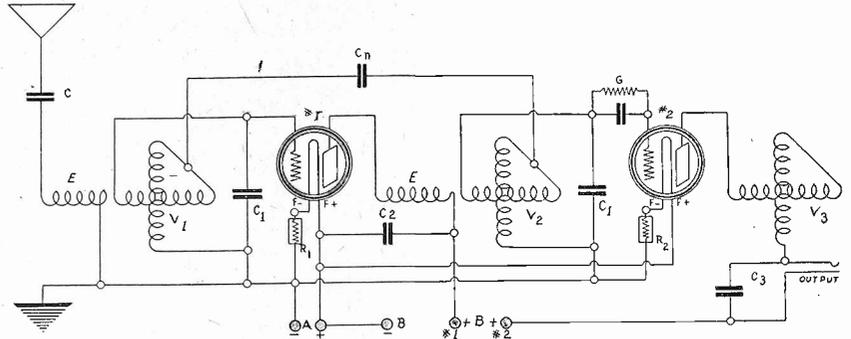
### How Variometers Are Used

Nearly every radio experimenter and set builder has around the house several spare variometers which are not used to any extent in present radio circuits. These variometers will come in very handy in experimenting with this circuit. In the diagram there are three variometers V1, V2 and V3. V1 and V2 are slightly altered by making a terminal at the point where the stators are joined to their respective rotors. This is done to allow a connection for the small neutralizing condenser marked Cn on the illustration. Then the coils E are added to each of the variometers, V1 and V2. This coil E is wound on a 4" diameter tubing with No. 22 DCC wire and has ten turns in all. Two such coils are made, one for each of the two variometers. By means of small angle brackets the units E can be mounted on the baseboard next to the variometers or directly on to the variometers. The units EV1 and EV2 should be spaced as far apart as necessary to prevent serious inductive coupling, a distance of about 7".

### Adapted to Long Aerial

Only when an extremely long aerial is used will it be necessary to insert the condenser C, which has a capacity of .00025 mfd. The condensers C1 should be as close to .0001 as possible to include the entire broadcast band. Of course the size and type of the variometer winding will determine this feature. The condenser C2 is a 1 mfd., an insulated bypass condenser. The units R are automatic self adjusting rheostat (Amperites). The condenser C3 has a capacity of .0025 to .005, depending upon the variometer V3. For tube No. 1 a UV199, or UV201A can be used and for No. 2 a Sodian D21 is recommended. If other than Sodian, UV200 or C300 is used, make the grid return connection of V2 to A battery positive.

One of the first adjustments to be made after the receiver is built is to get the right position for the condenser Cn. To determine this neutralizing value place the variometers V1 and V2 just a little past their minimum inductance position where the low wave stations would come in, and place V3 at the zero position. Then proceed to adjust Cn until tube No. 1 stops oscillating, which will be noted by the strong sound of air noise or static in the



A STAGE OF RF ahead of a regenerative detector, in which inductive tuning is employed. The coils E are home-made primaries. C is used only on long aerials. No. 1 is the amplifier voltage, B+ No. 2 the detector plate voltage. G is a grid leak, about 2 megohms, but may be omitted, if a Sodian D21 is used as detector.

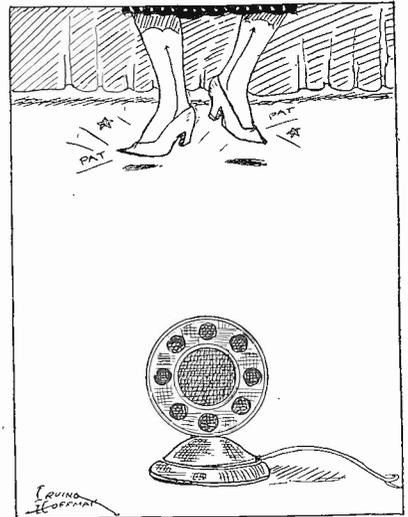
phones. Get this adjustment to the point where the sound is the strongest. Now since the receiver is neutralized at a low wave value it will mean that the receiver will be flat or lack sensitivity at the high wave signals.

### V3 Adds to Sensitivity

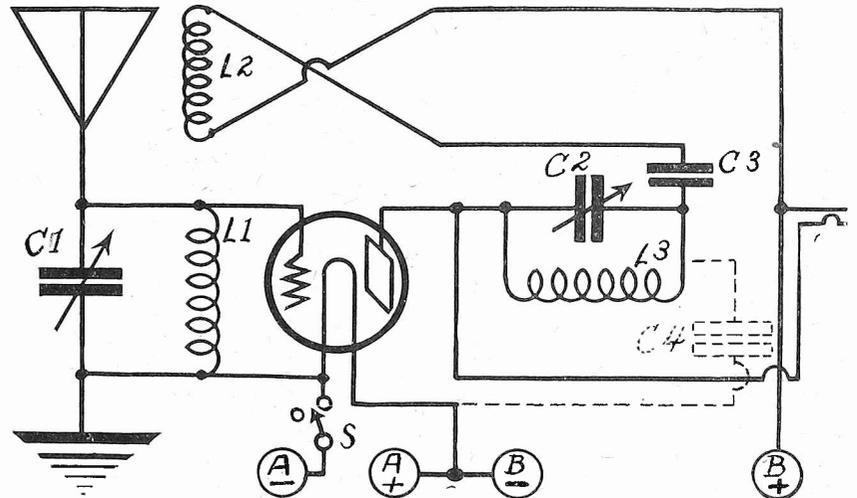
This fact is compensated for by the variometer-V3, which brings up the sensitivity by adjusting it at the high wave values. Tuning is accomplished by varying V1 and V2, and volume and sensitivity are controlled by V3. Since the perfection of this receiver requires a little skill and experience on the part of the builder I do not recommend a novice to tackle it. After it is constructed anyone can easily acquire expert operating skill. Audio-frequency amplification may be attached for loudspeaker operation over great distance.

THE 1-A PORTABLE, 1925 Spring Model, a 2-Tube Set of Great DX Powers. Two controls. Described by Herbert E. Hayden in RADIO WORLD, issues of March 28, April 4 and April 11, with trouble-shooting article in April 18 issue. Profusely illustrated, including templates. Send 60c, get all four copies. Address Circulation Manager, RADIO WORLD, 1493 Broadway, New York City.

## Super-Audible Feet



## Wrong Diagram for Experts



WHAT do you find wrong with this diagram? The fixed condensers C3 and C4 may serve as a hint. Trace the plate lead. Note the different effects of C4 and C3, intended as a bypass. Send in your solution to Wrong Diagram Editor, RADIO WORLD, 1493 Broadway, New York City.

# Wiring the Pressley Circuit

By **Thomas W. Benson**  
Consulting Engineer

## PART II

THE use of the Benjamin socket panel simplifies the assembly of the base panel, for the purchased panel has the sockets already mounted and by means of the special brackets the socket panel is quickly attached to the control panel. The binding posts are likewise in place and the small grid leak and condenser panel further simplifies construction. The use of parts of this type where much of the hard work of assembly is already done is recommended to those who construct their own receivers.

The only work of assembly necessary with the socket panel is to mount the intermediate frequency transformers in the positions shown in Fig. 5 where a bottom view of the sockets is shown. Note carefully how the terminals are arranged or the wiring will be difficult if the transformers are not mounted in the positions shown. The iron core transformers L1 and L2 are mounted with terminals 3 and 4 to the rear while the air core transformers K1 and K2 have the terminals 2 and 4 towards the rear.

The grid condenser panel is mounted on the left hand bracket and the fixed condenser F1 mounted thereon. The fixed bypass condenser H is soldered to the inside of the right-hand bracket as shown in Fig. 5. The two brackets are then bolted to the socket base and then to the control panel previously assembled, after which we are ready to wire the set.

### The Wiring of the Set

Before starting to wire the receiver it is well to study the diagram of the circuit given in Fig. 2. The purpose of this is to fix in the mind the general path of the signal through the receiver and then the diagrams become much simpler to follow.

Fig. 6 is a picture diagram of the wiring of the complete receiver. Use the medium bus wire, that is, bus wire that is not so hard that it breaks when bent sharply or so soft that it will not hold its shape. Run all wires in as short a path as possible but keep the wires well separated. If the wiring of the receiver is done in the following order little trouble will be experienced.

The panel diagram is on the basis of the following parts used: Sangamo kit; Cardwell variable condensers; general Radio No. 385 AFT; Benjamin 7-gang socket panel; brackets; Benjamin grid leak panel; Saturn single-circuit jack; Saturn double-circuit jack; Carter jack switch; Benjamin battery switch; two Dubilier .00015 fixed condensers with leak mounts; two Daven grid leads,  $\frac{1}{2}$  to 2 megohm; General Radio 10-ohm rheostats; Dubilier fixed condenser, .005 mfd., Dubilier fixed condenser, .5 mfd.

First run all filament wiring to proper places. All connections are made under the socket panel. Run the jumper between the positive terminals of the sockets and connect this to the switch R. The other terminal of R goes to the binding posts 8 and 6. The first five sockets have their negative filament terminals connected by a jumper which in turn goes to one terminal of the rheostat J 1. In the same manner the last two sockets have the negative filament terminals connected together and to the rheostat J 2. The two remaining terminals of the rheostat connect to binding posts 9 and 10. This completes the filament circuit wiring and it is well to test it by connecting a battery temporarily to the binding posts 8 and 9 and trying a tube in each socket to make sure the circuits are complete. In wiring to the sockets the bus is slipped up through the hole in the hollow rivet, bent over and soldered on top. Do the soldering carefully.

Second, wire the tuning and oscillator circuit. The letters S and R on the variable condensers refer to the stator and rotor respectively while the balancing condenser has two stators lettered S and S1.

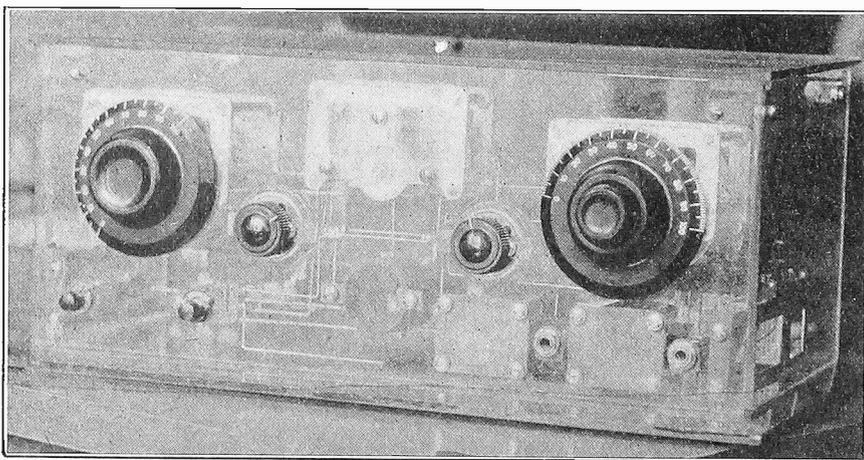
Connect the rotor of D to one stator of balancing condenser E and to terminal 3 of the oscillator coil A. The stator of D is connected to terminal 1 of coil A to the other stator of E and to one side of grid condenser F1, the other terminal of F1 going to the grid of the first tube T1. The stator of the tuning condenser C connects to terminal 2 of the oscillator coil A and to binding post 1. The center contact of switch Q is connected to the rotor of C and to the rotor of the balancing condenser. The top and bottom contacts of switch Q are connected to binding posts 2 and 3 respectively. A lead runs also from the rotor of the balancing condenser to the negative filament lead. It remains to connect in the plate circuit of the oscillator. From binding post 4 a wire leads to terminal 1 of the first intermediate K1. From post 2 of K1 connection is made of 4 of the oscillator coil B, the other terminal of which (5) connects to the plate of the first tube.

Third, wire the intermediate frequency amplifiers. Post 4 of K1 connects to the grid of the second tube, T2, while post 3 of K1 connects to negative lead running to the rotor of the balancing condenser as shown in the diagram. The plate of T2 connects to post 2 of the second intermediate transformer L1 and terminal 1 of which connects to binding post 5. This same wire runs around and connects to Post 1 of K2 and L2, to the positive B terminal of M1 and to one side of both fixed condensers H and G. Terminal 4 of L1 connects to the grid of the third tube T3 and the remaining terminal 3 of L1 goes to the negative A Battery lead. This wire also connects to terminal 3 of K2 and to the unconnected terminal of the bypass condenser H. To complete the connections to the third intermediate transformer K2 we have only to connect terminals 2 and 4 to the plate of T3 and the grid of T4 respectively. The last intermediate transformer has post 2 connected to the plate of T4, post 1 being already connected to the B Battery lead.

Since T5 is the second detector the grid of that tube goes to the condenser F2 which is supported by the buswire, the other side of F2 connecting to post 4 of L2. Post 3 being the grid return is connected to the positive lead to the sockets as shown.

Fourth, wire the audio-frequency amplifiers. The plate of the detector tube T5 connects to the remaining unconnected side of bypass condenser G and to the P terminal of audio-frequency transformer M1. Terminal G of M1 is next connected to the grid of T6 while the F terminal of both M1 and M2 are connected together and to binding post 11 on the rear of the socket panel. The plate of T6 is connected to Post P of M2 and to the frame of Jack P. The positive B terminal of M2 is connected to the short center spring of jack P. Terminal G of the same terminal connects to the grid of the last tube T7. The plate of T7 being then connected to the frame of jack O there only remains to connect binding post 6 to the top springs of both jacks to complete the wiring of the receiver. All

## How the Pressley Looks as a Portable Set



THE PRESSLEY SUPER-HETERODYNE is adaptable for portable use, in which case, of course, dry-cell tubes should be used. The set shown above was exhibited at the Superadio Co., New York City, and was built with their kit.

A PORTABLE THAT GETS MOST DX AND VOLUME POSSIBLE ON TWO TUBES, by Herbert E. Hayden. Profusely illustrated in Radio World dated March 28, April 4 and 11. 15c per copy, or start your subscription with any number. Exactly what you would want for your vacation. Radio World, 1493 Broadway, N. Y.

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[Part I of Thomas W. Benson's article on constructing the 7-tube Pensley Super-Heterodyne was published in the April 18 issue. Part III, the conclusion, will be published next week, issue of May 2.]

# Picture Diagram of Wiring of Pressley Super-Het

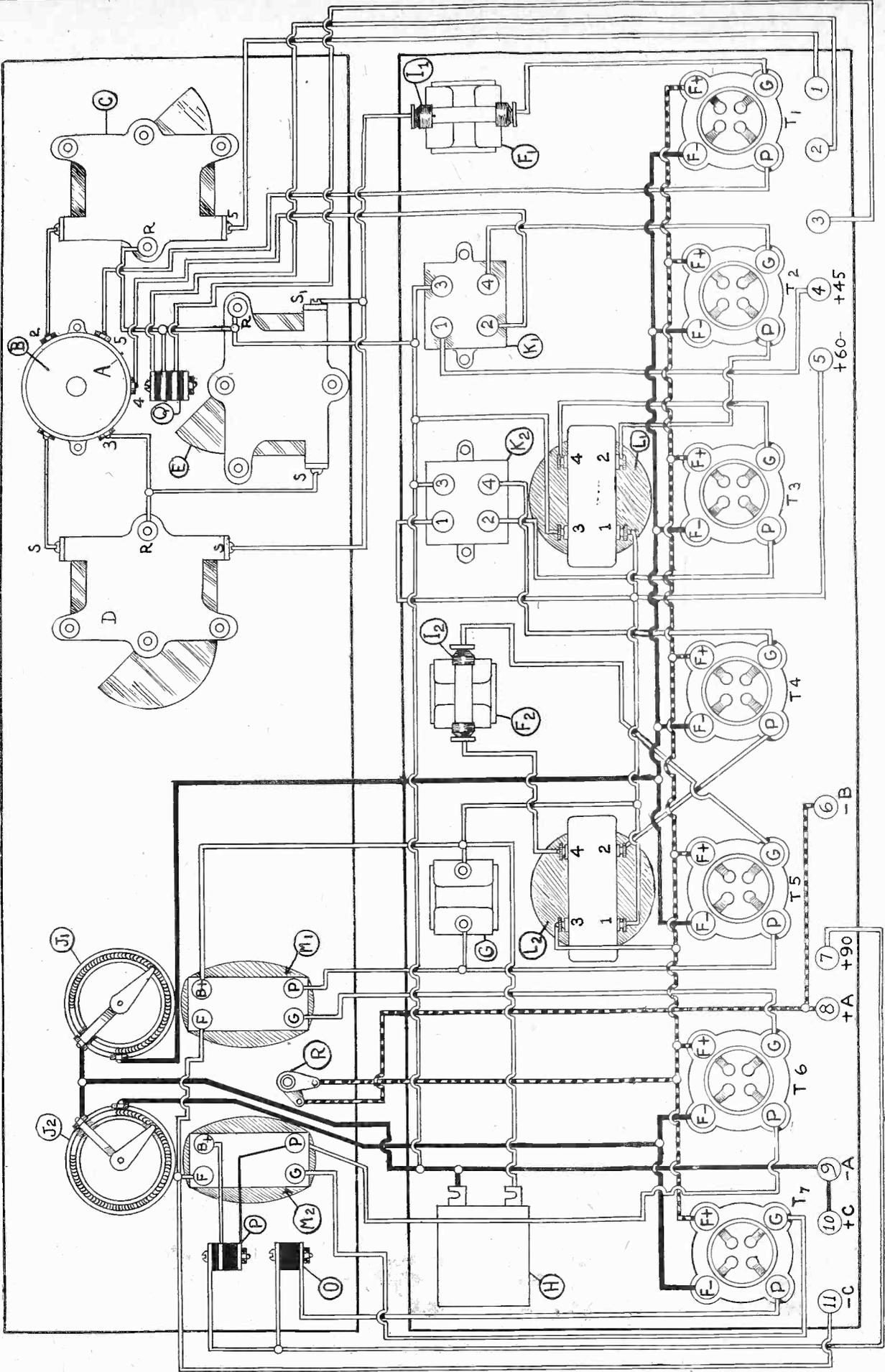
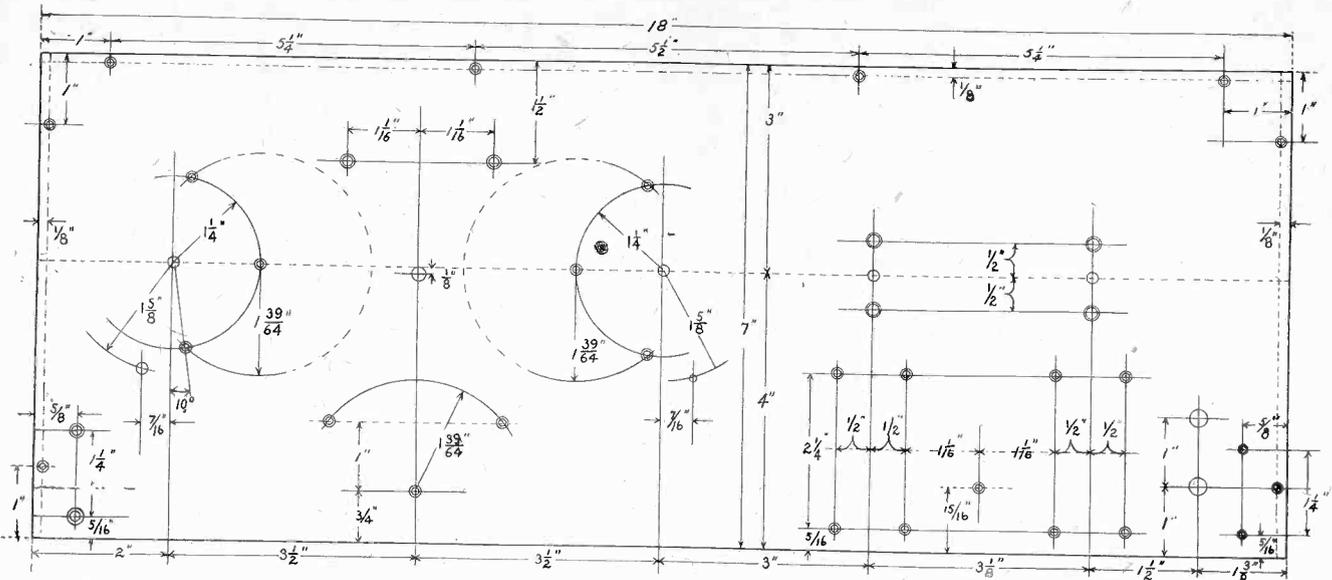


Fig. 6, the wiring of the Pressley Super-Heterodyne, shown in picture form. The parts are spread, for clearness, but the wiring actually is compact.

# Panel and Assembly Plans



# "Diamond" Trouble-Shooting

By Herman Bernard

ONE of the peculiarities that may develop in tuning The Diamond of the Air or any other circuit is that the rheostat has some effect on tuning, most noticeable on the low waves. This is due to incorrect connection of the grid return. As explained in the constructional article on this circuit, the grid return of the RF and detector tubes should be to A battery. Follow the lead from the battery. See that the low potential end of the secondary of the RFT (or loop) goes to A minus. If the Sodian tube or a soft detector is used, see that the grid return here also is to negative A. Do not make the connection to the socket side of the rheostat, for that would include the rheostat in the radio-frequency part of the circuit, introducing the resistance of the rheostat where it is not wanted, and also causing the inductive effect of the wire on that type of rheostat to make itself felt. Many may have felt that there must be induction in a rheostat, for a coil of wire is there. Indeed, often such induction is more than trivial and by turning the rheostat one station may be tuned in and another tuned out. That should not be. Make the grid return connections properly and get rid of this nuisance feature of the rheostat.

## Loop Turned Wrong Way

In tuning the Diamond it may be noticed that the regeneration control is affected by the direction in which the loop is pointed. Suppose that the loop were properly pointed toward the station being received. That would mean that one horizontal support of the loop would point toward the station. Do not point the broad side of the loop toward the station, a mistake some make before they become familiar with loop use. Now granting all's well, if the loop is turned in an "off" direction, the regenerative whistle may be heard. In many cases, where one is receiving a strong local station on the loop, that station may be heard, no matter in which direction the loop is turned, but once the loop faces the station properly, a sudden increase in volume is the gratifying result. Sometimes the loop turned the wrong way will cause the set to oscillate, because of a heterodyne note set up. Soon, however, the right direction for every station within range is learned, and after that no such trouble develops.

