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NEW DOUBLE SUPERDYNE

June 14

RADIO WORLD

Title Reg. U. S. Pat. Off.

VOL. 5. No. 12.

ILLUSTRATED

EVERY WEEK

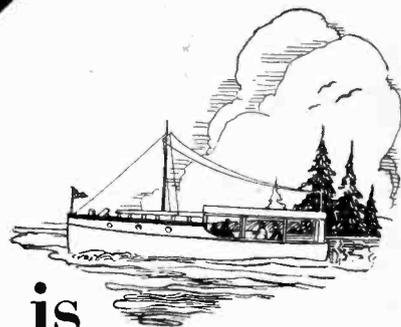
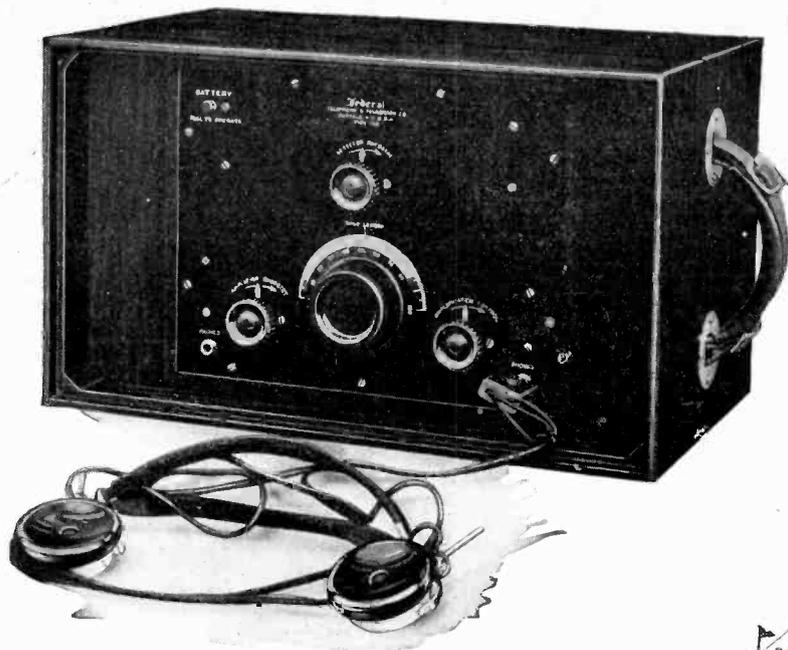


(Wide World)

THE RADIO helps to keep her happy, says Eva Frisk, Northwest beauty contest winner, who asserts you can't be beautiful unless you're happy. She is shown at Atlantic City.

A FOUR-TUBE DX REFLEX

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RADIO WORLD

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

A Weekly Paper Published Every Wednesday and Dated Saturday, by Hennessy Radio Publications Corporation from Publication Office, 1493 Broadway, New York, N. Y. Phones: Lackawanna 6976 & 2063.

Vol. V. No. 12. Whole No. 116

June 14, 1924

15c. per copy, \$6.00 a year

A Sensitive Double Superdyne

Negative feed-back regeneration used in the detector tube as well as in the RF stage, hence no more than the usual four tubes are needed.