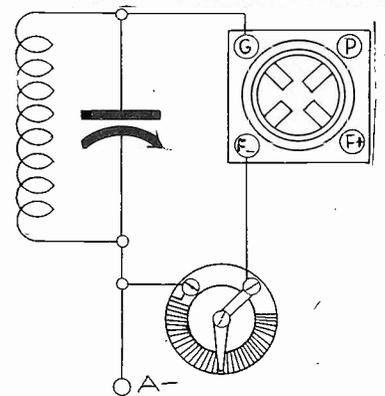
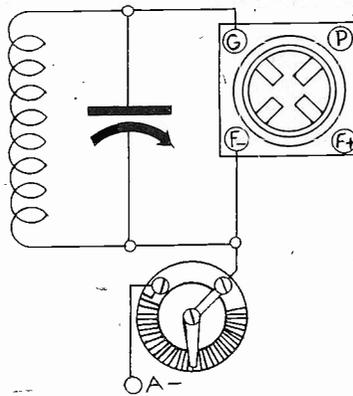
## Avoiding Stray Coupling

The inclusion of the radio-frequency transformer so that outdoor aerial and ground may be used, and loop cut out, introduces the possibility of stray coupling between the RF coil and the coupler.

It is important to remember that even the tiniest difference in the position of the two coils may make itself felt, so that the RF coil must be adjusted until there is no troublesome coupling. Total avoidance of any degree of coupling whatever, when both coils are within the set, is probably impossible, but there is no advantage in attempting the theoretical ideal. Practical success is all that counts, and you may achieve that readily.

## Dial Readings

Many may desire to have the left-hand tuning control read the same, whether



THE WRONG WAY of connecting the grid return is shown at left. Note that the resistance (and possible inductance) of the rheostat is included in the radio circuit. Hence the rheostat may affect tuning, besides contributing resistance where it is not wanted. At right is the correct manner of connection.

loop or outdoor aerial is used. That may be done readily by altering the number of turns on the secondary of the RFT. If the loop gives higher readings, then turns must be taken off the RFT secondary, to push the condenser readings up higher. If the loop gives a lower reading for the same station, then more turns must be put on the secondary, to make its inductance the same as that of the loop. However, other considerations arise, and these you must settle for yourself. For instance, if with the loop in use the RF and the detector condenser both tune in step, you may prefer to keep this advantage. Then stations may be logged, as to this pair of dials, with the same reading for both condensers. You might not desire to alter the secondary of the RFT to make it correspond to the loop readings, because then the parity of readings with the other dial would be lost. That being so, you would want to adjust the loop. If the collapsible type is employed, the inductance may be reduced by pushing the top of the loop farther down, making the loop more "squat". Also, the number of turns on the loop may be increased or reduced, depending on whether lower or higher readings are required. A tapped loop may offer ready solution of the difficulty.

## Must Tune in Whole Band

In dealing with these matters one must not forget that the set must tune in the entire broadcast band of wavelengths. Thus it would be idle to readjust the inductance on loop or secondary, only to make one coil conform to another that prevents tuning in the entire band! The winding directions given in the constructional article, issue of April 11, would enable you to tune in the entire band with .00005 condensers. Therefore attention should be concentrated on the loop to make its inductive value the same as that of the secondaries of the RFT and the detector stage coupler. This inductance is about 176 microhenries.

## If the Set Doesn't Work

If anybody has the misfortune of building the set without being able to obtain a peep out of it, the wiring should be checked against the schematic and picture diagram. Those diagrams were correct in all particulars. The picture diagram, as Henry Pavel, astute printer, discovered, had the primary connections to the first audio transformer reversed. This does no serious harm and if the set doesn't work it can't be on this account. There is considerable theoretical background for

## Parts for Diamond

- One loop
- One 3-circuit coupler (Bruno 77).
- One radio-frequency transformer (Bruno 55).
- Two .0005 variable condensers.
- One 6-ohm wire-wound rheostat.
- One Bradleystat.
- One .00025 mfd, fixed grid condenser.
- One .002 fixed condenser.
- One single-circuit jack.
- Two double-circuit jacks.
- Two audio-frequency transformers (Thordarson, 6-to-1, 3½-to-1).
- Three 4" vernier dials.
- One terminal block.
- One 7x24" panel.
- One Bruno 4 gang socket subpanel, with 4 sockets.
- One pair of Bruno brackets.

not reversing this primary connection, therefore see that the detector plate makes proper contact through the jack to P post of AFTI, the B post going to B plus. Your ear may never know the difference, but it is well to observe this polarity rule. It sometimes helps, never does any harm.

But suppose you hear nothing. Look over the B batteries, using a voltmeter. If these batteries show a reading of 25 per cent. less than the rated voltage it is time to replenish. Test the A battery with ammeter or hydrometer. The next concern is the tubes. If you can try them out in some other set, that's preferable. A set that doesn't work usually means (1) a broken connection, (2) tube trouble, (3) rundown batteries.

## FREE NAMEPLATE

In beautiful colors will be supplied to all who request one for their Diamond of the Air. These nameplates will not be ready for distribution until May 15, but get on the list early.

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THE DIAMOND OF THE AIR, by Herman Bernard, a 4-tube DX loop set of tremendous range and power. Three controls. Not reflexed. Send 45c, get April 4, 11 and 18 issues. RADIO WORLD, 1493 Broadway, New York City.

# BROADCAST PROGRAMS

(Wavelengths in meters; Eastern, Central, Mountain and Pacific Standard Time specified.)  
[E. S. T. stands for Eastern Standard Time; P. S. T., Pacific Standard Time; M. S. T., Manhattan Standard Time; C. S. T., Central Standard Time. Where D. S. is added it signifies Daylight Saving Time, which is one hour later than Standard Time in any time division.]

## Friday, April 24

**WGN, Chicago, Ill., 370 (C. S. T.)**—9:31 A. M., time. 9:35, quotations. 10, quotations. 11, quotations, weather, market. 11:30, quotations. 11:56, time. 12 M., quotations. 12:10 P. M., quotations. 12:30, quotations. 12:40, Drake concert ensemble, Blackstone string quintet. 1, quotations. 1:25, quotations. 2, Lyon and Healy concert hall. 3, Rocking Chair Time. 5, quotations. 5:30, Skeezix Time for Children. 5:57, time. 6, organ, Edwin Stanley Seder. 6:30, Drake concert ensemble, Blackstone string quintet. 8, classic hour. 10, Drake hotel orch.

**WEAR, Cleveland, O., 390 (E. S. T.)**—7 P. M., Business Men's orch.

**WOAW, Omaha, Neb., 526 (C. S. T.)**—4 P. M., matinee program. 5:45, news. 6, story hour, Doris Claire Secord. 9, Union Pacific Railroad Co. program. 10:30, Robison orch.

**WCAE, Pittsburgh, Pa., 461.3 (E. S. T.)**—12:30 P. M., weather, news. 4:30, Sunshine Girl, markets. 6:30, concert from William Penn Hotel. 7:30, Uncle Kaybee. 7:50, police reports. 8:30, concert from studio of Mme. Wilson-Smith.

**WOS, Jefferson City, Mo., 440.5 (C. S. T.)**—3 P. M., "TB Control in Missouri Livestock," Homer A. Wilson; poems, LeRoy H. Kelsey; music, Central Missouri Assoc. for Blind.

**WHAS, Louisville, Ky., 399.8 (C. S. T.)**—4 P. M., concert from Louisville Conservatory of Music; organ; police bulletins; weather; readings; news. 4:55, markets. 5, time. 7:30, Glee Club of the Kentucky College; news; time.

**WHO, Des Moines, Iowa, 526 (C. S. T.)**—7:30 P. M., circus Barker. 8, Des Moines University program. 11, dance program.

**WEAF, New York City, 492 (E. S. T.)**—6:45 A. M., physical exercises. 11-12, Dorothy Wilder, pianist; health talk; market and weather reports. 4-5 P. M., Laidislaw Soucek, tenor; lecture, "In the Footsteps of Balboa." 6-12, Waldorf-Astoria orch.; Gustav Langenus, clarinet sextette; "Sir Hobgoblin Takes a Ride" by Blanche Elizabeth Wade; "The Happiness Candy Boys"; "Hambone Male Quartette"; Sterling Piano Duo; "The Gloriant Girls"; Meyer David-Lido Venice orch.

**WDAF, Kansas City, Mo., 365.6 (C. S. T.)**—3:30 P. M., Star's radio orch. 5:50, marketgram; weather; time; road report. 6, piano tuning in; Tell-Me-a-Story Lady; Trioan Ensemble. 11:45, "Merry Old Chief," Plantation players.

**WLW, Cincinnati, Ohio, 423 (C. S. T.)**—10:45 A. M., weather and business reports. 11-55, time. 12:15 P. M., Ahaus Brunswick Shop orch. 1:30, business reports and stock quotations.

**WPG, Atlantic City, N. J., 299.8 (E. S. T.)**—7 P. M., Hotel Traymore dinner music. 9 P. M., Hotel Ambassador concert orch. 10, Paul White-man's Hotel Traymore dance orch.

**WGR, Buffalo, N. Y., 319 (E. S. T.)**—10:45 A. M., Gold Medal radio cooking school. 6:30 P. M., Buffalo Trust hour. 8, Jack Little and Paul Small, Cameo record artists. 8:30, "Draperies and Light-ing Fixtures," by C. N. Kierst. 8:40, Wm. L. Manning, baritone. 9, recital by Henrietta Hacker and friends. 9:30, Jack Little and Paul Small, Cameo record artists. 10, concert by the Chopin Singing Society.

**WGY, Schenectady, N. Y., 379.5 (E. S. T.)**—2 P. M., music; health hints. 6:30, International Sunday school lesson. 7, Albany Strand Theatre orch. 7:30, health talk. 7:40, WGY orch. 10:30, Ray Halse orch.

**KOB, State College, New Mexico, 348.6 (M. S. T.)**—7:30-8:30 P. M., popular science course, lesson No. 15, by Dr. D. S. Robbins. Radio talk, "Timber Resources of New Mexico," by R. E. Marsh.

**KFAE, State College of Washington, 348.6 (P. S. T.)**—7-9 P. M., bass solos, Harry Isaacs, Seattle; the agricultural profession, Dean Johnson; contralto solos; the petroleum industry, Prof. St. Johns; readings, Edith Armand, Ritzville; violin solo, Ralph Strumsh, Raymond; present day styles of architecture, Prof. Fred G. Rounds; the new books, Miss Webb; color in the kitchen, Miss Gladys Gallup.

**KFI, Los Angeles, Cal., 467 (P. S. T.)**—5 P. M., news. 5:30, Examiner program. 6:45, radiatorial. 7, Examiner program. 8, Dan MacFarland, organ-ist. 9, Herald program. 10, Lieberman Melody nine.

**KSAC, Manhattan, Kan., 341 (C. S. T.)**—12:35 P. M., reading; weather; spray dates and materials, L. E. Williams; question box; preventing erosion, E. B. Wells. 7:20, Radio College quartet. 7:30, legume bacteria. P. L. Gainey. 7:40, Radio College quartet. 7:50, parasites and the public health, J. E. Ackert.

**KNX, Los Angeles, Cal., 337 (P. S. T.)**—11:30 A. M., Estelle Lawton Lindsay's talk to women. 6:15 P. M., dinner hour program. 7:30, Eastern Co. program. 8, West Coast Theatres. 9, Davis Co. program. 10, feature program. 11, Coconut Grove orch. 12, Night Hawks.

**KGO, Oakland, Cal., 361.2 (P. S. T.)**—11:10 A. M., Prudence Penny, home making. 11:30, concert. 1:30 P. M., stocks; weather. 3, music; speaker. 4, orch. of Hotel St. Francis. 5:30, girls' half hour, Esther Wood Schneider. 6:45, stocks; weather; news.

**KPO, San Francisco, Cal., 429.5 (P. S. T.)**—7 A. M., daily dozen. 10, cooking and household

management, Mrs. Belle DeGraf. 10:30, the local theatres. 12 M., time, scripture reading. 12:45 P. M., Commonwealth Club luncheon. 1, Fair-mont Hotel orch. 4:30, Fairmont Hotel orch. 5:30, markets. 6:30, the local theatres. 8, Stan-ford University band.

**CNRE, Edmonton, Alta., 516.9 (M. T.)**—7:30 P. M., children's hour, the farmer. 8:30, W. H. Freed, Hawaiian guitar and mandolin orch.; E. J. Caseley, bass; accompanist, Dennis Clayton; address, Hon. H. Greenfield.

**CNRT, Toronto, Ont., 356 (E. S. T.)**—6:30 P. M., King Edward Hotel concert orch. 8:30, Miss D. Matthews, soprano; Mr. H. Barnes, violin; J. F. Stillman, tenor; C. E. Simpson, clarinet; Miss E. DeWitt, soprano; address, Hon. G. H. Ferguson. H. Stott, pianoforte; male quartet; K. Schofield, violin. 10:30, King Edward Hotel dance orch.

**CNRA, Moncton, N. B., 313 (A. S. T.)**—7:30 P. M., bedtime stories, Uncle Alf. 8, markets. 8:30, artists from Sussex, N. B. 10:30, CNRA orch.

## Saturday, April 25

**WOO, Philadelphia, Pa., 508.2 (E. S. T.)**—11 A. M., Grand organ. 11:30, Weather. 11:55, Time. 12 M., Golden's Orch. 4:40 P. M., Police Reports. 4:45, Grand Organ and Trumpets. 9:55, Time. 10:02, Weather.

**WGY, Schenectady, N. Y., 379.5 (E. S. T.)**—9 P. M., speeches of dinner by American Legion at National Vaudeville Artists' Club House, New York, as national tribute to General John J. Pershing; speakers, General Pershing, General James A. Drain and Newton D. Baker, former Secretary of War. 11, Phil Romano's orch.

**WGR, Buffalo, N. Y., 319 (E. S. T.)**—6:45 P. M., address, "The Master's Room."

**WPG, Atlantic City, N. J., 299.8 (E. S. T.)**—6:30 P. M., dance, Hotel Knickerbocker orch. 9, Hotel Traymore concert orch. 10, Hotel Knicker-bocker dance orch.

**WEEL, Boston, Mass., 303 (E. S. T.)**—6:45 A. M., Setting up exercises.

**WGY, Schenectady, N. Y., 379.5 (E. S. T.)**—11:55 A. M., time. 12:30 P. M., stock market. 12:40, produce market. 9, dinner program from WJZ, National tribute to General Pershing by American Legion at the National Vaudeville Artists' Club House, New York City; speakers, General Pershing, General James A. Drain, the Honorable New-ton D. Baker. 11, Phil Romano orch.

**WJZ, New York City, 455 (E. S. T.)**—1 P. M., Erdody's Park Lane orch. 4, Harriet A. Spink, soprano. 4:30, Sherry's tea music. 5:30, State and Federal agricultural reports; farm and home change quotations; closing quotations; foreign ex-change quotations; news. 7, Hotel Astor orch. 8, Wurlitzer musicale. 8:30, Rose Mountain, con-tralto. 9, National tribute to General John J. Pershing by American Legion, direct from Na-tional Vaudeville Artists' Club House; speakers, General John J. Pershing, General James A. Drain of American Legion, Hon. Newton D. Baker; WGY will also broadcast. 11, Waldorf-Astoria orch.

**WLIT, Philadelphia, Pa., 395 (E. S. T.)**—12:02 P. M., daily almanac. 12:05, organ recital. 2, Arcadia concert orch. 4:30, dance music. 7:30, Arcadia concert orch. 8, conclusion of program.

**WRC, Washington, D. C., (E. S. T.)**—4:30 P. M., Meyer Davis Le Paradis band. 6:45, children's hour. 7, Hotel Washington-Irving Boernstein orch. 7:45, Bible talk. 8, Wurlitzer musicale. 8:30, "The Development of the United States Capitol Building," by Charles E. Fairman. 10, Vincent Lopez orch. 10:30, "Crandall's Saturday Night-ers." 12, Sidney Seidenman's orch.

**WMC, Memphis, Tenn., 499.7 (E. S. T.)**—7:30 P. M., latest news flashes and markets. 8:30, program by the Freed-Hardeman College of Hen-derson, Tenn.

**WGBS, New York City, 316 (E. S. T.)**—10 A. M., time talk with Terese. 10:10, Eleanor Schorer's Kiddie Klub program. 10:40, Mme. Geo. fashion talk. 10:50, Jefferson centennial election talk. 1:30 P. M., Bible reading. 1:35, Charles Straub and John Lambrecht, steel guitar duo. 2, Peggy Wynne, soprano. 2:10, Phil Ollstein, violinist. 2:20, Alfred Seeger. 3, interview with Crete Car-ton, "Gloria Swanson's Double." 3:10, Carrie Cohen, pianist. 3:20, Prof. Perez De Vega, Span-ish lessons. 3:30, Carrie Cohen. 3:40, talk by Martha Wichinsky, woman press agent. 3:50, Carrie Cohen. 6, Uncle Geebee. 6:30, Piccadilly Four with Miss Haag and Miss Edwards. 7, John Regan, sport talk. 7:10, Piccadilly Four. 7:30, Ritz-Carlton orch. 8:30, "The Cost of a Hat" comedy, by Cellar Players. 9, Cecilia Reichman, concert pianist. 9:20, Ellen Jane Thom-son, soprano. 9:30, Sam Comly, "Inside Movie Chats." 9:45, Vaughn de Leath, popular enter-tainer. 10:15, Rudolph Jockowitz, violinist. 10:45, Joseph Hayden, songs. 11, May Singhi Breen, banjo, and Peter DeRose. 11:30, Bob Emerick, popular entertainer.

**WOAW, Omaha, Neb., 526 (C. S. T.)**—12:30 P. M., horticultural program. 3:45, public news. 6, dramatic hour. 6:30, to be announced. 6:45, William Robison orch. 9, de luxe program. 11, Nightingale orch. 11:30, organ music.

**WCAE, Pittsburgh, Pa., 461.3 (E. S. T.)**—12:30 P. M., news; weather reports; reading of program for the day. 2:30, tea music. 4, orch. program. 6:30, dinner concert. 7:30, Uncle Kaybee. 7:45, police reports. 8, current motor topics. 8:15, silent. 8:30, concert by the Pennsylvania College for Women glee club.

**WAHG, Richmond Hill, N. Y., 316 (E. S. T.)**—11:55 A. M., time. 12 M., special midnight pro-gram; Glen C. Smith's Paramount orch.

**KDKA, Pittsburgh, Pa., 326 (E. S. T.)**—9:45 A. M., stock reports; general market review and agricultural items. 11:55, time. 12 M., weather. 12:15 P. M., concert by Daugherty's orch. 3:30, baseball scores. 6, dinner concert by the Westing-house band. 7, baseball scores. 7:30, the junior meeting of the Pittsburgh Sun Radio Sphinx Club. 7:45, last minute helps to the Bible school teacher. 8, baseball scores. 8:30, concert by the Westing-

house Employees band. 9:55, time; weather; base-ball scores.

**WFAA, Dallas, Texas, 475.9 (C. S. T.)**—12:30 P. M., address, Dr. J. B. Cranfill, on "Playing the Game." 8:30, musical recital by George Ashley Brewster, singer. 11, The Adolphus Hotel orch.

**WHAS, Louisville, Ky., 399.8 (C. S. T.)**—4 P. M., concert from the Louisville Conservatory of Music; selections played on the Alamo Theatre organ; concert by students of the Hunt; police bulletins; weather; readings; late news. 4:55, local livestock, produce and grain market reports. 5, time. 7:30, concert by the Choristers ensemble. three-minute talk—Don Cameron Prentiss; late news; time.

**WBBR, New York, N. Y., 272.6 (E. S. T.)**—8 P. M., Dr. Hans Haag, violinist. 8:15, Bible ques-tions and answers. 8:45, Dr. Hans Haag.

**WDAF, Kansas City, Mo., 365.6 (C. S. T.)**—3:30 P. M., popular song fest. 5:50, marketgram, weatherforecast, time signal and road report. 6, School of the Air; piano tuning-in number on the Duo-Art; address, personal message from Roger W. Babson, statistical expert and "doctor of busi-ness"; The Tell-Me-a-Story Lady; music, The Trioan ensemble, Hotel Muehlebach. 11:45, Nighthawk Frolic—The "Merry Old Chief" and the Plantation Players, Hotel Muehlebach; Eddie Kuhn's Kansas City Athletic Club orch.; Johnnie Campbell's Kansas City Club orch.

**WEAF, New York City, 492 (E. S. T.)**—6:45 A. M., physical exercises. 4 P. M., Eugene M. Ingraham's orch. 6, Waldorf orch.; talk by Gen-eral Walter Irving Joyce; Huyler's "Foremost Four"; Harvard University Glee Club; Vincent Lopez orch.; American Legion Tribute to General Pershing, speakers, General Drain, Newton Baker, Chairman and General Pershing; music by op-eratic stars and stars from Broadway shows.

**WLW, Cincinnati, Ohio, 423 (C. S. T.)**—8 A. M., setting-up exercises. 10:45, weather; business re-ports. 11:55, time. 1:30 P. M., business reports and stock quotations. 3, dance program. 6, Rose City male quartet.

**WOR, Newark, N. J., 405 (E. S. T.)**—6:45 A. M., physical exercises. 2:30 P. M., recital by Fred P. Goodrick, baritone. 2:45, Prof. Barnabas Istok, violinist. 3, recital by Fred P. Goodrick, baritone. 3:15, Prof. Barnabas Istok, violinist. 3:30, joint program by Chris Traynor and Jack Sheehan. 6:15, "Music While You Dine"—East Orange High School Trio. 6:45, "The Famous DeMoss Concert Co." 7:30, "The Commanders" orch. 8, Vee Lawnburst, popular pianist. 8:15, recital by the Gertrude Hale Trio. 8:35, Vee Lawnburst, popular pianist. 8:50, Jessica Kenyon, lyric soprano, and Nancy Lawrence, harpist—Florence Wessell, pianist. 9:10, recital by the Gertrude Hale Trio. 9:30, John Regan talking on "Notables on Shipboard." 9:45, Jessica Kenyon, lyric soprano, and Nancy Lawrence, harpist—Florence Wessell, pianist. 10:45, Samuel Siegel, mandolin virtuoso. 10:30, Manhattan Serenaders. 11, Ciro's orch.

**WHN, New York City, 360 (E. S. T.)**—2:15 P. M., Carrie Cohen, pianist. 2:30, Gussie White, popular songs. 2:45, "The Criticisms," Henry Whiteman, leader. 3:45, joint recital by Frances Kirsch, soprano, and Howard Kirsch, violinist. 4, Murray Sandler, songs, accompanied by the ukulele. 4:15, Lester O'Keefe, tenor. 4:30, Sara V. Turits, soprano. 4:45, Kenneth E. Burdick, pianist, composer and singer. 5, Broadway Melody Boys. 6:30, violin solos by Orlott Vail. 7, mara-thon baseball returns. 7:05, Hotel Alamac dance orch. 7:30, health talk by Dr. Landis. 7:35, Hotel Carlton Terrace orch. 8, Jimmy Clarke and his White Way Entertainers. 8:15, Ben Lippin, baritone. 8:30, Strand Roof orch. 9, Theresa Stang, soprano. 9:15, joint recital by Edwin John-son of Carnegie Hall. 10, signing off for DX fans.

**WAAM, Newark, N. J., 263 (E. S. T.)**—7 P. M., sports—Major Tate. 7:15, Bert Brothers and Harold Linck. 7:30, Erv Bradley and Clint Blackwell. 7:45, Ebenezer A. L. E. Church of Rahway, N. J. 8:15, Erv. Bradley and Clint Blackwell. 8:30, Society Orchestra. 9, Winfield cott Minstrels of the Jr. O. U. A. M. of Elizabeth, N. J. 10, Ethel West, soprano. 10:15, James K. Muirhead, harmonica player. 10:30, dance orch.

**WNYC, New York City, 526 (E. S. T.)**—7 P. M., "The Chateau Four. 7:30, police alarms. 7:35, "Progress of the City of New York," by Mayor John F. Hylan. 7:50, The Chateau Four. 8:30, in Charge. Board of Inspection Service, Department of Agriculture. 9:15, Louis Burkow, violinist. 9:40, "Venice," by Mrs. Eva Adams, Lecture Service, Board of Education. 10, Banquet of the Mounted Police Association. 10:30, police alarms and weather. 10:35, banquet resumed.

**KTHS, Hot Springs, Okla., 374.8 (C. S. T.)**—12:30 P. M., markets, weather, music. 8:30, concert by the Charles L. Fischer Eastman Hotel orch. 9:15, concert by the College of The Ozarks trio. 10, dance concert by the Meyer Davis-New Arlington Hotel orch.

**KYW, Chicago, Ill., 536 (C. S. T.)**—6:30 A. M., morning exercises. 9:30, late news and comments of the financial and commercial markets. 10:30, farm and home service. 11:35, table talk by Mrs. Anna J. Peterson of Peoples Gas Co. 1:35 P. M., "Saturday Frolic." 6:02, news, financial and final markets. 6:35, children's bedtime story. 7, dinner concert from the Congress Hotel. 8, musical pro-gram. 9:35, Congress Classic. 12, Congress Car-nival.

**KHJ, Los Angeles, Calif., 405.2 (P. S. T.)**—10 A. M., weekly broadcasting class. 12:30 P. M., program presenting Vera Heifetz-Merenbach, so-prano; Eva Seiffert, contralto; Piggly Wiggly Girls. 2:30, matinee musicale. 6, Art Hickman's concert orch. 6:30, children's program. 7:30, special program through the courtesy of the Y. M. C. A. 8, program through the courtesy of William E. Bush, Inc. 10:30, Art Hickman's dance orch. 11:30 P. M., to 2 A. M.; weekly pro-gram of the "Lost Angels" of KHJ.

**KPO, San Francisco, Cal., 429.5 (P. S. T.)**—7 A. M., daily dozen by Bernard Durry, piano ac-

companion by Mel Lyons. 10, "What is Playing at the Local Theatres." 12 M., time; dearing of the Scripture. 1 P. M., Rudy Seiger's Fairmont Hotel orch. 5:30, market reports. 6:30, "What is Playing at the Local Theatres." 8, Art Weidner's dance orch.

KOAO, Denver, Colo., 322.4 (M. S. T.)—12:20 P. M., Kialto (theatre) organ recital. 1, final reading N. Y. stock reports; live stock and weather. 9, Joe Mann and his Rainbow-Lane orch. KGO, Oakland, Cal., 361.2 (P. S. T.)—11:30 A. M., luncheon concert. 12:30 P. M., final reading, stock reports and weather. 4, concert orch. of the Hotel St. Francis. 8, P. M., One—given by the University of California Glee Club; comic opera, "King of Spades," by Lydia Warren Lister; orch. 10, dance program by Henry Halstead's orch.

KFOA, Seattle, Wash., 455 (P. S. T.)—4 P. M., The Times, Wm. F. Hoffman's Olympic Hotel Concert Orch., studio program by the Moran School for Boys. 8:30, The Times program. 10:00, Eddie Harkness and Orch.

KSAS, Manhattan, Kan., 341 (C. S. T.)—12:35 P. M., radio fans' question box.

KFI, Los Angeles, Cal., 467 (P. S. T.)—5 P. M., Los Angeles Herald news. 5:30, Los Angeles Examiner matinee program. 6:45, radiatorial period. 7, program by the Lake Arrowhead orch. 7:45, the boy sheriff, Miss Nancy. 8, program presented by the Los Angeles Examiner. 9, Mildred Masser, female baritone. 9:15, Dave Albert, accordion soloist. 9:30, joint recital of Marguerite Johnston, violinist, and Archie Moors, basso. 10, Packard Radio Club.

CNRO, Ottawa, Ont., 435 (E. S. T.)—7:30 P. M., bedtime story. 8, Cateau Laurier concert orch. 8:30, music.

CKAC, Montreal, Canada, 411 (E. S. T.)—7 P. M., Kiddies stories. 7:15, Talk by Dr. W. G. Kennedy. 8:30, Windsor Hotel dinner concert. 8:30, Save forests talk by the Honorable H. Mercier, Minister of Lands and Forests. 10:30, Windsor Hotel Dance Orch.

PWX, Cuba, 400 (E. S. T.)—8:10 P. M., concert by the soprano, Maria Gonzalez.

Sunday, April 26

WBBR, Staten Island, N. Y. C., 272.6 (E. S. T.) 10 A. M., Watchtower orch. 10:20, Mr. Fred Iwaroschik tenor, accompanied by Watchtower orch. 10:30, Bible lecture, "The Time of Deliverance." 11, Mr. Fred Iwaroschik, tenor, accompanied by orch. 9 P. M., Staten Island School of Music. 9:15, I. B. S. A. choral singers. 9:25, Bible lecture, "Behold Thy King," Mr. W. L. Pelle. 9:55, I. B. S. A. choral singers. 10:05, violin solos, Mr. C. Chapin. 10:15, Staten Island School of Music. 10:25, I. B. S. A. choral singers.

WFAA, Dallas, Texas, 475.9 (C. S. T.)—5 P. M., Vesper service at Westminster Presbyterian Church. 6, radio Bible class. 8, service at Central Congregational Church. 9:30 P. M., Buddy's Blue Melody Boys orch.

WMAK, Lockport, N. Y., 265.5 (E. S. T.)—10:25 A. M., First Presbyterian Church.

WEAF, New York City, 492 (E. S. T.)—3 P. M., "Sunday Hymn Sing" and Interdenominational services under the auspices of the Greater New York Federation of Churches, the Rev. Wm. B. Millar, presiding officer; music by the Aida brass quartet; Federation Radio Male and Mixed quartet, under the direction of Arthur Hunt. 7:20, "Roxy and His Gang," Capitol Theatre. 9:15, organ recital direct from the Chapel at Columbia University, New York City.

WOAW, Omaha, Neb., 526 (C. S. T.)—9 A. M., radio chapel service. 1:30, matinee program. 2:30, Presbyterian Church at Fremont, Neb. 6, Bible study hour. 9, musical chapel service.

WOAL, San Antonio, Tex., 394.5 (C. S. T.)—11 A. M., services of First Presbyterian Church. 7:30 P. M., services of Central Christian Church. 9:30, The WOAL Entertainers.

WOS, Jefferson City, Mo., 440.9 (C. S. T.)—7:30 P. M., religious services of the Evangelical Church.

WCBD, Zion, Ill., 344.6 (C. S. T.)—8 P. M., The Mixed quartet.

WGR, Buffalo, N. Y., 319 (E. S. T.)—3 P. M., Vesper Services by C. Lansing Seymour. 4, organ recital by Mr. Robert Demming. 7:15, pre-service organ recital by Wm. Wall Whiddit. 7:30, evening service, Central Pres. Church.

WLW, Cincinnati, O., 422.3 (E. S. T.)—9:30 A. M., editorial staff program. 11, services from the Church of the Covenant. 7:30, services of the First Presbyterian Church. 8:30, concert by the Western and Southern Orch.

WGY, Schenectady, N. Y., 379.5 (E. S. T.)—9:30 A. M., service of First Baptist Church. 2:35 P. M., WGY Symphony Orch. 6:30 service of First Baptist Church, Schenectady. 7:45, program by Hotel Commodore orch. 9, violin recital by Godfrey Ludlow.

WHO, Des Moines, Iowa, 526 (C. S. T.)—11 A. M., church service from the University Church of Christ. 7:30 P. M., Reese-Hughes orch.

WOI, Ames, Iowa, 270 (C. S. T.)—10:45 A. M., college chimes. 11, chapel services.

WEMC, Berrien Springs, Mich., 285.5 (C. S. T.)—11 A. M., studio chapel service. 8:15 P. M., studio chapel service; Radio Lighthouse choir.

WGN, Chicago, 370 (C. S. T.)—11 A. M., Uncle Walt reads the funnies to the children. 11:45, concert from theatre. 2 P. M., Edwin S. Seder, organ. 2:30, artists concert. 3:30, recital Musical College. 9, concert directed by Charles H. Gabriel, Jr., with WGN singers and by Drake concert ensemble.

WOO, Philadelphia, Pa., 508.2 (E. S. T.), D. S.—10:30 A. M., Morning Services from Bethany Presbyterian Church. 2:30 P. M., musical exercises. 6:00, old time hymns and melodies and sacred chimes recital on the Wajnamaker grand organ.

WEEL, Boston, Mass., 303 (E. S. T.)—3:45 P. M., Men's Conference Y. M. C. A., Bedford Branch

At Station WNYC (Municipal Station, New York City 526 Meters) with Irving Hoffman RADIO WORLD Cartoonist

CR BOHSACK, STUDIO DIRECTOR, IS A VERY BUSY MAN. (Illustration of a man at a desk)

THOMAS H. COWAN ANNOUNCER, AND HERMAN NEUMAN, MUSICAL DIRECTOR, PLAYED A DUET. (Illustration of two men playing instruments)

JOHN F. HYLAN, MAYOR OF NEW YORK CITY, SPEAKS FREQUENTLY FROM WNYC. (Illustration of a man speaking into a microphone)

PHILIP BEROLZHEIMER, CITY CHAMBERLAIN, GAVE A VERY INTERESTING TALK ON MUSIC. (Illustration of a man speaking)

JOHN COFF, OF THE NEW YORK POLICE DEPT., BROADCASTS POLICE ALARMS NIGHTLY. (Illustration of a man in uniform)

UMBERTO TRAVERSI, VIOLIN VIRTUOSO, CHARMED HIS LISTENERS. (Illustration of a man playing violin)

HARRY ASH AND HIS ROYAL ORCHESTRA ARE A BIG HIT! (Illustration of a man conducting an orchestra)

Restaurant orch. 8, program from Loew's Warfield Theatre. 8:30, Rudy Seiger's Fairmont Hotel orch. KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—11 A. M., complete services of the First Presbyterian Church. 8:30 P. M., Meyer Davis orch. 10, Sunday night frolic. KGW, Portland, Ore., 491.5 (P. S. T.)—10:30 A. M., First Presbyterian Church services. 6 P. M., church services provided by Portland Council of Churches. 7, Colburn concert orch. CKAC, Montreal, Canada, 411 (E. S. T.)—4:30 P. M., studio concert.

Monday, April 27

WEEL, Boston, Mass., 476 (E. S. T.)—6:45 A. M., setting-up exercises. 7:45 morning watch from Estey Organ Studio by Boston Y. M. C. A. 3 P. M., Sam Bittel Ramblers. 5:30, Procter's Perfect Players. 6:30, Big Brother Club. 7:15, talk by W. A. L. Basley on "Forest Fires." 7:30, Dok-Eisenburg and his Sinionians. 8, Lowell Electric Light orch. 8:45, health talk. 9, from New York, A. & P. Gypsies. 10, Blue Ribbon Quartet.

WGTB, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., Gold Medal Home Service talk by Betty Crocker. 6 P. M., Rush Yates orch. 8, "House hold Equipment," by Clarence N. Kierst. 8:15, recital by Viola Cornell, Hamburg, N. Y. 8:45, address by Bryan J. Boyle, Deputy Water Commissioner. 9, Nu Tymers orch. 10, Buffalo Lyceum Bureau Concert.

WLW, Cincinnati, O., 422.3 (E. S. T.)—8 A. M., setting-up exercises. 10:45, weather, business reports. 11:55, time. 12:15 P. M., noon day services. 1:30, business reports. 3, market reports. 4, Babson reports, recital by pupils of Helen Abercherle. 6, dinner hour concert. 6:45, market reports. 10, concert program by Saint Cecilia Artists, Bob Diekmann orch.

WMAQ, Chicago, Ill., 447.5 (C. S. T.)—12:45 P. M., Radio Farm School, "Swine Day." 4, "Mothers in Council," by Mrs. Frances M. Ford; one of a weekly series. 4:30, Chicago High School Teachers' Council. 6, Chicago Theatre organ recital. 6:30, Hotel LaSalle orch. 6:50, Family Altar League.

WGY, Schenectady, N. Y., 379.5 (E. S. T.)—1 P. M., music, talk, "How to Press Garments," by Mrs. Caroline McIlroy. 5:30, Ten Y. Trio. 6, weekly sport review. 6:15, address, "Fourteen Years of Farm Bureaus," L. A. Muckle. 6:30, baseball scores. 6:35, boys' week program, Rotary Club of Amsterdam, N. Y.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., setting-up exercises. 9:30, "Tonight's Dinner" and a special talk by the woman's editor. 10:25, weather. 11:55, time. 12:05 P. M., Jules Klein's Hotel Statler orch. 3, The Detroit News orch. 3:50, weather. 3:55, market report and baseball scores. 6, dinner concert. 8, The Detroit News orch. 9, concert broadcast through WEAF.

WBRR, New York City, 272.6 (E. S. T.)—8 P. M., Mrs. Irene Kleinper, soprano. 8:10, vocal duets. 8:20, world news digest by editor of "Golden Age Magazine." 8:40, Mr. Fred Franz, tenor. 8:50, vocal duets.

WGTF, Atlanta, Ga., 270 (E. S. T.)—9:10 P. M., Howard McClave, violin; Prof. J. A. Campamoor, baritone; D. M. Harlan, piano.

WEAF, New York City, 492 (E. S. T.)—6:45 A. M., physical exercises. 4 P. M., Sol Giskin, violinist; "Children's Verses," by Joseph Osman Skinner; Orphelia Crumm, contralto; elementary French lessons by William Doub-Kerr. 6, Waldorf-Astoria orch.; Nancy McCord, soprano; musical program direct from the Mark Strand Theatre, New York City; "Tower Health Talk" by Metropolitan Life Insurance Co.; A. and P. Gypsies; "Blue Ribbon Quartet"; Ben Bernie's Hotel Roosevelt orch.

WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M., noonday program by Randall's Royal Fontenelle orch. 5:45, public news period. 6, organ music, transmitted from the World Theatre; Arthur Hays, organist. 6:30, to be announced. 6:45, to be announced. 9, de luxe program.

WOS, Jefferson City, Mo., 440.9 (C. S. T.)—8 P. M., address, "The Boy and His Project," by Mr. John B. Boyd.

WCBD, Zion, Ill., 344.6 (C. S. T.)—8 P. M., male chorus.

WMC, Memphis, Tenn., 499.7 (E. S. T.)—7:30 P. M., weekly farm talk by Dr. C. W. Watson. 8:30, Hotel Gayoso orch.

WEMC, Berrien Springs, Mich., 285.5 (C. S. T.)—8:15 P. M., orch. concert by Radio Lighthouse Music Makers.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., program broadcast from the Newman and Royal theatres. 5, weekly Boy Scout program. 5:50, marketgram, weather, time and road report. 6, School of the Air. 8, "Around the Town with WDAF." 11:45 P. M., to 1 A. M., Nighthawk Frolic—"The Merry Old Chief" and the Plantation Players. Hotel Muehlebach.

WIP, Philadelphia, Pa., 509 (E. S. T.)—7 A. M., setting-up exercises. 10, the daily menu and intimate talk to housewives. 1 P. M., Gimbel Tea Room orch. 1:30, weather. 3, "The Millennium," part two, a talk by J. G. Calhoun of the International Bible Association. 3:15, artist recital by the Combs Conservatory of Music. 4, "Hints on Home Gardening," a talk by Charles K. Hallowell. 6, weather. 6:05, dinner music by Clarence Seamon's Hotel St. James orch. 6:45, livestock and produce market reports. 7, Uncle Wip's bedtime story.

WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., college chimes; weather; livestock markets; Professor G. H. Collingwood. 9:30, weather. 10, program of popular music.

WHO, Des Moines, Iowa, 526 (C. S. T.)—7:30 P. M., Stewart Watson, American baritone; Helen Birmingham, accompanist; Cornelius Ahern, tenor. 8, program under direction of Dean Holmes Cowper. 11:15, organ recital by L. Carlos Meier.

WOO, Philadelphia, Pa., 508.2 (E. S. T., D. S.)—

Brooklyn, N. Y. 7:20, Roxy and his Gang. 9:20, organ recital, Columbia University, N. Y. KPO, San Francisco, Calif., 429.5 (P. S. T.)—8 A. M., presentation of the "funnies" from the San Francisco Chronicle. 10:30, "What is Playing at the Local Theatres." 11, undenominational and non-sectarian church services. 6:30 P. M., "What is Playing at the Local Theatres." 7:30, States

# Permanent Schedule of Hours on Air

Time given is Eastern Standard and always P. M. For conversion to Central Standard Time subtract one hour; Mountain Time, two hours; Pacific Time, three hours.

Station	Meters	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
KDKA, E. Pittsburgh, Pa.	309	7:30-9:55	4:00-8:45	6:15-9:55	6:15-12:00	6:15-9:55	6:15-12:00	6:15-9:55
KFAE, Pullman, Wash.	348	Silent	Silent	10:30-11:30	Silent	10:30-11:30	Silent	10:30-11:30
KFL, Los Angeles, Calif.	468	9:45-2:00	7:00-2:00	9:45-2:00	9:45-2:00	9:45-3:00	9:45-2:00	9:45-3:00
KFKX, Hastings, Neb.	288	Silent	Silent	10:30-12:00	Silent	10:30-12:00	Silent	10:30-12:00
KFNK, Shenandoah, Ia.	266	7:30-10:00	7:30-9:00	7:30-9:00	Silent	7:30-9:00	7:30-10:00	7:30-10:00
KFOA, Seattle, Wash.	454	9:45-2:00	Silent	9:45-1:00	9:45-2:00	9:45-1:00	9:45-2:00	9:45-2:00
KFFT, Salt Lake City	261	10:00-12:00	11:00-12:00	10:00-11:00	10:00-11:00	10:00-11:00	10:00-11:00	10:00-11:00
KFRU, Bristow, Okla.	394	10:00-1:00	6:00-7:00	8:00-11:30	11:30-1:00	9:00-11:20	11:30-12:30	12:00-2:00
KFUO, St. Louis, Mo.	545	Silent	10:15-11:15	Silent	Silent	10:15-11:15	Silent	Silent
KGO, Oakland, Calif.	361	11:00-3:00	6:30-10:30	11:00-3:00	11:00-3:00	Silent	11:00-3:00	Silent
KGW, Portland, Ore.	491	1:00-3:00	6:00-10:00	Silent	11:00-3:00	11:00-3:00	11:00-3:00	11:00-3:00
KHL, Los Angeles, Calif.	495	11:00-3:00	11:00-1:00	Silent	11:00-2:00	11:00-1:00	11:00-2:00	11:00-3:00
KJS, Los Angeles, Calif.	293	Silent	10:15-12:30	Silent	11:00-12:00	Silent	11:00-12:00	Silent
KLX, Oakland, Calif.	508	Silent	Silent	9:00-2:00	9:00-10:00	9:00-2:30	Silent	9:00-1:30
KNX, Hollywood, Calif.	336	9:15-4:00	10:00-2:00	9:15-3:00	9:30-3:00	9:15-3:00	9:30-2:00	9:30-3:00
KOA, Denver, Colo.	322	11:00-2:00	6:00-11:45	10:00-11:00	Silent	10:00-2:00	Silent	10:00-11:00
KOB, State College, N. M.	348	Silent	Silent	9:30-10:30	Silent	10:00-2:00	Silent	10:00-11:00
KPO, San Francisco, Calif.	429	11:00-3:00	11:30-1:00	10:00-1:00	10:00-2:00	9:30-10:30	Silent	9:30-10:30
KSAC, Manhattan, Kan.	340	Silent	9:00-10:00	8:20-9:00	8:20-9:00	8:20-9:00	8:20-9:00	8:20-9:00
KSD, St. Louis, Mo.	454	8:00-11:00	Silent	9:00-12:00	7:00-12:00	7:00-8:00	Silent	9:00-12:00
KTHS, Hot Springs, Ark.	374	9:30-12:00	9:30-12:00	9:30-2:15	9:30-11:00	9:30-12:00	9:30-2:15	9:30-11:00
KTW, Seattle, Wash.	455	Silent	10:00-12:30	Silent	Silent	Silent	Silent	Silent
KYW, Chicago	535	8:00-3:00	8:00-10:00	Silent	8:00-3:30	8:00-3:30	8:00-3:30	8:00-3:30
NAA, Radio, Va.	434	Silent	Silent	7:45-8:00	7:45-8:00	7:25-7:40	7:45-8:00	7:45-8:00
WAHG, Richmond, N. Y.	315	12:00-2:00	Silent	8:00-2:00	Silent	8:00-11:30	Silent	8:00-11:30
WBAP, Fort Worth, Tex.	475	8:00-9:00	12:00-1:00	8:30-11:45	8:00-11:45	8:00-11:45	8:00-11:45	8:00-11:45
WBAR, Sisseton, Wis.	406	Silent	11:00-12:00	10:00-11:00	Silent	9:00-10:00	8:30-9:30	8:00-9:00
WBVA, Columbus, O.	293	Silent	Silent	8:00-9:00	Silent	Silent	Silent	8:00-9:00
WBBG, Mattapoisett, Mass.	248	Silent	Silent	8:00-10:00	Silent	8:00-9:00	Silent	7:00-2:00
WBBM, Chicago	226	Silent	9:00-10:00	Silent	9:00-10:00	Silent	9:00-10:00	Silent
WBBR, Staten Island, N. Y.	272	8:00-9:45	9:00-10:20	8:00-8:50	Silent	Silent	8:00-8:50	Silent
WBCN, Chicago	266	7:00-2:00	5:00-1:00	Silent	7:00-2:30	7:00-11:15	7:00-2:00	7:00-2:00
WBZ, Springfield, Mass.	333	6:00-11:00	7:00-11:00	6:00-11:00	6:00-9:55	6:00-11:00	6:00-12:45	7:05-8:05
WCAE, Pittsburgh, Pa.	461	6:30-9:30	4:00-7:30	6:30-12:00	6:30-12:00	6:30-10:00	6:30-11:00	6:30-10:00
WCAL, Northfield, Minn.	336	1:00-2:00	9:30-11:00	12:00-1:00	Silent	Silent	10:00-11:00	7:00-10:00
WCAP, Washington, D. C.	468	Silent	6:20-10:15	7:00-11:30	7:30-9:30	8:00-11:10	7:30-11:00	7:00-10:00
WCAU, Philadelphia, Pa.	278	Silent	5:30-9:30	Silent	6:00-12:00	Silent	9:00-11:30	7:30-10:30
WCBD, Zion, Ill.	344	Silent	3:30-10:00	9:00-11:30	7:30-11:00	8:00-1:30	8:00-11:00	7:30-1:00
WCCO, Minn.-St. Paul	416	9:00-12:00	5:10-10:15	9:00-12:00	6:00-9:30	6:00-9:30	7:00-2:00	7:00-2:00
WCX, Detroit	516	6:00-7:00	Silent	6:00-9:30	7:00-2:00	7:00-2:00	7:00-2:00	7:00-2:00
WDAF, Kansas City, Mo.	365	7:00-2:00	5:00-6:30	Silent	9:00-10:30	Silent	Silent	Silent
WDWF, Providence, R. I.	440	Silent	5:00-6:45	Silent	6:00-10:00	6:00-12:00	6:00-12:00	6:00-12:00
WEAF, New York	491	6:00-12:30	8:15-10:15	Silent	Silent	9:00-10:20	Silent	Silent
WEAO, Columbus, O.	293	8:00-9:00	Silent	7:00-8:00	7:30-10:00	7:00-8:00	7:00-10:00	7:00-10:00
WEAR, Cleveland, O.	389	Silent	3:30-5:00	Silent	8:00-1:00	8:00-1:00	8:00-1:00	8:00-1:00
WEBB, Chicago	370	8:00-1:00	8:00-10:00	Silent	7:00-9:00	7:00-9:00	Silent	7:00-9:00
WBJ, New York	233	Silent	Silent	Silent	9:00-10:00	Silent	8:30-9:30	Silent
WEBW, Beloit, Wis.	268	Silent	5:30-6:30	Silent	6:30-11:00	6:30-12:00	6:30-11:00	6:30-10:30
WEEL, Boston, Mass.	475	Silent	3:45-10:15	Silent	9:15-10:15	Silent	10:00-11:45	10:00-11:45
WEMC, Berrien Sp., Mich.	285	Silent	9:15-11:00	7:30-10:30	7:30-1:00	Silent	7:30-1:00	7:30-10:30
WFSA, Dallas, Tex.	475	9:30-1:00	7:00-12:00	6:00-1:15	6:00-11:30	6:15-1:15	6:00-12:30	6:00-1:30
WFBH, New York	272	6:00-8:45	6:00-8:30	6:00-1:15	6:30-11:00	6:30-8:00	6:30-11:00	6:30-8:00
WFI, Philadelphia	394	6:30-9:00	4:30-5:30	6:30-8:00	6:30-10:00	Silent	6:30-10:00	6:00-7:30
WGBS, New York	315	6:00-12:00	3:30-3:45	6:30-7:30	7:00-12:00	7:00-12:00	7:00-12:00	7:00-12:00
WGN, Chicago	370	6:00-12:00	3:00-11:00	Silent	6:00-11:30	8:00-11:00	6:00-11:00	6:00-11:00
WGR, Buffalo, N. Y.	319	6:00-7:30	4:00-8:30	8:15-11:00	6:00-11:00	Silent	8:00-9:00	Silent
WGST, Atlanta, Ga.	270	Silent	Silent	10:40-9:00	6:30-12:30	Silent	6:30-11:30	7:00-11:30
WGY, Schenectady, N. Y.	379	9:30-12:00	3:35-11:00	6:00-9:00	Silent	10:00-11:00	Silent	8:45-9:45
WHA, Madison, Wis.	535	Silent	Silent	8:45-9:45	8:30-9:30	Silent	9:00-10:00	8:30-9:00
WHAD, Milwaukee, Wis.	275	Silent	Silent	8:30-9:30	8:30-10:00	8:30-10:00	8:30-10:00	8:30-10:00
WHAS, Louisville, Ky.	399	8:30-10:00	5:00-6:00	Silent	9:00-10:00	Silent	Silent	Silent
WHAZ, Troy, N. Y.	379	Silent	Silent	9:00-10:00	9:00-11:15	8:00-9:00	8:00-11:00	8:00-9:00
WHB, Kansas City, Mo.	365	Silent	9:00-2:00	8:00-9:00	6:30-7:30	6:00-7:30	6:00-11:30	6:00-10:00
WHK, Cleveland, O.	273	6:00-1:00	7:30-11:00	6:00-7:30	6:30-12:30	6:30-12:30	6:30-12:30	6:30-12:30
WHN, New York	361	6:30-12:30	3:00-12:45	6:30-1:00	Silent	7:30-12:00	12:00-1:00	8:30-10:00
WHO, Des Moines, Ia.	526	Silent	5:00-9:30	8:30-1:00	Silent	7:30-12:00	12:00-1:00	8:30-10:00
WIP, Philadelphia	508	6:05-12:05	3:15-9:30	6:05-7:30	6:00-12:00	6:05-7:05	6:05-12:00	6:05-7:30
WJAR, Providence, R. I.	305	7:10-8:10	7:20-10:15	8:00-9:00	8:00-9:00	8:00-9:00	Silent	7:30-11:00
WJJD, Mooseheart, Ill.	302	8:15-1:00	Silent	8:30-11:00	8:15-9:15	8:15-9:15	8:15-9:15	8:15-9:15
WJY, New York	405	Silent	Silent	8:15-9:15	8:15-11:00	Silent	7:30-10:00	8:30-9:30
WJZ, New York	454	7:00-11:30	4:00-8:30	7:00-10:00	7:00-10:20	7:00-10:30	7:00-12:00	7:00-11:30
WKAR, Lansing, Mich.	285	12:30-2:30	Silent	7:00-8:00	Silent	8:00-9:15	Silent	7:00-8:00
WLBL, Stevens Pt., Wis.	278	1:00-1:00	7:00-8:30	9:00-11:00	Silent	9:00-11:00	Silent	Silent
WLIT, Philadelphia	394	7:30-8:30	2:00-3:30	7:30-11:02	7:30-8:50	7:30-11:03	7:30-8:30	7:30-11:03
WLS, Chicago	344	9:00-1:00	7:30-9:00	Silent	7:30-2:00	7:30-1:00	7:30-9:00	7:30-12:00
WLW, Cincinnati	422	9:00-11:00	8:30-11:00	9:00-11:00	9:00-11:00	11:00-1:00	12:00-2:00	Silent
WMAK, Lockport, N. Y.	265	Silent	Silent	8:00-9:00	Silent	Silent	12:00-1:00	Silent
WMAQ, Chicago	447	7:00-11:00	Silent	Silent	7:00-11:00	7:00-11:00	7:00-11:00	7:00-11:00
WMBF, Miami, Fla.	384	8:00-3:00	8:00-3:00	8:00-3:00	8:00-3:00	8:00-3:00	8:00-3:00	8:00-3:00
WMC, Memphis, Tenn.	499	9:30-10:30	Silent	9:30-10:30	9:00-1:00	Silent	9:30-10:30	9:30-1:00
WMH, Cincinnati, O.	422	11:00-1:00	7:00-8:30	9:00-11:00	Silent	9:00-11:00	Silent	Silent
WNAO, Boston	280	10:00-11:00	8:30-10:30	7:00-11:00	9:00-11:00	7:00-11:00	9:00-11:00	7:00-11:00
WNYC, New York	526	6:30-10:20	9:00-11:00	7:00-10:25	7:20-10:20	7:30-10:30	7:20-9:30	7:30-10:20
WOAI, San Antonio, Tex.	394	Silent	8:30-11:30	Silent	9:30-11:30	Silent	10:30-11:30	Silent
WOAX, Omaha, Neb.	526	7:00-1:00	7:00-11:00	7:00-12:30	7:00-12:30	Silent	7:00-12:30	7:30-12:30
WOC, Davenport, N. J.	483	Silent	Silent	9:15-11:00	Silent	Silent	Silent	9:00-11:00
WOJ, Ames, Ia.	270	7:30-1:00	9:00-12:30	Silent	7:30-10:00	7:30-1:00	7:30-1:00	7:30-10:00
WOO, Philadelphia	508	Silent	Silent	11:00-12:00	Silent	Silent	9:15-10:15	Silent
WOR, Newark, N. J.	405	6:15-7:30	Silent	6:05-8:30	6:15-11:15	6:15-9:45	6:15-7:15	6:15-7:15
WORD, Batavia, Ill.	275	Silent	Silent	8:00-8:50	9:00-9:50	9:00-9:55	Silent	8:00-9:00
WOS, Jefferson City, Mo.	440	Silent	Silent	8:30-9:30	9:00-10:00	Silent	9:00-10:00	Silent
WPG, Atlantic City, N. J.	299	9:00-12:00	3:15-11:00	Silent	7:00-12:00	Silent	8:15-12:00	9:00-10:00
WQJ, Chicago	447	8:00-4:00	9:00-11:00	Silent	8:00-3:00	8:00-3:00	8:00-3:00	8:00-3:00
WRBC, Valparaiso, Ind.	278	Silent	8:30-9:00	8:30-9:00	Silent	Silent	Silent	Silent
WRC, Washington, D. C.	468	6:45-12:15	Silent	Silent	6:45-12:00	Silent	6:45-11:30	Silent
WRO, Lansing, Mich.	285	Silent	7:00-8:00	Silent	8:15-9:45	Silent	8:15-9:45	Silent
WSAC, Clemson Coll., S.	336	Silent						
WSAI, Cincinnati	325	9:00-2:00	4:00-5:00	7:00-1:00	8:00-11:00	8:00-1:00	8:00-1:00	8:00-1:00
WSB, Atlanta, Ga.	428	9:00-1:00	8:30-10:15	9:00-1:00	9:00-1:00	9:00-1:00	9:00-1:00	9:00-1:00
WSUL, Iowa City, Ia.	483	8:30-10:00	8:00-10:30	8:30-10:00	Silent	8:30-10:00	Silent	Silent
WTAM, Cleveland, O.	389	6:00-12:00	Silent	6:00-12:00	6:00			

P. M., Myrtle Williams, soprano; Stewart Watson, baritone; Helen Birmingham, pianist. 8, The Great Western Silver String Serenaders. 11, dance program.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., The Star's radio trio. 5, weekly child talent program. 5:50, marketgram, weather, time and road report. 6, School of the Air. 11:45 P. M. to 1 A. M., Nighthawk Frolic—"Newman Nighthawk Night" theatre entertainers, broadcast from the stage of the Newman Theatre.

WIP, Philadelphia, Pa., 509 (E. S. T.)—7 A. M., setting-up exercises. 10, the daily menu and intimate talk to housewives. 1 P. M., organ recital. 1:30, weather. 3, Frances Lande, select violinist to the late President Harding, and his Mayflower orch. 6, weather. 6:05, baseball talk by Monte Cross, "Oldtimer." 6:15, Benjamin Franklin concert orch. 6:35, "What Farm Boys Need to Farm Successfully." 6:45, produce market reports. 7, Uncle Wip's Roll Call. 8, a talk by William Rowen. 8:15, Symphony orch. concert. 10:05, the Angelus hour. 11, Benjamin Franklin dance orch.

WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 1:30 P. M., college chimes; weather; livestock; Professor G. B. MacDonald; 9:30, weather report.

WMC, Memphis, Tenn., 499.7 (E. S. T.)—7:30 P. M., weekly health talk by Dr. E. E. Francis. 8:30, program arranged and sponsored by George Hughes, Dixie's Harry Lauder. 11, organ recital by Harry O. Nichols.

WOO, Philadelphia, Pa., 508.2 (E. S. T., D. S.)—11 A. M., grand organ. 11:30, weather. 12 M., Golden's Orch. 12:35 P. M., time. 4:40, police reports. 4:45, grand organ and trumpets. 10:55, time. 11:02, weather.

KPO, San Francisco, Calif., 429.5 (P. S. T.)—7 A. M., daily dozen. 10:30, "What is Playing at the Local Theatres." 12 M., time. 1 P. M., Rudy Seiger's orch. 4:30, Rudy Seiger's orch. 5:30, market reports. 5:30, children's hour stories. 6:30, "What is Playing at the Local Theatres." 6:30, States Restaurant orch. 7, Rudy Seiger's orch. 8, program under the auspices of the Bass-Heuter Paint Co. 9, program by the San Rafael Thursday musical club. 10, Johnny Buick's Amphians of Cabrera Ca.

KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—12:30 P. M., markets, weather, music. 8:30, Eastman Hotel orch. 9:45, Meyer Davis orch. 11:30 P. M., weather. 12:30 P. M., Rose City trio. 5, children's program. 7:15, markets, weather, news bulletins and police reports. 8, Oregon Agricultural College Extension Service lecture. 8:30, concert. 10, Multnomah Hotel Strollers (2 hours).

KSAC, Manhattan, Kan., 341 (C. S. T.)—12:35 P. M., reading; weather report. "Did You Get That Last Pocket Gopher, E. A. Oman; question box; Some Timely Hints on Preventing Animal Diseases. R. R. Dykstra.

KFMQ, Fayetteville, Ark., 299.8 (E. S. T.)—9 P. M., choir, First Presbyterian Church.

CNRA, Moncton, N. B., 313 (A. S. T.)—8:30 P. M., Mrs. Bob Gander, elocutionist; Miss Hilda Linden, mezzo soprano; Miss Jean Parker Hanright, soprano; Mr. Frank R. Hanright, saxophone; Mr. Bob Gander, baritone; Prof. Selte Fowles, pianist; saxophone solo; reading; soprano solo; baritone solo.

CNRA, Moncton, N. B., 313 (A. S. T.)—8 P. M., weekly bedtime travel tale; Belvedere Symphony orch.

CKAC, Montreal, Canada, 411 (E. S. T.)—4 P. M., weather and stock reports. 7, kiddies stories. 7:30, Windsor Hotel dinner concert. 8:30, program from the Oriental Room of the Montreal Press Club.

Wednesday, April 29

WEEL, Boston, Mass., 476 (E. S. T.)—6:45 A. M., setting-up exercises. 7:45, morning watch from Estey Organ Studio by Boston Y. M. C. A. 3 P. M., Frankie Ward and his Avalon orch. 5:30, Ye Middleton Arms orch. 6:30, Big Brother Club. 7:15, Walter F. Dunn, tenor. 7:30, Vitali Podolski, violinist. 8, The Traveler Shoe orch. 8:30, M. B. Cohan's half hour musicale. 9, Gillette Safety Razor Concert orch.

WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., Gold Medal Home Service talk by Betty Crocker. 11, "Gardens and Grounds," by Clarence N. Kierst. 6:30 P. M., Stewart's Lake Shore orch. 9, recital by Irene Pellet Studt. 9:30, piano, violin and vocal recital by Anna Williams. 10, concert by P. Arlow Mathews.

WLW, Cincinnati, O., 423 (E. S. T.)—8 A. M., setting-up exercises. 10:45, weather, business reports. 11:55, time. 12:15, Hagenbeck Wallace Circus Band. 1:30, business reports. 3, market reports. 4, program for the "Shut Ins." 6, WLW Dinner Hour Concert. 6:45, market reports. 10, The Cincinnati Zither Quartet. 10:15, Miami University Male Quartet. 11, The Crosby Hello Boys. 11:15, The Famous "Coom Goo" orch.

WMAQ, Chicago, Ill., 447.5 (C. S. T.)—12:45 P. M., Radio Farm School, "Dairy Day." 1, speeches from the weekly luncheon of the Association of Commerce. 4, program to be announced. 4:30, musical program to be announced. 6, Chicago Theatre organ recital. 6:30, stories for the children, by Miss Georgene Faulkner, the Story Lady. 8, weekly lecture from Northwestern University. 8:25, musical program to be announced. 9, Mr. Edward G. Taylor. 9:15, WMAQ players.

WGY, Schenectady, N. Y., 379.5 (E. S. T.)—5:30 P. M., program for the children. 6, Albany Strand Theatre orch.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., setting-up exercises. 9:30, "Tonight's Dinner" and a special talk by the Woman's Editor. 10:25, weather. 11:55, time. 12:05 P. M., Jules Klein's Hotel Statler orch. 3, the Detroit News orch. 3:50, weather. 3:55, market reports and baseball scores. 6, dinner concert. 8, The Detroit News orch. Anne Campbell, Detroit News poet. 10, Jean Goldkette's Victor Recording orch.

WEAO, Columbus, Ohio, 293.9 (E. S. T.)—8 P. M., faculty talk, Girls Glee Club.

WEAF, New York City, 492 (E. S. T.)—6 A. M., physical exercises. 11, Freda Williams, soprano; "Young Mother's Program"; market and weather reports. 4 P. M., Steven H. Ackert, bass baritone; children's stories. 6, Waldorf-Astoria orch.; Amphion male quartet; Synagogue services; Rudolph Luks string quartet; "Ipana Hour"; Royal Little Symphony orch.; Meyer Davis Lido Venice orch.

WOS, Jefferson City, Mo., 440.9 (C. S. T.)—8 P. M., address "Spring Music-making in Your Kitchen," by Miss F. Clark; address by George A. Pickens; musical program by Bichet-Botz Sisters.

WEAO, Columbus, Ohio, 293.9 (E. S. T.)—8 P. M., lecture, Edwin Long Beck.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., The Star's radio trio. 5:30, marketgram, weather, time and road report. 6, School of the Air. 8, program of classical music by the State's radio orch., assisted by vocal and instrumental soloists. 11:45 P. M. to 1 A. M., Nighthawk Frolic—"The Merry Old Chief" and Carl Nordberg's Plantation Players, Hotel Muehlebach.

WHO, Des Moines, Iowa, 526 (C. S. T.)—6:30 P. M., Reese-Hughes orch. 7:30, Mr. Wilfred Fletcher, tenor; Mrs. John T. Goble, soprano; Mr. Bernard Thompson, tenor. 9, The Des Moines Theatre symphonic orch. 9:45, Bankers Life radio orch.

WIP, Philadelphia, Pa., 509 (E. S. T.)—7 A. M., setting-up exercises. 10, the daily menu and intimate talk to housewives. 1 P. M., Gimbel Tea Room orch. 1:30, weather. 3, The Puccini quartet. 6, weather. 6:05, Benjamin Franklin concert orch. 6:45, livestock and produce market reports. 7, Uncle Wip's bedtime story.

WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., college chimes; weather; livestock markets. 9:30, weather report.

WEMC, Berrien Springs, Mich., 285.5 (C. S. T.)—8:15 P. M., ensemble recital by Dr. and Mrs. Birt Summers of Emanuel Missionary College.

KPO, San Francisco, Calif., 429.5 (P. S. T.)—7 A. M., daily dozen. 10:30, "What is Playing at the Local Theatres." 12 M., time. 1 P. M., Rudy Seiger's orch. 4:30, Rudy Seiger's orch. 5:30, market reports. 5:30, children's hour stories. 6:30, "What is Playing at the Local Theatres." 6:30, States Restaurant orch. 7, Rudy Seiger's orch. 8, Atwater Kent artist program. 9, vocal and instrumental program. 10, Johnny Buick's Amphians of Cabrera Ca.

KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—8:30 P. M., violin recital by Jacques Renard. 9:10, popular piano numbers by Phil Wall. 10, Meyer Davis orch. 11, Chas. L. Fisher orch.

KGW, Portland, Ore., 491.5 (P. S. T.)—11:30 A. M., weather. 12:30 P. M., Rose City trio. 5, children's program. 6, Hotel Portland concert. 7:15, markets, weather, news bulletins and police reports. 8, grand invitational program to Elks Lodge convention.

KFAE, State College of Washington, 348.6 (P. S. T.)—Sigma Kappa national sorority program; the role of vitamins in livestock feeding; building materials for your new home; what sewing club girls are doing. E. Belle Alger.

CNRM, Montreal, Que., 411 (E. S. T.)—8:30 P. M., trio; violin; violoncello; piano; songs, Miss Gertrude Sanger; violin; piano; pianoforte solo; violoncello solo; address; songs; violin solo; pianoforte solo; violoncello solo; trios.

CNRO, Ottawa, Ont., 435 (E. S. T.)—7 P. M., half-hour talk for boys and girls. 7:30, market. 8, Laurier concert orch.

PWX, Cuba, 400 (E. S. T.)—8:10 P. M., concert at the Malecon band stand by the Municipal Band of Havana.

CKAC, Montreal, Canada, 411 (E. S. T.)—10:30 P. M., Windsor Hotel dance orch. 1:45, Harry Salter trio. 4, weather and stock reports.

Thursday, April 30

WGY, Schenectady, N. Y., 379.5 (E. S. T.)—1 P. M., music; talk, "Helps for Home Sewers." Frances Brookins. 5:30, Hotel Ten Eyck orch. 6:35, book talk, William F. Jacob, librarian, General Electric Co. 6:45, program by Mary Zoller and Erlau Wilcox, xylophonists, and Edith Penner, whistler. 7:30, program from Vanamaker's Auditorium, New York. 8:25, address of banquet in celebration of Anniversary of Inauguration of George Washington, Hotel Roosevelt, New York; speakers, Sir Esme Howard, English Ambassador; Giacomo De Martino, Italian Ambassador; General John J. Pershing and Major General John A. Lejeune, U.S.M.C. 10:30, organ recital by Stephen E. Boisclair.

WEEL, Boston, Mass., 476 (E. S. T.)—6:45 A. M., setting-up exercises. 7:45, morning watch from Estey Organ Studio by Boston Y. M. C. A. 2:30, P. M., French Poetry by Mon. Ernest Perrin. 3:15, Noah's Arkadians. 6:30, Big Brother Club. 7:15, Sager's "How of Hospitality." 7:25, Pathe News flashes. 8, from New York-Musicale. 8:30, Musicale. 9, Atwater-Kent Radio Artists. 10, Goodrich Silvertown Cord orch.

WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., "A Woman's Room and the Guest Room," by C. N. Kierst. 8 P. M., joint broadcasting with WEAF, New York.

WLW, Cincinnati, O., 423 (E. S. T.)—8 A. M., setting-up exercises. 10:45, weather, business reports. 11:55, time. 12:15 P. M., program by the Mu Phi Epsilon Sorority. 1:30, business reports. 3, market reports. 4, French Lesson by Madame Ida Teimpide; piano, recital by Adelaide Apfel. 6, WLW Dinner Hour Concert. 6:45, market reports. 10, three-minute messages from the U. S. Civil Service Department. 10:03, The Cooper Corporation Concert; solos by the Cooper Male Quartet.

WMAQ, Chicago, Ill., 447.5 (C. S. T.)—12:45 P. M., Radio Farm School, "Legume Day." 4, household hour, under direction of Mrs. Elizabeth O. Hiller. 4:30, Illinois Federation of Wo-

men's Clubs. 6, Chicago Theatre organ recital. 6:25, Hotel LaSalle orch. 6:50, "Daddy." 8, garden talk, James H. Burdett. 8:15, musical program to be announced. 8:50, University of Chicago lecture. 9:15, program by the Ravenswood Methodist Episcopal Church.

WHO, Des Moines, Iowa, 526 (C. S. T.)—7 P. M., musical program. 11, dance program.

WDAF, Kansas City, Kans., 365.6 (C. S. T.)—3:30 P. M., The Star's radio orch. 5:30, marketgram, weather, time and road report. 6, School of the Air. 11:45 P. M. to 1 A. M., Nighthawk Frolic—"The Merry Old Chief" and the Plantation Players, Hotel Muehlebach. Eddie Kuhn's Kansas City Athletic Club orch., Johnnie Campbell's Kansas City Club orch.

WIP, Philadelphia, Pa., 509 (E. S. T.)—7 A. M., setting-up exercises by Dr. Francois D'Eliscu. 10, the daily menu and intimate talk to housewives. 1 P. M., Gimbel Tea Room Orch. 1:30, weather. 3, artist recital by the Sternberg School of Music. 6, weather. 6:05, Benjamin Franklin Concert Orch. 7, Uncle Wip's Roll Call. 8, The Boy's Harmonica Contest Finals. 10:05, the Angelus Hour. 11, Benjamin Franklin Dance Orch.

WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., college chimes, weather, complete livestock markets, Professor I. T. Bode. 8:15, musical program. 9:30, weather.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., setting-up exercises. 9:30, "Tonight's Dinner" and a special talk by the Woman's Editor. 10:25, weather. 10:30, confirmation of Dean Warren L. Rogers as an Episcopal bishop. 3 P. M., The Detroit News orch. 3:50, weather. 3:55, market reports and baseball scores. 6, dinner concert. 8, concert broadcast through WEAF.

WBBR, New York City, 272.6 (E. S. T.)—8 P. M., instrumental selections. 8:10, violin solos, Mr. Carl Park. 8:20, International Sunday school. 8:40, flute solos, Mr. Frank Wood. 8:50, instrumental selections.

WOAW, Omaha, Neb., 526 (C. S. T.)—12:30 P. M., horticultural program. 5:45, public news. 6, every child's story hour. 6:20, to be announced. 6:45, Raynald's Royal Fontenelle orch. 9, Buckingham's orch. 10, program arranged by Mildred Sinnott, pianist. 10:30, Nightingale orch.

WEAF, New York City, 492 (E. S. T.)—6:45 A. M., physical exercises. 11, musical program; talk to housewives; market and weather reports. 4 P. M., Genevieve Williams, soprano; poems of Joyce Kilmer by Annie K. Kilmer. 6, Waldorf-Astoria orch.; mid-week services, Greater New York Federation of Churches; Cushman's "Serenaders"; "Touring in a Packard Eight," by George Elliott Cooley; "Atwater Kent Radio Artists"; "The Silvertown Cord Orch."; Vincent Long orch.

WGST, Atlantic, Ga., 270 (E. S. T.)—7 P. M., program, sponsored by Mrs. G. E. Cooper, contraalto; Dr. A. V. Henry, head of the Ceramics Department, on the subject, "Some Phases of the Development of Ceramics."

WOAL, San Antonio, Tex., 394:5 (C. S. T.)—9:30 P. M., Jimmie Joy's orch.

WOS, Jefferson City, Mo., 440.9 (C. S. T.)—8 P. M., Rotary International Boys' Week program.

WEAO, Columbus, Ohio, 293.9 (E. S. T.)—6 P. M., chimes; father and son banquet.

WBD, Zion, Ill., 344.6 (C. S. T.)—8 P. M., public band concert.

KFMQ, Fayetteville, Ark., 299.8 (E. S. T.)—7:30 P. M., Pi Kappa Alpha fraternity; what is new in educational practice. C. M. Reinohl; public school music, Mrs. Don Parmelee; comparison of human ear with radio microphone, H. McKinley.

WMC, Memphis, Tenn., 499.7 (E. S. T.)—7:30 P. M., weekly science talk by Brother Joseph of C. B. C. 8:30, programme by employees of the Bowers Stores, Inc.

WGN, Chicago, Ill., 370 (C. S. T.)—9:31 A. M., time. 9:35, quotations. 10, quotations. 11, quotations, weather, market. 11:30, quotations. 11:56, time. 12 M., quotations. 12:10 P. M., quotations. 12:30, quotations. 12:40, Drake concert ensemble, Blackstone string quintet. 1, quotations. 1:25, quotations. 2:30, Lyon and Healy concert hall. 3, Rocking Chair Time. 5, quotations. 5:30, Skeezix Time for Children. 5:57, time. 6, organ, Edwin Stanley Seder. 6:30, Drake concert ensemble, Blackstone string quintet. 8, classic hour. 10, Drake Hotel orch.

KPO, San Francisco, Calif., 429.5 (P. S. T.)—7 A. M., daily dozen. 10:30, "What is Playing at the Local Theatres." 12 M., time. 1 P. M., Rudy Seiger's orch. 4:30, Rudy Seiger's orch. 5:30, market reports. 6:30, children's hour stories, "What is Playing at the Local Theatres." 7, States Restaurant orch. 7:30, Rudy Seiger's orch. 8, Clear Lake Highland orch. 9, Don Lee-Cadillac Night. 10, Johnny Buick's Amphians of Cabrera Ca.

KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—12:30 P. M., markets, weather, music. 8:30, Chas. L. Fischer orch.

KGW, Portland, Oregon, 491.5 (P. S. T.)—11:30 A. M., weather. 12:30 P. M., Rose City Trio. 5, children's programme. 7:15, market, weather, and news bulletins and police reports. 8, concert by Sherman Clay & Company. 10, Multnomah Hotel Strollers. (2 hours).

CNRR, Winnipeg, Man., 384.4 (C. S. T.)—8 P. M., market reports. 8:15, bedtime tale. 8:30, trio selection; baritone solo; violin solo; address; trio selection; contralto solo; trio selection; baritone solo; cello solo; trio selection; contralto solo; trio selections. 10, Frank Wright's Country Club dance orch.

CNRC, Calgary, Alberta, 430 (M. T.)—7 P. M., bedtime tale. 9, Canadian National Railways symphony orch.; violin solo; cello solo; violin solo.

Friday, May 1

WMC, Memphis, Tenn., 499.7 (E. S. T.)—7:30 P. M., radio talk. 8:30, Britling's Cafeteria orch. 11, midnight frolic by Bob Miller.

WHO, Des Moines, Iowa, 526 (C. S. T.)—7:30 (Concluded on page 27)

# Useful Trim



DONITA CASTLEGRAND beside a set. Her dress is trimmed with radio ribbon, which acts as an indoor antenna. The ribbon when connected to the aerial binding post of any receiver, gives results equal to and better, so far as the quality of reception is concerned, than the usual bothersome roof antenna.

(International Newsreel).



"UNCLE BILL from Sweetmeadows," (Rupert B. Ripley) one of the most popular performers in the New England States, does his stuff through station WBZ, Springfield, Mass.

# They Raised \$25,000



STATION WTAS, in cooperation with the Chicago Daily Journal, broadcast for aid for the purpose of helping the injured, the poor and the children who had lost their parents in the tornado in Illinois and Indiana. At the desk of the Chicago Daily Journal is piled up tornado relief fund mail as a result of broadcasting the appeal. The fund neared \$25,000. The money served an excellent purpose and was welcomed by the grateful beneficiaries. (Underwood & Underwood).

# 1-B

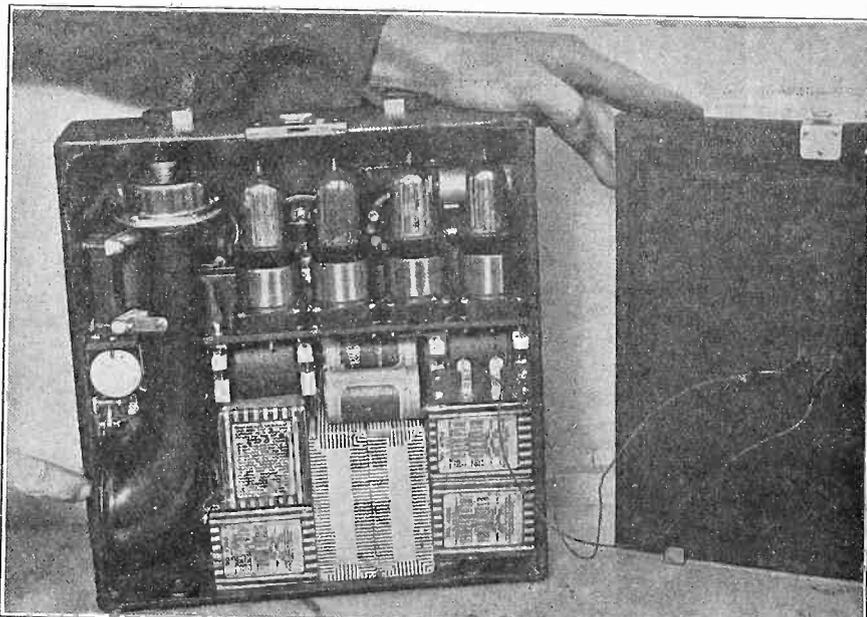


SECRETARY OF the fellow w

# Vote Each Week for Your

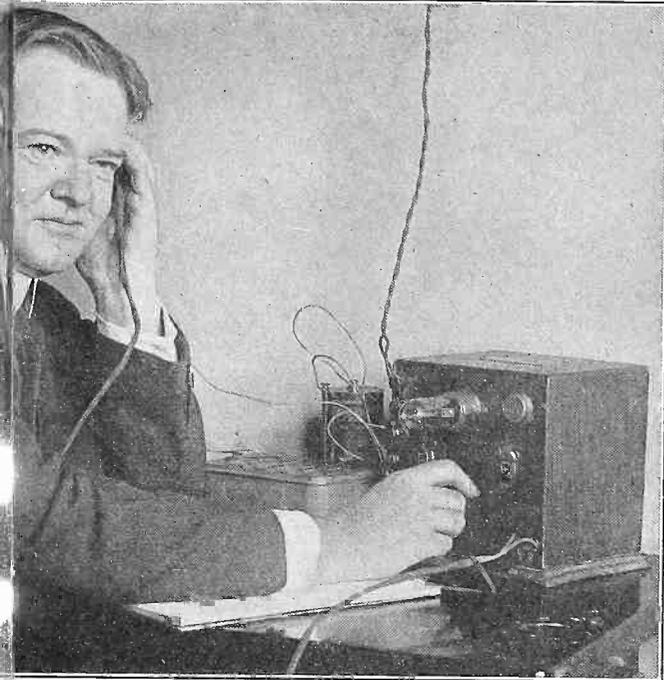
MORE effective than an applause card is a vote for your favorite entertainer—singer, instrumentalist, band, orchestra, speaker or announcer—cast in RADIO WORLD'S Gold Medal Contest. Each coupon clipped from RADIO WORLD entitles you to one vote. See page 20 for coupon. The contest closes July 31. But don't save up your coupons.

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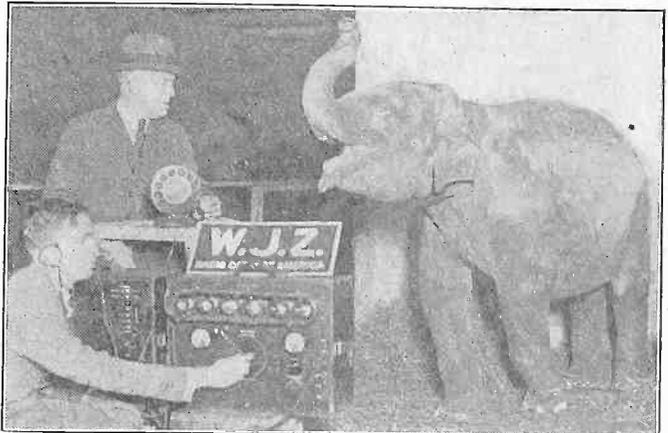
INTERIOR view of Sidney Kasindorf's portable 4-tube reflex. Note the loud speaker in the left hand corner. The two wires running to the cover are the connections of the loop aerial which is concealed in the cover. (Kadel & Herbert)

# Alb Hoover on the Job



COMMERCE HOOVER listening in on a 1-tube dry cell set to find out what a 1-tube set has to contend with when listening in.—(Harris and Ewing).

# Baby Elephant on Air



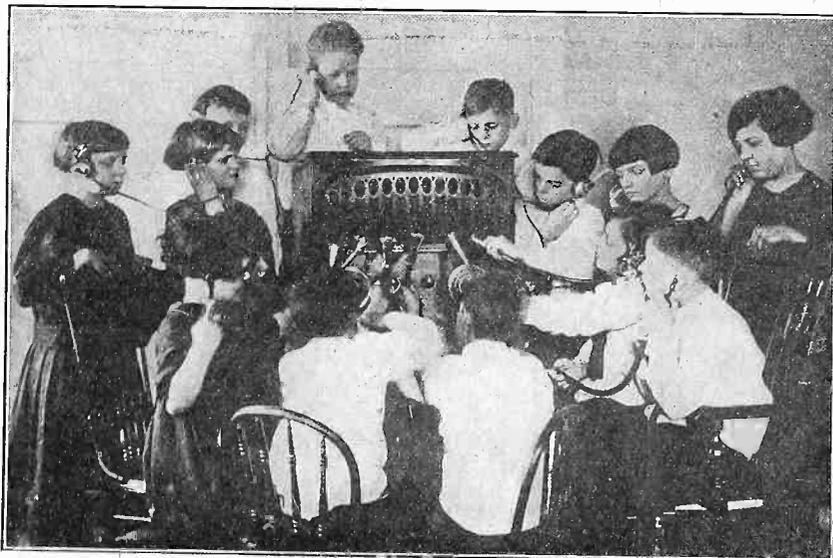
HETERO PACHYDERM (the elephant) takes the air at Madison Squares Garden over stations WGY, WJZ, and WRC. (Foto Topics).

# Favorite Entertainer!

votes NOW! A contestant's good position in the encourages a rain of votes for him from others. subscribing may cast at one time the total number of presented by the number of weeks the subscription is Also the coupons may be used additionally as they hed, up to July 25 issue.



NEW YORK UNIVERSITY students, left to right: Mildred Andevesson, Miriam Steep, John Sasso, and Edwina Colville at station WGBS, listening to their own voice over the loud talker. These students broadcast through this station, the voice being recorded by a phonograph. The record was then played so that the students could determine the faults in their speech. (Foto Topics).

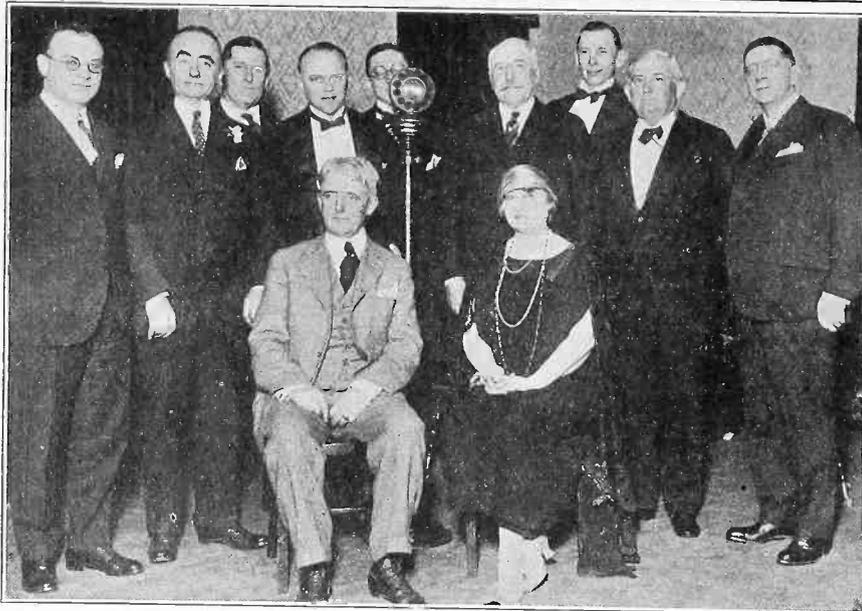


A GROUP of children listening to octophone in connection with a radio set at the De Paul Institute, Pittsburgh, Pa., where it is claimed that children never before able to distinguish a sound are slowly learning to hear through the use of radio. (United).



PRINCE WILLIAM, Duke of Sudermarie, second son of King Gustave of Sweden, gives a travel talk over the radio from Stockholm. His Royal Highness is famous as a traveler, big game hunter and writer. (Underwood & Underwood)

# Jefferson Group Broadcasts

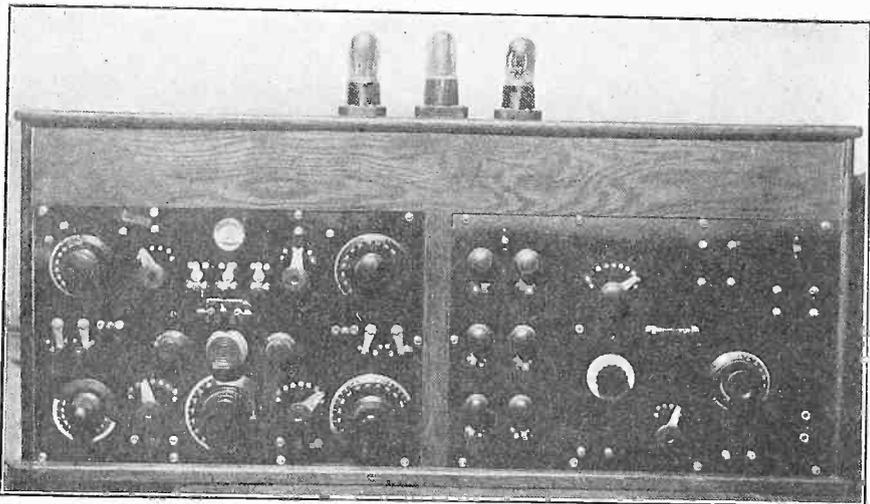


FOR the first time since its inception, the Thomas Jefferson Memorial Foundation conducts a regular business meeting before WOR's microphone. Left to right, Congressman Emanuel Celler; Congressman John Boylan; Vernon D'Arnalle; Henry Alan Johnson, secretary; F. Cootes; Alton Brooks Parker; Martin W. Littleton; Stuart G. Gibboney, president; seated, A. M. Barrett and Mrs. Martin W. Littleton. (International).

# Baldwin's Bow



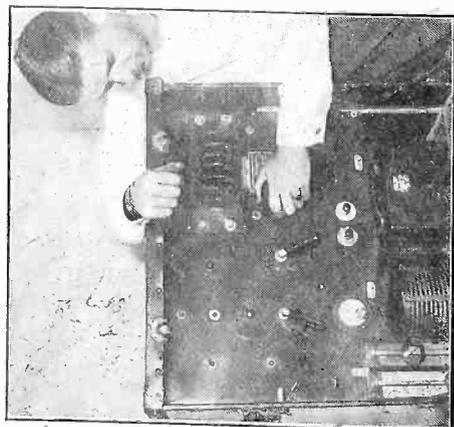
PRIME MINISTER Baldwin and Mrs. Baldwin, broadcasting an appeal for the Y. W. C. A. girls through station 2LO, London. (Keystone View).



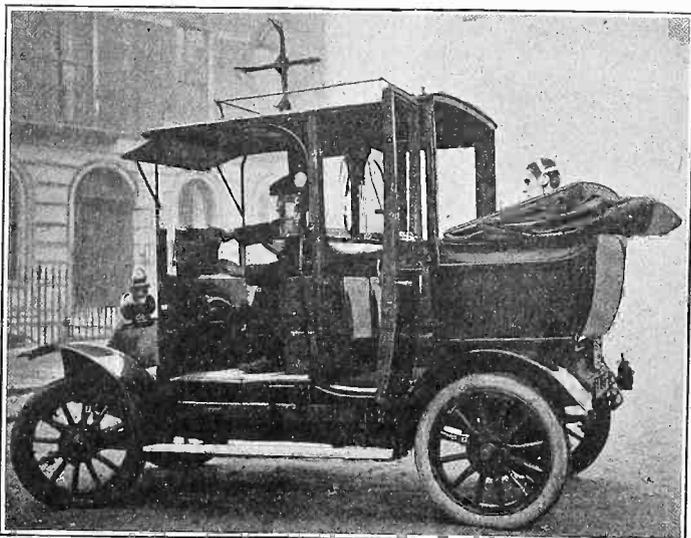
A NOVEL RECEIVER combining every known form of circuit from a crystal to a Super-Heterodyne. The set was built and designed by President Brown, of the Grid Radio Club of the Bronx, N. Y. C. (Foto Topics).



HIS pet portable, and a wee un, too!



ALSO on the line of massiveness, interchangeability and power is this amateur's receiving contraption.



FREDERICK CHARLES FLECHE, Esq., a London taxidriver, installed a novel radio set in his cab, so that the "fare" may enjoy the concerts, while riding to his destination. (Keystone View).

HARRY MILLER, literary editor of WLS, the Sears-Roebuck Agricultural Foundation broadcasting station, Chicago, inaugurated a book review service known as "On the Book Trail."



# THE RADIO UNIVERSITY

A QUESTION and Answer Department conducted by RADIO WORLD for its Readers by its Staff of Experts. Address Letters to The Radio University, RADIO WORLD, 1493 Broadway, New York City.

**WHAT** does the Edison cell consist of and what happens during the charge and discharge of the cell?—L. Blumen, Waco, Tex.

The Edison cell uses an alkaline electrolyte consisting of a 21 per cent. solution of potassium hydrate mixed with a small amount of lithium hydrate. The active metals of this cell are nickel and iron, but are used in the form of nickel hydrate and iron oxide. The negative electrode consists of a nickel-plated steel grid, into the pockets of which are placed and hydraulically pressed the perforated corrugated steel pockets which have been filled and packed with iron oxide to which has been added a small percentage of metallic mercury. The positive electrode consists of a nickel-steel grid to which are secured perforated steel tubes reinforced by steel seamless springs. These tubes are filled with alternate layers of nickel hydrate and very thin flaked nickel, firmly and carefully packed by a loading machine. The normal fully charged voltage of an Edison cell is 1.2, but the cell is said to be discharged when the voltage has dropped to .9 volts. The following action takes place during the charge and discharge of an Edison cell: The first charging of an Edison cell reduces the iron oxide to metallic iron, while converting the nickel hydrate to a very high oxide, black in color. On discharge the metallic iron goes back to iron oxide and the high nickel oxide goes to a lower oxide, but not to its original form of green hydrate. On every cycle thereafter the negative charges to metallic iron and discharges to a high nickel oxide. Current passing in the direction of charge or discharge decomposes the potassium hydrate of the electrolyte, and the oxidation and reductions of the electrodes are brought about by the action of its elements. An amount of potassium hydrate equal to that decomposed is always reformed at one of the electrodes by a secondary chemical reaction. In consequence there is none of it lost—its density remains constant. The eventual result of charging is therefore the transference of oxygen from the iron and nickel hydrate, and that of discharging is a transference back again.

**WHAT** is the effect of radio frequency resistance on a receiving set?—L. L. Brown, N. Y. C. The tuning is broadened.

**WHAT** kinds of capacity and inductance are there?—C. L. Jackson, Md.  
There are two types of capacity, (a) concentrated in the condenser and (b) distributed in the wires. There are also two types of inductance, (a) concentrated in the coil and (b) distributed in the wires.

**IS** it absolutely necessary to have a lightning arrester?—B. J. O'Brien, West N. Y. Yes; where the fire laws require one.

**WHAT** action takes in the audio frequency transformer?—J. K. Linten, Camden, N. J.  
The incoming signals which are rectified by the detector produce audio-frequency currents in the primary of the transformer which are transferred to the secondary of the transformer by induction. The resulting secondary electromotive force is now impressed upon the grid of the second tube and a corresponding variation takes place in the plate current of the second tube and with the addition of more B battery the signal strength is increased in the loud talking apparatus.

**PLEASE** state the address of the company that manufactures the Nolte RF low-loss coils.—Grant Guy, Indiana.  
Nolte Mfg. Co., 61 Gautier Ave., N. J.

**PLEASE** state why I get a loud hum on my 5-tube receiver.—Arthur Risley, Richfield Springs. Test the RF transformers for an open circuit. Push up prongs of the sockets so as to make a perfect contact.

**COULD** I use the S13 Sodio tube instead of the D21 in the Bernard Diamond of the Air receiver? (2) May I use a D coil in the set?—J. D. Galano, N. J.  
No; the D21 oscillates, the S13 does not. (2) No.

**PLEASE** cite some book that I might get to familiarize myself with the technical points of radio?—Wm. Roff, 1124 West 16th St., Topeka, Kansas.  
The International Correspondence Short Course on Radio Principles.

**WOULD** the DV2 vacuum tube give good results in the Eria Duo Reflex receiving set? (2) Which is the better tube, the 201A or the 301A? (3) Is it true that lengthening the antenna broadens tuning?—John Wagner, Nashville, Tenn.  
(1) Yes. (2) They are both the same tube except that the Cunningham tube is distributed mostly in the West and the RCA tube is distributed in the Eastern section. (3) Yes, if the antenna is extremely long. Usually, the shorter the antenna the sharper the set will tune.

**IS** the Diamond of the Air in its experimental stage or is it a practical set to build? (2) Can I use the 199s in this set?—J. Clark, Washington.  
(1) It is a thoroughly tested and practical set

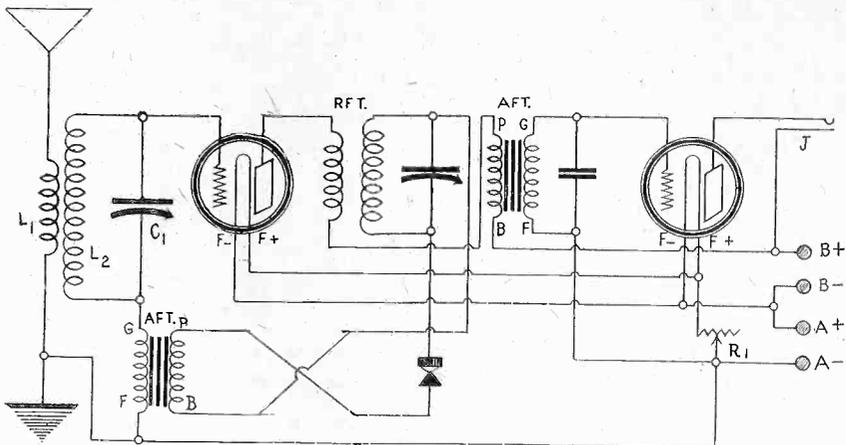


FIG. 133, the Harkness 2-tube reflex, employing two 201A tubes for amplification and a fixed crystal detector for rectification so as to get clear, perfect signals, as the crystal cannot amplify and therefore cannot distort. The RFT are mounted on the same shaft as the variable condensers and the first RFT is at right angles to the second RFT. The secondaries of both RFT contain 62 turns of No. 22 DCC on a 2 3/4" form, 3/4" in diameter. The primary of L1, which is wound over secondary (insulated by strip of Empire cloth) contains 16 turns, while the primary of second RFT which is wound over secondary, contains 36 turns. Both primaries are wound with No. 22 DCC. The variable condensers have a capacity of .00035 mfd.

to build. (2) Yes, use 35-ohm rheostat in the detector stage.

**PLEASE** give me a diagram of the Harkness 2-tube reflex.—J. C. McClellan, Toledo, O. Fig. 133 shows this diagram.

**I WOULD** appreciate the following information regarding the Anderson Superdyne: (1) My set does not regenerate; (2) Tuning is very broad; (3) I cannot receive signals above 492 meters; (4) The RF and detector tubes do not give as much volume as that of a 1-tube set.—J. Russo, Newark, N. J.

(1) Increase the plate voltage, add several turns to the tickler coil. Test different tubes in the RF socket. (2) See that all connections are tight. If shellac was used, take it off and drop some collodion on the ends of the coils for holding purposes. Use low-loss straight-line condensers, with short antenna. (3) Put a condenser .001 across the antenna and ground. Add five turns to the secondaries. Use separate B battery for detector and RF.

**HOW** can I receive pure CW signals on the Super-Heterodyne.—L. L. Fiske, Atlantic City, N. J.

To receive pure CW signals you will have to use a separate second oscillator, which should be placed in inductive relation to the second detector.

**PLEASE** tell me if a vario-coupler can be re-constructed to a 3-circuit tuner. (2) How can spider-web wound RF transformers be employed?—P. K. Hlandman, N. J.

Wind 40 turns secondary, 35 turns tickler, 10 turns primary over the secondary. Use No. 14 bare wire for primary, No. 20 DCC for the secondary and tickler windings. (3) Wind 47-turn secondary, with 8-turn primary in center. Use No. 22 DCC wire. Insert in circuit in standard fashion.

**I HAVE BUILT** the Benson Reflexed Super-Heterodyne and have the following difficulties:

- (1) My oscillator will not oscillate as it should.
- (2) Weak signals.
- (3) Set is not selective.—J. Kramer, Bronx, N. Y.

(1) Add ten turns to the plate coil, test different tubes for oscillator action, use porcelain base sockets for tubes. (2) Add more plate voltage. (3) If good apparatus is used the set will be selective. The Super-Heterodyne is a very difficult set to operate and you should not be disheartened if at the beginning the stations do not come as you expected them to be received. Loosen the coupling between oscillator coils. Put a .00025 condenser shunted across loop.

**WHY** are the signals in my Melco Supreme 5-Tube set choked up?—M. Cherchne, 55 Harrison Ave., Boonton, N. J.

Put in a new grid leak and condenser (.00025 mfd. and 2 megohm) in place of the present ones.

**HOW** can I stop my tube from oscillating in my Neutrodyne receiver?—J. L. Fimen, L. I., N. Y.

Decrease the plate voltage. Put your plate and grid leads at right angles, if possible. Mount the radio-frequency coils on angle irons so that you can tip them to determine the oscillating of the tube. The angle of inclination of the RF coils is very important, as this is one factor in determining the oscillation constant of the tube. An angle of 57.3 has proven satisfactory.

**WHAT** is the difference between a 2 and a 3 element tube?—A. Celbra, N. Y. C.

Both tubes rectify RF signals but only the 3-element tube can amplify them.

**THE 1-A PORTABLE**, 1925 Spring Model, a 2-Tube Set of Great DX Powers. Two controls. Described by Herbert E. Hayden in RADIO WORLD, issues of March 28, April 4 and April 11, with trouble-shooting article in April 18 issue. Profusely illustrated, including templates. Send 60c, get all four copies. Address Circulation Manager, RADIO WORLD, 1493 Broadway, New York City.

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

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

A THOUGHT FOR THE WEEK

PATENTS may come and patents may go, but God Almighty still has complete control over the air currents.

RADIO WORLD

Radio World's Slogan: "A radio set for every home."

TELEPHONES: LACKAWANNA 6976 and 2063 PUBLISHED EVERY WEDNESDAY (Dated Saturday of same week)

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EDITOR, Roland Burke Hennessy MANAGING EDITOR, Herman Bernard

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CLASSIFIED ADVERTISEMENTS

Ten cents per word. Minimum, 10 words. Cash with order. Business Opportunities, 50 cents a line; minimum, \$1.00. Entered as second-class matter, March 28, 1922, at the Post Office at New York, New York, under the act of March 3, 1879.

APRIL 25, 1925

A Query of Tomorrow



TOM (Patting Jim on shoulder): Say, old man, wasn't that your photo I saw over the radio last night?

A 3-TUBE REFLEX FOR THE NOVICE, by Feodor Rofpatkin. Schematic and picture diagrams, panel and assembly. Send 15c for March 28 issue of RADIO WORLD.

Reinartz to Go With MacMillan



Captain Donald B. MacMillan, the explorer at a Zenith long distance receiving, the same type of receiver he uses in his trips to the North Pole region. (Fotograms).



LIEUT. COMMANDER Eugene F. McDonald, U. S. N. R. F., who will be radio officer on the MacMillan Arctic expedition. Commander McDonald was formerly in charge of the Edgewater Beach Broadcasting Station of the Zenith Co. in Chicago. John L. Reinartz will be radio operator. (Wide World).

CHICAGO.

JOHN L. REINARTZ of South Manchester, Conn., radio amateur, was appointed radio operator for MacMillan's expedition to the North Pole, it was announced by Captain Donald B. MacMillan, who will head the expedition.

Mr. Reinartz and Captain MacMillan were here to confer with radio experts, and as guests of the Illinois Athletic Club. Mr. Reinartz is chief electrician for a silk factory at South Manchester.

Explaining the choice of an amateur as radio operator, Captain MacMillan said Mr. Reinartz was an expert in radio, and that as an amateur he was familiar with the short wavelengths which are to be employed, but which have been little used professionally.

"On our last trip we were cut off from the world," he said, "because the sunlight at the pole killed our radio. We have found that the short wavelengths to which amateurs were restricted seem to penetrate the sunlight better than the long waves in professional use. Hitherto 180 meters has been considered fairly short; we shall use 20 and 40 metre lengths. For a long time they were used only at night. This spring the amateurs demonstrated

they could get Europe and Australia at midday with the short waves."

LATEST PATENTS

METHOD of Harmonic or Subharmonic Frequency production (No. 1,527,228), invented by John C. Schelleng, of East Orange, N. J., and assigned to Western Electric Company. Generates a wave whose frequency is a desired multiple or sub-multiple of a given frequency.

AMPLIFIER (No. 1,527,654), invented by Edward W. Kellogg and Frank Elder, of Schenectady, N. Y., and assigned to the General Electric Company. Provides apparatus for amplifying electrical variations.

ELECTRON discharge apparatus (No. 1,527,703), invented by David C. Prince, of Schenectady, N. Y., and assigned to General Electric Company. Improves the efficiency of operation of electron discharge devices.

RADIO CABINET (No. 1,527,896), invented by Samuel L. Miller, of Chicago, Ill. Provides a cabinet to facilitate positioning therein of apparatus and to insure proper position of the apparatus, eliminating inconveniences. Binding posts are in proper alignment with the cabinet openings.

RADIO WORLD'S POPULARITY TEST

To Determine the Gold Medal Radio Entertainer for 1925

Popularity Editor, RADIO WORLD, 1493 Broadway, New York City.

I hereby cast one ballot for:

(Name of Entertainer).....

(Entertainer's Station).....

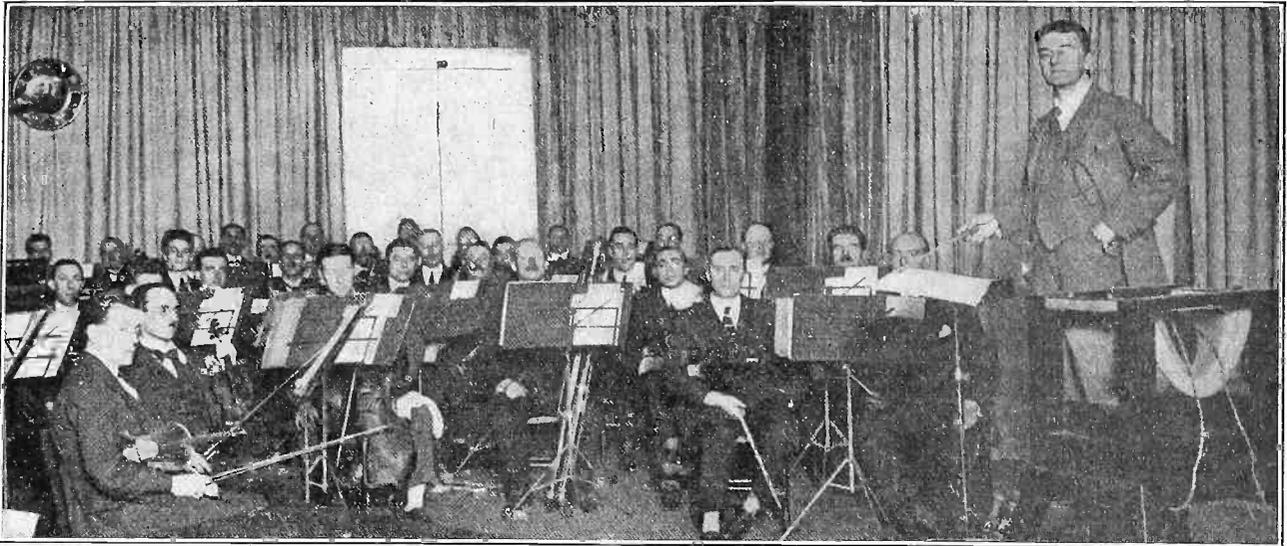
(Voter Sign Full Name Here).....

(Street and Number).....

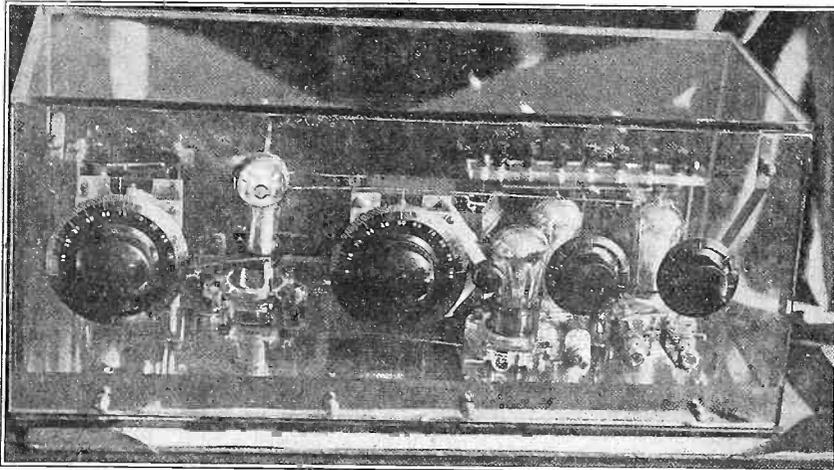
(City)..... (State).....

FILL OUT THIS COUPON AND MAIL NOW!

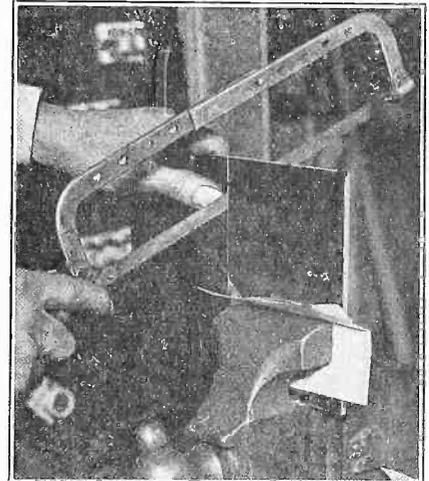
# 2LO On Air for Our Benefit



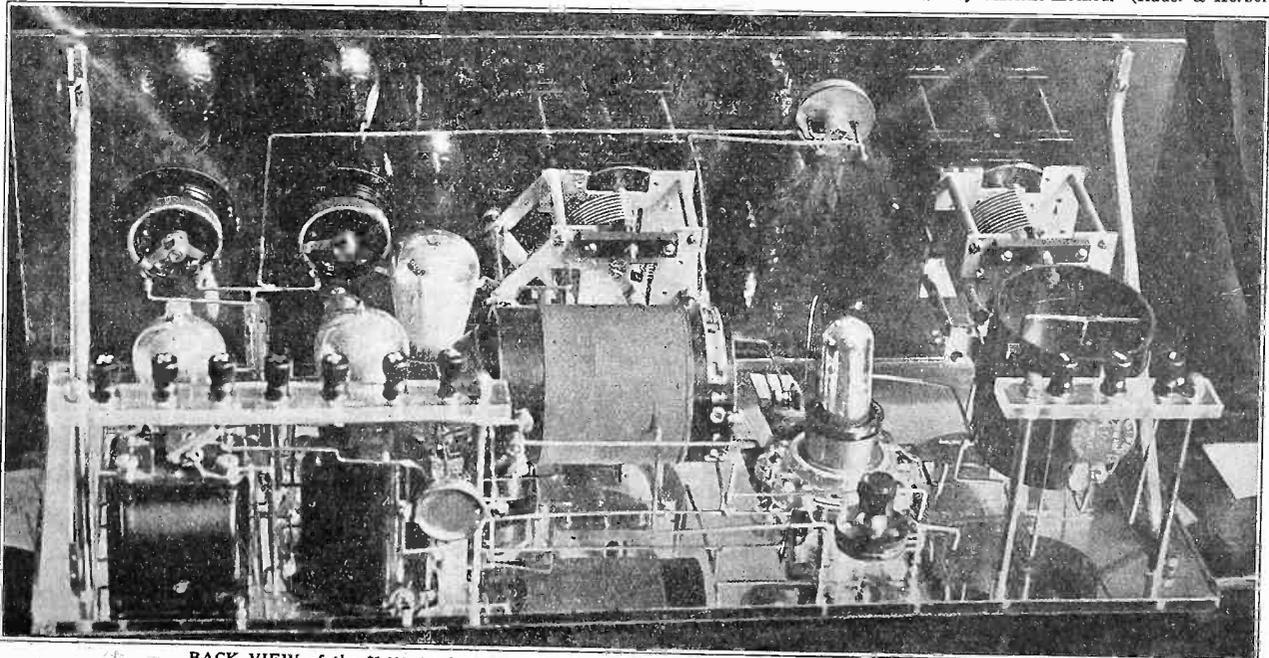
THE STUDIO of 2LO, London, containing an orchestra which is playing music for the rebroadcasting tests. This music is picked up by SXX at Chelmsford and then broadcast on 1,600 meters to Belfast, Me., which in turn rebroadcasts it on short waves to the Radio Corporation test station in Van Cortlandt Park, N. Y. From there the signals go by land wire to WJZ and KDKA for broadcasting. (Kadel & Herbert).



VIEW of the luxurious 4-tube set valued at \$1,000 by the builder, Joseph Affanato, Boston jeweler. Bus wire, binding posts and supports are heavily plated with gold. (Underwood & Underwood).



A HARD rubber panel is put in a vise to be cut. It is a very efficient method. (Kadel & Herbert).



BACK VIEW of the \$1,000 4-tube set, employing one UV199 and three 201As. (Underwood & Underwood).

## Literature Wanted

THE names of readers of RADIO WORLD who desire literature from radio jobbers and dealers are published in RADIO WORLD on request of the reader. The blank below may be used, or a post card or letter will do instead.  
Trade Service Editor,  
Radio World,  
1493 Broadway, New York City.  
I desire to receive radio literature.

Name .....

City or town .....

State .....

Are you a dealer?.....  
If not who is your dealer?

His Name .....

His Address .....

Kenneth Veler, 712 Ontario St., Toledo, Ohio.  
M. M. Montgomery, Seymour, Ind.  
Paul J. Stuart, R. S. S., Rutland, Mass.  
Ivan Van Winkle, Hyden, Ky.  
L. Katz, 92 Hartford Ave., New Britain, Conn.  
C. J. Bradley, Frankford, Mo.  
Emil Cuhumber, R. 2, Tower Hill, Ill.  
Max Tait, dealer, Friendship, N. Y.  
Elmer Johns, 5639 Shafter Ave., Oakland, Cal.  
W. W. Banter, dealer, 1948 North 24th St., Terre Haute, Ind.  
W. P. Crawford, dealer, Gorham, Kans.  
M. F. Carter, Ash Flat, Ark.  
Geo. Bensinger, No. 37 Eagle St., Springfield, Mass.  
Springfield Radio Co., dealers, Main St., Springfield, Mass.  
Neal R. Hubel, 2668 Berkshire Road, Cleveland, Ohio.  
E. L. L'Hernault, 517 W. 151st St., New York, N. Y.  
Yorkville Radio Co., 86th St. and Lexington Ave., New York, N. Y.  
Chas. Fenwick, care Merrill Motor Co., Sequin, Wash.  
C. W. Miller, dealer, Harman, La.  
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A. A. Wotiek, No. 12 Helen St., New Haven, Conn.  
Delmas Randall, 2507 Rutland St., Houston, Tex.  
Chas. McClelland, dealer, 1314 Preston Ave., Houston, Tex.  
G. A. Artley, 18 Canaan St., Carbondale, Pa.  
H. Diem, Jr., 4188 Farlen Ave., St. Louis, Mo.  
F. Schnur, 900 Tower Grove Ave., St. Louis, Mo.  
E. E. Lessard, dealer, 3929 National Ave., Milwaukee, Wis.  
A. H. Vaughn, 130 So. Blvd. St., Atlanta, Ga.  
Hickey Electric Co., dealers, Peach Tree Arcade, Atlanta, Ga.  
Thomas Saxton, 460 44th St., Milwaukee, Wis.  
Geo. Dubreuil, 495 A. Casgrain, Montreal, Can.  
Charles E. Randall, dealer, State Line, Miss.  
Otto F. Jacobson, Jemmland, Me.  
E. G. Roberts, 422 Colecott, Shelbyville, Ind.  
Mutual Laboratory, 702 Century Bldg., St. Louis, Mo.  
E. P. Spurgin, Merkel, Tex.  
Henry West, dealer, Merkel, Tex.  
Hymen Gutmaker, dealer, 1101 Sloan St., Philadelphia, Pa.  
Emanuel Newman, 1416 So. 27th St., Philadelphia, Pa.  
Furnan Johnson, Medill, Okla., Box 174.  
Norman Mason, Shawnee, Okla., Box 97.  
William S. Clarke, 3500 Bowdoin Ave., Des Moines, Iowa.  
Elmer Dietz, 2304 So. 10th St., St. Louis, Mo.  
Benson Radio Co., dealers, 922 Pine St., St. Louis, Mo.  
M. G. Simmons, dealer, Elmore, Minn.  
Earl Schick, 3537 N. Merville St., Philadelphia, Pa.  
Shimel Electric Co., dealers, 526 Arch St., Philadelphia, Pa.  
Paul Loose, R. R. No. 1, Davenport, Iowa.  
George Weigh, Jr., Alamogordo, New Mex.  
Russell Killian, Buckeye, Wash., Route No. 1.  
Kenneth R. Buckton, 34 Lenox Rd., Brooklyn, N. Y.  
Bob White, 4663 Maplewood Ave., Los Angeles, Cal.  
O. S. Secust, Rock River, N. Y.  
E. T. Rush, P. O. Box 362, San Francisco, Cal.  
Miles Kouba, 57 W. College Ave., St. Paul, Minn.  
St. Paul Electric Co., dealers, 145 E. 5th St., St. Paul, Minn.  
R. J. Duncan, 2028 W. 42nd Pl., Los Angeles, Cal.  
D. L. Cady, Geneseo, Ill.  
J. R. Kenyon, Lee, Mass., Box 731.  
Muriel Wiedebusch, 460 W. 3rd Ave., Columbus, Ohio.  
C. C. Dreding, 1808 S. Ringold St., Philadelphia, Pa.  
L. A. Guedinger, Valleyfield, Que., Canada.  
Bissette & Meury, Dealers, Valleyfield, Que., Canada.  
William Tuyman, Petty, Tex.

# THE RADIO TRADE

## New Supertron Tubes

THE Supertron Mfg. Co., 32 Union Square, New York City, is putting the new and improved Supertron, all types, at a new list price of \$2. They believe that the best tube should not sell at more than this price as they figure that it includes a fair margin of profit to the trade and to the manufacturer, so as to warrant a service to the public really guaranteeing satisfaction. They feel that the tube business must come down to a substantial merchandising level, and to manufacture and sell good tubes the manufacturer must produce quality and deliver his message universally, at the same time standing behind his product.

Supertron has undertaken all factors necessary together with their experience in the art of tube making, as they are pioneer manufacturers having sold in excess of a half million Supertrons and have built up and retained a good will in the industry. Their merchandising methods are well founded, which is evidenced by their satisfied clientele which represents the best in all parts of the country.

The Supertron Tube is guaranteed by a serial number with an assurance of satisfaction. That in itself is a unique detail in merchandising. Both the industry and the trade will be pleased with Supertron. Mr. H. Bobker, sales manager of the Supertron Mfg. Co., 32 Union Square, New York City, invites correspondence from the best manufacturers and jobbers in America.

## \$1,000,000 SALES IN 2 MONTHS REPORTED BY DE FOREST

THE De Forest Company issued the following statement:

The board of directors of the De Forest Radio Company, after a careful review of the patent situation, have arrived at the conclusion that the De Forest Radio Company has a decided advantage in most suits now in litigation, and that there are several cases which may result in a very great benefit both financially and otherwise to the company. On the other hand and despite the reports to the contrary, there are no suits pending which, if decided adversely, would prevent the company from carrying on its business as successfully as ever.

"Gross sales of tubes and sets for January and February were over a million dollars, or more than 40 per cent. of the business for 1924. Sales for March, 1925, are estimated at over \$400,000, which is very greatly in excess of the same period last year."

## Coming Events

[Readers are requested to send in dates and places of future events not scheduled in this department.]

APRIL 18-MAY 2—Radio and Industrial Exposition, Toledo, Ohio.  
APRIL 18 TO 25—Minneapolis-St. Paul National Radio Exp., Overland Bldg. Write, N. R. E., 1030 Marshall St., N. E., Minneapolis, Minn.  
APRIL 21 to 28—Toledo, O., Radio Show.  
AUG. 22 to 28—3d Annual Pacific Radio Exposition, Civic Auditorium, San Francisco. Write P. R. E., 905 Mission St., San Francisco.  
SEPT. 6 TO 12—National Radio Exposition, Grand Central Palace, N. Y. C. Write American Radio Exp. Co., 522 Fifth Ave., N. Y. C.  
SEPT. 14 TO 19—Second Radio World's Fair, 258th Field Artillery Armory, Kingsbridge Road and Jerome Ave., N. Y. C. Write Radio World's Fair, Times Bldg., N. Y. C.  
SEPT. 14 TO 19—Pittsburgh Radio Show, Motor Square Garden. Write J. A. Simpson, 420 Bessemer Bldg., Pittsburgh, Pa.  
SEPT. 15 TO 19—Washington Radio Show. Write Chamber of Commerce, Homer Bldg., Washington, D. C.  
SEPT. 23 TO OCT. 4—International Wireless Exp., Geneva, Switzerland.  
SEPT. 28 TO OCT. 3—National Radio Exposition, American Exp. Palace, Chicago. Write N. R. E., 440 S. Dearborn St., Chicago, Ill.  
OCT. 17 TO 24—Brooklyn Radio Show, 23d Regt. Armory. Write Jos. O'Malley, 1157 Atlantic Ave., Brooklyn, N. Y.  
OCT. 12 TO 17—St. Louis Radio Show, Coliseum. Write Thos. P. Convey, manager, 737 Frisco Bldg., St. Louis, Mo.  
OCT. 19 TO 25—Second Annual Cincinnati Radio Exp., Music Hall. Write G. B. Bodenhoff, care Cincinnati Enquirer.  
NOV. 19 TO 25—Milwaukee Radio Exp., Civic Auditorium. Write Sidney Neu, of J. Andrae & Sons, Milwaukee, Wis.  
NOV. 17 to 22—4th Annual Chicago Radio Exp., Coliseum. Write Herrmann & Kerr, Cort Theatre Bldg., Chicago, Ill.  
DEC. 1 TO 6—Boston Radio Show, Mechanics' Hall. Write to B. R. S., 209 Massachusetts Ave., Boston, Mass.

THE DIAMOND OF THE AIR, by Herman Bernard, a 4-tube DX loop set of tremendous range and power. Three controls. Not reflexed. Send 45c, get April 4, 11 and 18 issues. RADIO WORLD, 1493 Broadway, New York City.

## New Incorporations

Hamilton Radio Co., New York, accessories, \$500,000. (United States Corporation Co.)  
Goodyear Radio Service Co., New York City, \$5,000; J. Gross, R. Roth, S. Fishman. (Atty., C. Somberg, 309 Broadway).  
Voltron Mfg. Co., Newark, N. J., radio supplies, \$25,000; Otto Hershkowitz, Pauline Hershkowitz, Harry Bliwise, Newark. (Atty., William Greenfield, Newark).  
Radio Jobbers, New York City; \$50,000; S. Kavish, C. L. Amensdorf, D. Fredman. (Attys., Price Bros., 261 Broadway).  
Desimone Radio Corp., New York City, \$100,000; M. G. Desimone, C. H. Liebman. (Atty., H. J. Lucker, 342 Madison Ave.).  
Paper Radio Corp., Jamaica, N. Y., \$5,000; W. F. Pape, C. E. Helmman, W. B. Philipbar. (Atty., L. Cohen, Jamaica).  
Sterling Radio Corp., Perth Amboy, N. J., manufacturing supplies, \$100,000; Ruth Sutton, South Amboy; Henry K. Golenbech, Perth Amboy; James S. Wright, Woodbridge. (Attys., Wright, Wright and Golenbech, Perth Amboy).  
Sun Electrical Supply House, New York City, radio, \$20,000; H. Goldberg, M. Sokoeff, M. Weinstein. (Atty., A. A. Burdick, 233 Broadway, Manhattan).  
Maskeryne Radio Corp., New York City, 100 common, no par; L. Stone, A. B. Epstein. (Atty., E. A. Brown, 217 Broadway).  
Kameraphone Corp., New York City, radios, etc.; 200 common, no par; J. Entel, L. Rothschild, J. Fried. (Atty. M. S. Hirsch, 49 Wall St.).  
Lipault Radio Corp., Wilmington, Del., 500,000 (Corporation Trust Company of America).  
All-American Radio Alliance, \$20,000; E. J. Lavioie, J. McCabe, B. W. Carey. (Atty., D. Senft, 922 Broadway, Brooklyn, N. Y.).  
Ken-Lin Radio Corp., Trenton, N. J., supplies, \$100,000; Abe Abrahams, Trenton; Philip Chamberlin, Trenton. (Atty., Philip Chamberlin, Trenton).  
Holiday Radio Service, New York City, 200 shares, \$100 each; 200 common, no par, B. Haldy, E. Vogel, L. C. Haggerty. (Attys., Smith, Haggerty, King and Corcoran, 17 East 42nd St.)

## Business Opportunities Radio and Electrical

Rates: 50c a line; Minimum, 2 lines.

### A REAL OPPORTUNITY.

We manufacture electrical devices and radio parts; our business for 1924 was almost one-half million dollars; in order to take care of new business, which is world-wide, we require \$50,000 from three or four parties; only bona fide investors need apply; no brokers; business will continue under present successful management; control will not be surrendered; high rating in Dun's and Bradstreet's, Box 202 Radio World.

RESPONSIBLE RADIO MANUFACTURER wants organization or men undertake direct sales campaigns in exclusive territories, New York and New England States; proven set selling installed below fifty dollars; ample margin of profit; negligible investment. Apply "L," 23 Lispenard St., New York.

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### LIST OF STATIONS

Complete, Accurate, Official

Get this roster of American broadcasters, compiled in alphabetical order of call letters. Send 15c for April 4 issue, the great Third Anniversary Number, to Circulation Manager, RADIO WORLD, 1493 Broadway, New York City.

THE 1-A PORTABLE, 1925 Spring Model, a 2-Tube Set of Great DX Powers. Two controls. Described by Herbert E. Hayden in RADIO WORLD, issues of March 28, April 4 and April 11, with trouble-shooting article in April 18 issue. Profusely illustrated, including templates. Send 60c, get all four copies. Address Circulation Manager, RADIO WORLD, 1493 Broadway, New York City.

A SURVEY OF 1-TUBE DX SETS, by Lieut. Peter V. O'Rourke. Seven circuit diagrams. Great material for DX fans. Send 15c for April 11 issue. RADIO WORLD, 1493 Broadway, New York City.

## RECENT BACK NUMBERS

of RADIO WORLD, 15 cents each, or any seven for \$1. Address Circulation Manager, RADIO WORLD, 1493 Broadway, New York City.

# Stations Now Pay Composers

**Following Appellate Court Reversal of Earlier Defeat, Society of Composers, Authors and Publishers Demand Payment — WEAF and Brunswick Comply—WJZ, WJY, KDKA and WBZ Refuse.**

**F**OLLOWING the decision of the Federal Court of Appeals in Cincinnati affirming the claim of the American Society of Composers, Authors and Publishers that broadcasting stations must pay royalty fees to composers for the right of sending out their compositions, the society is preparing to enforce the regulation thus put into their hands.

Most of the broadcasting stations of the country have already made arrangements for payment of an annual license fee in the form of block royalty to all members of the society. The Brunswick-Balke-Collendar Company has agreed to pay \$1,500 a year to the society for the privilege of broadcasting music by its members for two hours a week over station WJZ. Station WEAF, controlled by the American Telephone & Telegraph Company, was one of the first stations to enter into such an agreement.

**Distributed Among Members**

The money received in this manner by the society is distributed quarterly to the 440 writers and fifty publishers who are members, according to their classification in the society. There are six classifications, ranging from composers who produce prolifically and whose compositions are extremely popular, down to those whose compositions are infrequent and of secondary importance.

Several important broadcasting stations have refused to sign yearly contracts with the American Society of Composers, Authors and Publishers with the result that the stations are forced to restrict their programs to compositions whose copyrights have expired. These stations are WJZ and WJY, operated by the Radio Corporation of America; the General Electric company's station at Schenectady, the Westinghouse Company's station KDKA at Pittsburg and the Boston station WBZ.

Silvio Hein, assistant secretary of the society, points out that these broadcasting stations must each employ a clerk to stand by at the microphone to verify the eligibility of each piece of music that is about to be played, from the point of

**Hearst and Schenck Combine to Run Four Stations**

LOS ANGELES.

**T**HE Los Angeles "Examiner" in an article says that William Randolph Hearst, publisher, and Joseph M. Schenck, motion picture executive, have formed a partnership to start a nation-wide broadcasting program. Announcement was made by Mr. Hearst.

Four powerful radio stations, the paper says, will be erected in as many cities. Three of these—New York, Chicago and Los Angeles—have been selected, and the fourth will be the natural supplement enabling the four stations to blanket the United States with a daily program of news and entertainment. Construction will be started as soon as locations and equipment can be obtained.

No announcement was made of what wavelengths the Hearst-Schenck combination hopes to get. All channels are overcrowded now, Secretary Hoover said a short time prior to the Hearst announcement.

view of its being controlled by the American Society.

**Need the Money**

Mr. Hein said that the members of the society were particularly pleased with the Cincinnati decision because it clearly defined the term "public performance" as being one at which all the spectators do not have to be in the same building, but may be scattered over the whole country, and because a liberal definition was put on the term "performance for profit," the court deciding that a performance may be for profit even though no admission is charged to it, since broadcasting is a commercial as opposed to a philanthropic enterprise, being carried on for the purpose of advertising and stimulating the sales of radio apparatus.

"If this had not happened," said Mr. Hein, "the composers would be in a deplorable state and might as well drive taxicabs for a living." Radio has murdered the sale of sheet music and phonograph records, so that with those two sources of income gone, a composer must look to radio for some fair return for his efforts."

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Roberts—2 tube, Parts.....\$31.44  
 Roberts—4 tube, Parts..... 48.35  
 Rasla—1 tube, Parts..... 23.78  
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Complete stock of standard goods.

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 Madison, Wis.

**BUY THE FILEKO LIGHTNING ARRESTER**  
 SCIENTIFICALLY CORRECT

with the "100% Guarantee"

Warranted to protect your radio from lightning, with a guarantee to pay you \$100 or to repair your set, should it be damaged by lightning through any fault of the arrester.

Listed as STANDARD under the re-examination service of the National Board of Fire Underwriters.

If your dealer has none, send his name with remittance direct to Dept. RW 425, DX INSTRUMENT CO., Harrisburg, Pa.

 \$1.50

\$ 2.10 IN CANADA.

**THE DIAMOND OF THE AIR**

A 4-tube DX loop set, was described in the April 4, 11 and 18 issues of RADIO WORLD. Send 45c, get all three. Address: Circulation Manager, RADIO WORLD, 1493 Broadway, New York City.

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Please send me FREE, your NEW **RADIO CATALOG**

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 to those who contemplate building

**THE NEW PRESSLEY SUPERHETERODYNE**

Those who have built sets before should have no trouble in getting the marvelous results which may be expected from the new Pressley receiver. But beginners must expect some difficulties, even on the simplest sets. Therefore we strongly advise all purchase complete kits from us.

**WE HAVE CONFIDENCE IN THE PRESSLEY RECEIVER. THE CIRCUIT IS EXCELLENT. THE PARTS SPECIFIED ARE EXCELLENT. NOW WITH OUR SERVICE, PROPER CONSTRUCTION AND OPERATION ARE ASSURED AND THE ONLY DOUBTFUL ELEMENT HAS BEEN REMOVED.**

1. We will make every effort to promptly and satisfactorily fill each order.  
 2. Complete instructions will be furnished with each kit. These include a clear description of the method of assembling, wiring, balancing and tuning and three blue prints, one full size front panel template, one circuit diagram and a full size picture diagram showing the exact location of each part and wire.  
 3. We will promptly and cheerfully answer all telephone, mail or personal inquiries regarding the assembling, wiring, balancing and tuning.  
 4. We will even test any set delivered to our laboratory, remedy minor defects and prescribe remedies for the more serious faults.

**COMPLETE PARTS** including drilled and engraved bakelite front panel, Sangamo Kit, X-Lab. Condensers, Benjamin socket shelf, Thordarson A. F. Transformers, in fact, every item of the highest quality—Instruction and service included.....

All parts sold separately. Write for complete price list, and see our advertisement in the RADIO WORLD for April 18.

**\$79.50**

**THE SUPERADIO CO.** 136 LIBERTY ST., N. Y. C.  
 RECTOR 2450

# Own Stations Proposed for Movie Industry

A SUGGESTION has been made by Harry M. Warner, motion picture producer, that the movie industry build broadcasting stations at New York, Los Angeles,

and in the midwest so that the artists of the screen can talk to the radio audience and exhibitors can profit by the indirect advertising afforded by broadcasting.

"My attention has been directed to a general tendency within the amusement field to fight radio," said Mr. Warner. "The identical arguments, used only a few years ago in an effort to minimize the popularity of motion pictures, are being dragged out and pointed at an entertainment which now has millions of supporters.

"The cry of 'the pictures will ruin the theatre' is within easy memory. They didn't, although there is no doubt that pictures inflicted considerable damage to the cheaper theatrical attractions. To this is now added the alarm, 'the radio will ruin the theatre and the pictures.' It will not if it is used intelligently.

"Radio is here to stay, just as the pictures and the theatres. They all have their followers. Just as the picture audience is a theatre audience, so is the radio audience largely a picture audience.

"To my mind, any effort to fight an entertainment that has the backing of 20,000,000 people is sadly misdirected," said Mr. Warner, "and will react harmfully on the entire country. If radio has cut in on pictures, as is no doubt the case on the word of exhibitors who know what they are talking about, my idea is not to wage a useless fight against it, but use it.

"There is no argument in the statement that the man hurt directly by the new form of entertainment is the exhibitor. This is a fact. It seems to me, then, it is up to the producers to direct their efforts toward helping the exhibitor meet a new situation which he cannot do individually except in certain specific cases.

"Does any one suggest that the Capitol Theatre in New York has been hurt by the broadcasting of Roxy and his Gang, or the Strand by The Plunketeers, or the Rialto and Piccadilly by the radio entertainment of those theatres?

"In answer to this will naturally come the question: But how about the small-town exhibitor; he has not the facilities nor can he afford a broadcasting program, even if it would boost his house?"

"My contention is that the producers can

do for the whole industry, including the exhibitor, what New York impresarios and other big town exhibitors are now doing for their respective theatres; what we are attempting to do for the West Coast with our new broadcasting station, KFWB, at our Hollywood studio, and what Balaban and Katz and other big booking combines, who control chains of theatres, are about to do, according to their announcement."

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Makes for quick assembling. Repairs can be made by using Morsing Bus-Bar Union without taking set apart.

Assemble round or square Bus-Bar and solder three wires at a time. Order No. 1 for No. 14, No. 2 for No. 12 wire. Send 25 cents for enough for building one set, or ten dozen for \$1.00.

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**A DX Circuit of Great Volume and Charming Tonal Quality**

**Simple to Build and Operate**

Circuit Not Reflexed

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Blo-Pruf 501A is a perfect detector, radio frequency amplifier, or audio frequency amplifier.

These tubes are sold direct by mail, price \$3.00 postpaid—the same price as ordinary tubes. When you install Blo-Prufs in your set you are guaranteed against the great loss of blown-out tubes. Order enough for your set now, sending check or money order at \$3.00 each. If the tubes are not entirely up to your expectation return them and your money will be immediately refunded. If a tube blows out inside of six months from any cause it will be immediately exchanged. Don't put off securing these wonder tubes. Act at once! Order Blo-Prufs NOW!

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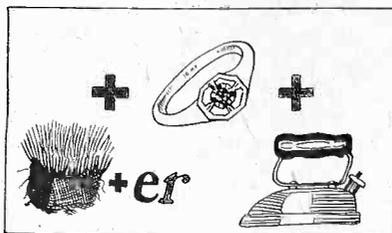
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The names of those sending the solution will be published.



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Tom A. Carr, Box 227, Newport News, Va.

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Bob White, 4663 Maplewood Ave., Los Angeles, Cal.  
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Mahone Rees, Live Oak, Fla.  
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Clyde B. Leich, 136 Prospect St., East Orange, N. J.  
Howard A. Walker, 145 South St., N. W., Washington, D. C.  
H. F. Dildine, Van Wert, Ohio.  
Irrving Radding, 398 Central Ave., Jersey City, N. J.  
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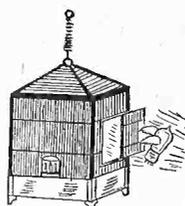
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## College Debaters, Far Apart, to Be Heard on the Radio

WORCESTER, MASS. A DEBATE by radio between A teams representing Holy Cross College and Boston College has been arranged for Tuesday night, April 28, through Station WNAC in Boston and WEAN in Providence. The Boston College students will speak from the Boston station and the Holy Cross students from the Providence station.

The discussion will be carried out in usual college style and the radio listeners will be asked to vote for the team they consider the winner, the decision resting on the result of this ballot. The glee clubs of both colleges will provide music from the stations.

travel through the earth, announced that a message transmitted from the underground antennae of his radio station here had been picked up by a station in Toulon, France.

The following cablegram was received by Dr. Rogers:  
"Heard your station 3XR at Capitol 01, HOS, GMT (1 A. M., Greenwich, meridian time), about F8 meters, calling CQ (any station). Audibility QSA (very loud). Letter confirm."

"SACAZES M." Attempts to reach Europe by underground broadcasting were begun by Dr. Rogers on Monday. He has been continuing his tests from 6 to 7 o'clock every night. He expects to hear from other European stations informing him of the reception of his message.

### COOLIDGE PUTS HOOVER IN CHARGE OF PATENTS

THE executive order of President Coolidge transferring the U. S. Patent Office from the jurisdiction of the Department of the Interior to that of the Department of Commerce, thereby placing it under control of Secretary Hoover, was praised by Dr. Lee De Forest as "the most forward-looking step in the history of the Patent Office."

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Eastern Coils for 1925 DX set.....	5.95
Daven Resistances and Kits, 25% off list	

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# Programs

(Concluded from page 15)

P. M., special "May Day" program. 11, dance program.  
 WDAF, Kansas City, Kansas, 365.6 (C. S. T.)—3:30 P. M., The Star's radio trio. 5:30, market-  
 program. P. M., weather, time and road report. 6, school.  
 8, midwestern zone elimination of the national high school oratorical contest, broadcast from Ivanhoe temple. 11:45 P. M., to 1 A. M., (Night-hawk Frolic)—The "Merry Old Chief" and the Plantation Players, Hotel Muehlebach.  
 WIP, Philadelphia, Pa., 509 (E. S. T.)—7 A. M., setting-up exercises. 10, the daily menu and intimate talk to housewives. 1 P. M., Gimbel Tea Room Orch. 1:30, weather. 3, "Helpful Hints to

Housewives." 5:15, artist recital by the Frank Oglesby Studios. 6, weather. 6:05, popular numbers by Joe Burke. 6:15, Harold Knight's Singing Orch. 6:45, livestock and produce market reports. 7, Uncle Wip's bedtime story.  
 WOI, Ames, Iowa, 270 (C. S. T.)—9:30 A. M., weather. 12:30 P. M., college chimes, weather, livestock markets, Professor C. H. Diggs. 9, weather.  
 WEMC, Berrien Springs, Mich., 285.5 (C. S. T.)—9 P. M., Radio Lighthouse Choir; Sunday School Lesson Roundtable.

WWJ, Detroit, Mich., 352.7 (E. S. T.)—8 A. M., setting-up exercises. 9:30, "Tonight's Dinner" and a special talk by the Woman's Editor. 10:25, weather. 11:55, time. 12 M., Good Friday services. 3 P. M., The Detroit News orch. 3:50, weather. 3:55, market reports and baseball scores. 6, dinner concert. 8, The Detroit News orch. 9, Jean Goldkette's Victor Recording orch.  
 WEAJ, New York City, 492 (E. S. T.)—6:00 A. M., physical exercises. 11, musical program; health talk; market and weather reports. 4 P. M., Ruth B. Heilmann, soprano; talk by American Museum of Natural History. 6, Waldorf-Astoria orch.; Gustav Langenus, clarinet sextet; Helen Morris, soprano; "Sir Hobboglin Takes a Ride," by Blanche Elizabeth Wade; "The Happiness Candy Boys"; "Spear & Co. Home Entertainers"; "The Gloriet Girls"; Meyer Davis Lido Venice orch.

WEEL, Boston, Mass., 476 (E. S. T.)—6:45 A. M., setting-up exercises. 7:45, morning watch from Estey Organ Studio by Boston Y. M. C. A. 2 P. M., Norm's Serenaders. 3:15, Greater Boston Federation of Churches program. 5:30, Boy's Band. 6:25, American Child Health Asso. talk. 6:30, Big Brother Club. 7:15, "Bringing the Forest to the People," by Harris A. Reynolds. 7:30, program courtesy Whiting Milk Company. 8, Neapolitan Ice Cream Program; Rotary Club Hour. 9, Howe's Valetaria Entertainers. 9:30, Breck's garden talk.

WGR, Buffalo, N. Y., 319 (E. S. T.)—10:45 A. M., Gold Medal Radio Cooking Course by Betty Crocker. 7:50 P. M., "Rooms for Men and Boys," by Clarence N. Kierst. 8, "Thais," by Massenit; educational opera entertainment, by Eleanor D. Baker. 9, ball room; joint charities banquet. 10, American Hawaiian Quartette and Temple Male Quartette.

WLW, Cincinnati, O., 422.3 (E. S. T.)—10:45 A. M., weather, business reports. 11:55, time. 12:15 P. M., Ahaus Brunswick orch. 1:30, stock quotations.

WMAQ, Chicago, Ill., 447.5 (C. S. T.)—12:25 P. M., Y. M. C. A. forum. 1, Radio Farm School, "Special Farm Service Day." 4, fashion talk by Jean Mowat. 4:30, pupils of Bush Conservatory. 5, the Lullaby Lady, Mrs. Gene Burton, Davenport. 6, organ recital from Chicago Theatre. 6:30, Hotel LaSalle orch. 6:50, Family Altar League. 8, weekly Wide-Awake club program directed by Mrs. Frances M. Ford. 8:30, musical geography, Mr. and Mrs. Marx E. Oberndorfer. 9, Christian Endeavor topics. 9:15, Bellman and De Svenske chorus.

WGY, Schenectady, N. Y., 379.5 (E. S. T.)—1, P. M., music; one-act play, "The Old Peabody Pew." WGY Matinee Players. 5:30, International Sunday School Lesson. 6, Albany Strand Theatre orch. 6:30, health talk. 6:40, drama, "The Boom-crang." WGY Players; music by WGY orch. 9:30, Viola Hales, lyric soprano and WGY orch.  
 KGW, Portland, Oregon, 491.5 (P. S. T.)—11:30 A. M., weather. 12:30 P. M., Rose City Trio. 5, children's programme. 6, St. Francis choir directed by Catherine Covach Fredrich. 7:15, market, weather, news bulletins and police reports. 10:30, Hoot Owls.

KOB, State College, New Mexico, 346.6 (M. S. T.)—7:30 P. M., Popular Science Course, Lesson No. 16, by Dr. D. S. Robbins, "Timber Turi and Tumbling Waters," by Quincy Randles, Forest Service.

KFAE, College of Washington, 348.6 (P. S. T.)—7:30 P. M., Children's Night—"Nutrition and Its

Relation to Child Health," Prof. Lila Hunt; "The Child in the Home," Dean A. A. Cleveland; "Books on Child Welfare and Education," Alice Lindsey Webb; "Washington Agriculture for May," R. M. Turner.

KPO, San Francisco, Cal., 429.5 (C. S. T.)—7 A. M., daily dozen. 10, "What is Playing at the Local Theatres." 12 M., time. 12:05 P. M., talk from the Commonwealth Club Luncheon, at the Palace Hotel. 1, Rudy Seiger's orch. 4:30, Rudy Seiger's orch. 5:30, market reports. 6:30, "What is Playing at the Local Theatres." 7, concert from the Palace Hotel. 8, Palace Hotel concert.

KTHS, Hot Springs, Ark., 374.8 (C. S. T.)—8:30 P. M., piano specialties by Phil Baxter. 9, Meyer Davis orch.

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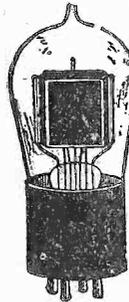


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## "HOW TO MAKE—"

The following constructional articles have appeared in recent issues of RADIO WORLD:

- Sept. 6, 1924—A simplified Neutrodyne with Grid-Bias Detector, by J. B. Anderson.
- A Low-Loss Wave Trap, by Brewster Lee.
- Nov. 15—A Sturdy Low-Loss Coil, by Lieut. P. Y. O'Rourke.
- An Ultra 2-Tube Receiver, by Byrt C. Caldwell.
- Dec. 6—A 6-Tube Super-Heterodyne Using a Variometer, by J. E. Anderson. A 51 Coil Winder, by Herbert E. Hayden.
- Dec. 13—The World's Simplest Tube Set, by Lieut. P. Y. O'Rourke.
- Dec. 20—A 1-Tube DX Wonder, Rich in Tone, by Herman Bernard. An Interchangeable Detector, by Chas. M. White.
- Dec. 27—A 2-Tube Variometer Set, by Lieut. P. Y. O'Rourke.
- Jan. 3, 1925—A 3-Tube Portable That Needs No Outdoor Aerial, by Abner J. Gelula.
- Jan. 10—A Low-Loss DX Inductance, by Herbert E. Hayden.
- Jan. 17—A \$25 1-Tube DX Wonder, by Abner J. Gelula.
- Jan. 24—A Selective \$15 Crystal Set, by Brewster Lee. A Variometer-Tuned Reflex, by Abner J. Gelula. A 1-Tube DX Circuit for the Beginner, by Fodor Rofpaktin.
- Jan. 31—A Transcontinental 2-Tube Set, by H. E. Wright. An Experimental Reflex, by Lieut. P. Y. O'Rourke.
- Feb. 7—The Bluebird Reflex, by Lieut. P. Y. O'Rourke. A \$5 Home-Made Loudspeaker, by Herbert E. Hayden.
- Feb. 14—A Super-Sensitive Receiver, by Chas. H. M. White. A Honeycomb RFT for DX, by Herbert E. Hayden.
- Feb. 21—A 1-Tube Reflex for the Novice, by Fodor Rofpaktin. A Set for Professional Folk, by Lieut. P. Y. O'Rourke. A Honeycomb Crystal Receiver, by Raymond B. Wales.
- Feb. 28—A Set That Does the Most Possible With 6-Tubes, by Thomas W. Benson. Three Resistance Stages of AF on the 3-Circuit Tuner, by Lieut. P. Y. O'Rourke.
- March 7—Storage Battery, by Herbert E. Hayden. Benson's Super-Heterodyne.
- March 14—The Reflexed 3-Circuit Tuner That You Can Log, by Herman Bernard.
- March 21—A Variable Leak, by Herbert E. Hayden. A 4-Tube 3-Control Set That Gets the Most DX, by Lieut. P. Y. O'Rourke.
- March 28—The Improved DX Dandy Set, by Herbert E. Hayden. A 3-Tube Reflex for the Novice, by Fodor Rofpaktin.
- April 4—The Diamond of the Air, by Herman Bernard. What the New Sordlon Tube Is, by Stiney E. Finkolstein. Sets for the DX Devotee, by Lieut. P. Y. O'Rourke.
- April 11—Audio Hookups for Fine Volume and Quality as Well, by Brewster Lee. The Coils for The Diamond, by Herman Bernard. 1-Tube Distance-Getting Sets, by Lieut. P. Y. O'Rourke.

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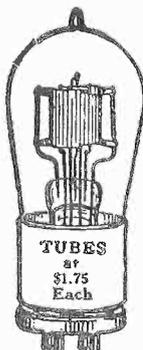
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KFIF	Benson Polytechnic School, Portland, Ore.	248
WCK	Stix-Baer & Fuller, St. Louis, Mo.	273
WJAD	Jackson's Radio Engr. Labs., Waco, Tex.	353

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THE Aeolian Company, which deserted Fifth Avenue twelve years ago for its present home in Forty-second Street opposite Bryant Park, New York City, is to return to the avenue and will occupy quarters in a building to be erected on the northeast corner of Fifty-fourth Street and Fifth Avenue.

This property, formerly owned by William Rockefeller, with its old brownstone mansion, was recently acquired by Commodore Charles A. Gould, one of the largest owners of Fifth Avenue realty, in anticipation of the transaction closed with the officials of the Aeolian Company. The Aeolian Company gets the property on a straight lease of sixty-three years. The exact terms were not revealed, but an official of the company said that more than \$12,000,000 was involved.

A twelve-story building, with the necessary set-backs, will be erected by Commodore Gould for the leasing company. The company, a music firm, handles radios, too.

### PIANIST AT ST. PAUL TWIN STATION

IN a recent issue was published a photograph of Miss Eleanor Freemantel, accompanist at WCCO. This station, which was mentioned as being in Milwaukee, Wis., is located in St. Paul-Minneapolis, Minn.

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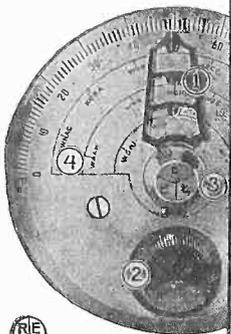
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# RESULTS

RESULTS EDITOR:

I BUILT White's D-Xellent 2-tube set, issue of Dec. 6. I used low-loss parts, basket-weave coils, and dry-cell tubes

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509 So. State St., CHICAGO, ILL., Dept. R.W.6

(WD11). With a variable gridleak it is a wonder for DX. I added a stage of push-pull audio and by using anywhere from 50 to 90 volts on the plate of the RF tube this hookup will perform as efficiently as any 5-tube Neutrodyne. I used a Chelton Midget for the balancing condenser, and it sure is there when it comes to damping out the oscillations and the code stations. It is no trick at all on any night to get 1,500 miles on the speaker. With a good aerial system even greater distance can be had. Try it, brother radio fans, and see if you don't get 'em. Selectivity is very good. If the set is built properly you can separate stations only 5 meters apart, as I have done. I used the Univernier dials for the two tuning condensers. Best wishes to RADIO WORLD.

HAROLD W. REILEY,  
3½ North Post Street,  
Spokane, Wash.

\*\*\*

RESULTS EDITOR:

I CONSTRUCTED Feodor Ropatkina's 1-Tube Reflex for the Novice, February 21 issue, and have had excellent results with it.

EMIR A. GAW,  
5720 Keith Ave.,  
Oakland, Cal.

\*\*\*

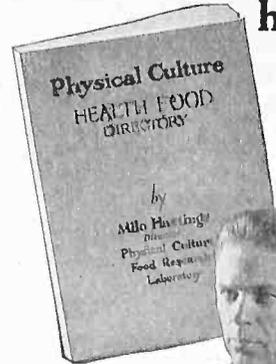
RESULTS EDITOR:

I HAVE built your 1925 Model DX wonder from issues of January 10, 17 and 31, as described by Herman Bernard, and it works wonders. I receive KGO Oakland, Cal., regularly on speaker. The local stations come in with very good volume on this 4-tube set and with a very clear tone. WGY, Schenectady, is about the loudest station I get and comes in so loud that at night if there is anyone asleep in the house I have to turn the juice away down and some times I have to get another station because of Schenectady's tremendous volume.

I am using the Bruno condenser (No. 19) and an Arc Rad Tri-Tuner. I constructed my own RFT.

R. W. BERGSTEN,  
2253 W. State St.,  
Olean, N. Y.

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Only 25c postpaid!

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This book was compiled by Milo Hastings, director of the Physical Culture Health Food Laboratory. Mr. Hastings is one of America's best known authorities on food selection and diet. He has been engaged in studying and popularizing food science for more than twenty years. His book contains practically all he has learned in these years of intensive study and experimentation. It is undoubtedly the most understandable and most practical book ever written on the use of food science as a means of building health and of preventing disease.

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The food rating tables in this directory are worth many times the price of the book. These tables rate all foods in popular use for their effect on vitality, on growth, on energy, on weight reduction and on constipation. They enable you to select for yourself the foods that will reduce you if you are over-weight, the foods that will increase your vitality and endurance, that will cure constipation, etc. Helpful menus are also given for specific health conditions.

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# Rofpatkin on Condensers

(Continued from page 4)

such knowledge is necessary. If frequency were popularized, or at least given

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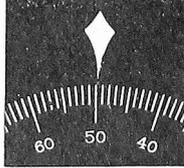
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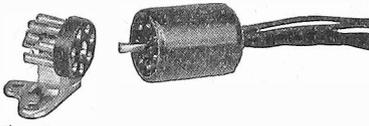


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**Jones MULTI-PLUG**

THE STANDARD SET CONNECTOR

**HOWARD B. JONES**  
618 S. CANAL STREET CHICAGO



THE MODEL 1-A 1925 PORTABLE, by  
Herbert E. Hayden, a 2-Tube DX Set of  
Wonderful Volume and Tone, fully de-  
scribed in RADIO WORLD, issues of  
March 28, April 4 and 11. Send 45 cents,  
get all three of these important issues.  
This set is the successor to Hayden's  
famous DX Dandy. RADIO WORLD,  
1493 Broadway, New York City.

**Why the Lower End of  
Condenser Dial Is  
Crowded**

Wavelength	Frequency	Dial
200 Meters	= 1499 kcy.	= 0
250 Meters	= 1199 kcy.	= 5
300 M. diff.	= 300 kcy.	= 5

Wavelength	Frequency	Dial
450 Meters	= 666 kcy.	= 50
500 Meters	= 599 kcy.	= 70
50 M. diff.	= 67 kcy.	= 20

This serves to illustrate how five degrees of the dial of a mere capacity variation condenser separate stations 50 meters apart on the low waves, while 20 degrees represent the same difference in wavelength at the upper end of the dial.

If 5 degrees represent a difference of 50 meters at the lower extreme, the average is 10 meters to one degree. At the upper end the average is 2½ meters per degree. This illustration is theoretical, yet accentuates the idea of an existing handicap of 4 to 1 (10 to 2½).

at equal showing with wavelength designations, if wherever the one is used the other is employed also, frequency reference would gradually become more popular. It is much more scientific. It is just as easy to act upon any numerical differences, no matter what the numbers are, although on the frequency plan it is true that larger numbers must be employed. Nevertheless if the kilocycle (1,000 cycles) were used as the basis, this would suffice, an even subdivisions of a kilocycle might be ignored with safety.

**Radio Aids Sale  
of Pianos**

THE popularity of the radio is helping, rather than unfavorably affecting, the piano business, according to George C. Foster, president of the American Piano Company. In a statement issued to stockholders, Mr. Foster says, in part:

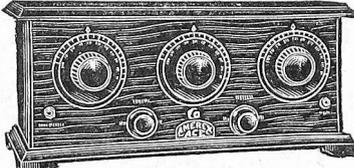
"The question as to the effect of radio on the piano business is frequently asked. We believe it to be decidedly helpful. It is increasing, the knowledge and appreciation of music and is awakening an interest in many to whom it has hitherto been a matter of indifference. It is increasing the desire to hear better music, especially in the home. The enjoyment that the radio brings has unquestionably pointed a way to even greater enjoyment through the actual possession of a means of making music, which leads directly to the thought of a piano."

**5-Tube Tuned Radio Frequency Set**

**Liberal Discount Allowed**

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Write for Circular B



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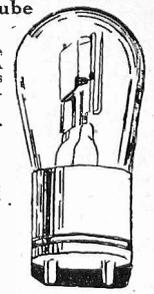
A Guaranteed Radio Tube  
Within Reach of All

Every tube guaranteed. A tube for a dollar of \$3 value. A trial order will convince you as it has thousands of others. Send your orders at once. Orders sent C.O.D. parcel post.

Type..201A  
Type..200  
Type..199  
Type..199A

**\$1.00 EACH**

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# WINNER'S CIRCUIT

(Concluded from page 3)

Now turn antenna variometer to right, just before the tube reaches the point of oscillation. Great care should be exercised in tuning this receiver.

Among the DX stations received almost

## EVEREADY

### Radio Batteries

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Four and Five Tube Sets

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Horne Verni-Tuners, 2 for	1.00
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Federal Radio Products Co.

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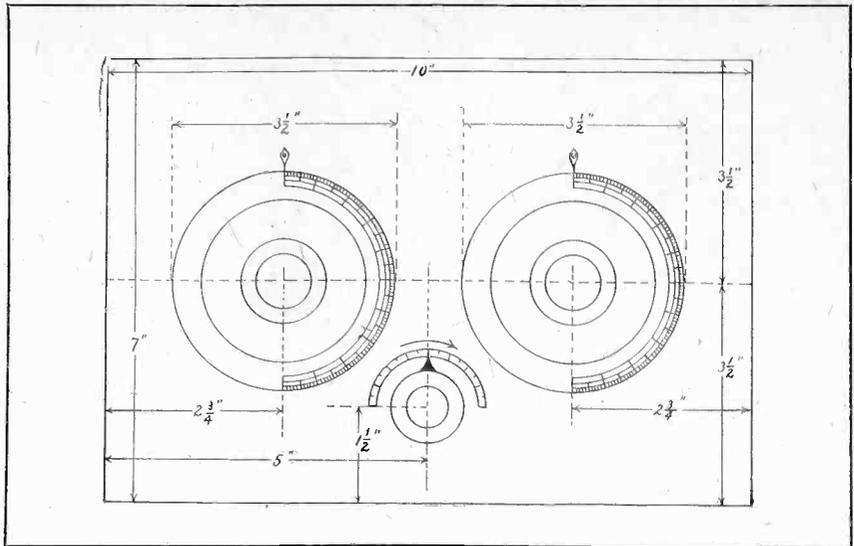


FIG. 2, the panel layout, using 3 1/2" hard rubber dials and a 20-ohm rheostat, with vernier attachment, to control the filament temperature of the detector tube.

nightly in New York City are WGY, KDKA, KYW, WGN, WCBD, WKAQ, WTAM.

#### Parts to Use

- Two variometers (Amrad).
- One rheostat (20-ohm vernier).
- One porcelain base socket.
- Bell wire for internal set wiring.
- One 7x10" panel.
- One 7x10" cabinet.
- One 6x9" baseboard.
- One UV 201A tube.
- One .0005 mica (Dubilier) condenser.
- One .00025 mica (Dubilier) condenser.
- Two 3 1/2" or 4" hard rubber dials.
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- Two feet of Litz wire for flexible leads.
- One pair of phones.
- One hundred feet of antenna wire (No. 14 hand drawn copper).
- Two insulators.
- Fifty feet of lead-in wire (No. 14 rubber covered type).
- Ground clamp.
- One 80-ampere storage battery.
- One 45-volt B battery.
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14 Sizes in Beautiful Display Case  
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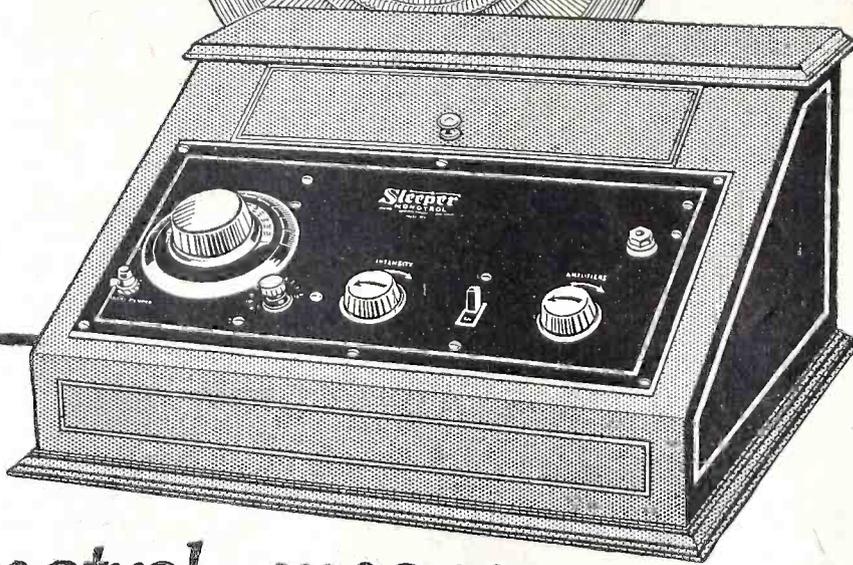
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And I left 'em sweating and stealing  
A year and a half behind."*

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The Sleeper Monotrol is built for this latter class. It has but one Tuning Dial calibrated

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# Sleeper

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