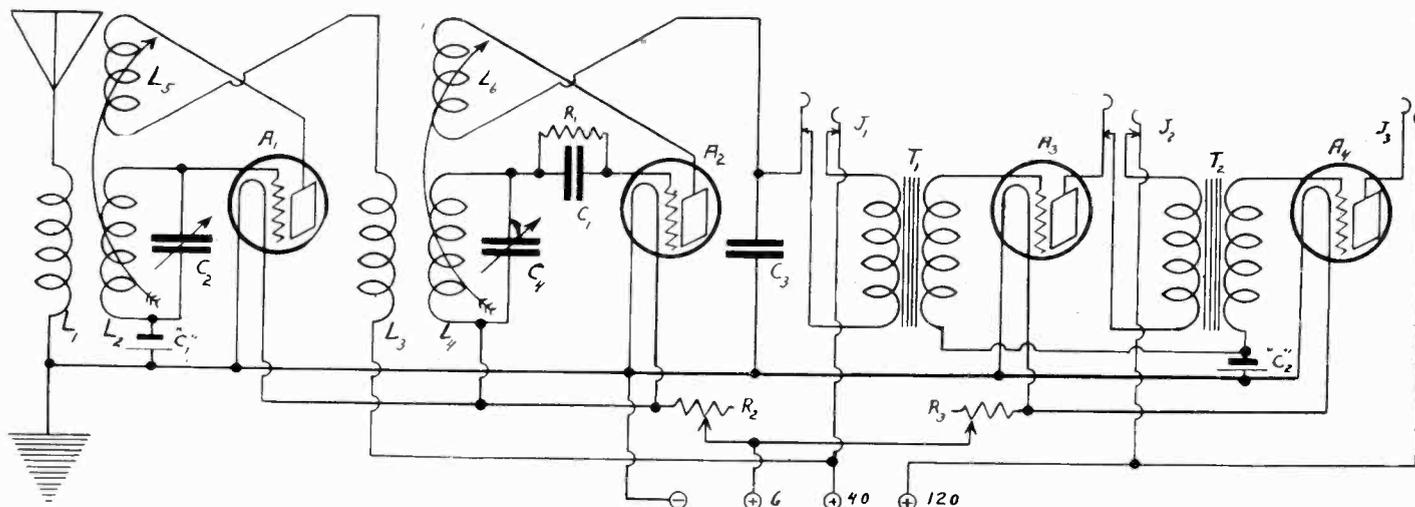


FIG. 1.—Circuit diagram of the Double Superdyne, which uses the reverse feedback in the detector as well as in the RF stage.

By Fennimore Feene

IN the Superdyne, or, as it is also called, the counter E. M. F. receiver, regeneration and self-oscillations are controlled by means of negative or reverse inductive feed-back. A small coil is connected in series with the plate circuit of the tube and is placed in inductive relation with the grid tuning coil in such a way that the energy returned from the plate tends to oppose the oscillations. That is, the leads to the ordinary tickler coil are reversed. This constitutes an inductive brake on the circuit which effectively prevents the tube from breaking into self-oscillation.

The sensitivity of the circuit depends largely on the degree of damping exerted by this negative tickler. If the damping is more than enough to offset the positive stray coupling, which ordinarily exists between the output and input sides of the tube, the circuit will be less sensitive than one in which there is no positive coupling. If the damping is just enough to compensate for the stray coupling, the set will be of the same order of sensitivity as the Neutrodyne; but if some of the effective positive coupling is retained, the circuit will be more sensitive than any of these circuits. The coupling may readily be adjusted so that the circuit is just on the verge of oscillating without doing so. It is then in the most sensitive adjustment attainable.

This condition of adjustment is different for different frequencies, and this fact requires that means be provided whereby the adjustment may be made conveniently as the tuning of the receiver is switched from one frequency to another. This is usually done by means of small vario-couplers controlled with dials on the panel.

The advantage of the reverse feed-back circuits over the capacity neutralized circuits is that the same sensitivity may be obtained with one fewer tube. The fact

that one tuning condenser may also be eliminated simplifies the construction and lowers the expense of the receiver, but it does not simplify the tuning of it very much, since one or more sensitivity controls are required with which to manipulate the set. The circuit may, however, be calibrated for any given setting of these controls.

The circuit diagram of a sensitive and simple four-tube Superdyne is shown in Fig. 1. The first tube in this circuit is a stage of straight radio-frequency amplification provided with a negative tickler; the second tube is an ordinary detector also provided with a negative tickler; the third and fourth tubes are audio-frequency amplifiers.

The usual double circuit jacks, J_1 and J_2 , are provided in the output of the detector and the first stage of audio, and the single circuit jack J_3 in the output of the second stage of audio.

The transformers T_1 and T_2 , used in the audio-frequency amplifier, should be the best obtainable, with a turns ratio between 5 to 1 and 3 to 1. Instruments having large silicon iron cores and large windings are preferred ordinarily, because these usually have sufficient core area to carry the flux without overloading, and they have a large primary impedance, essential requirements for good quality.

Only two rheostats are necessary in the circuit—one for the two radio-frequency tubes and one for the two audio-frequency tubes. Each of these rheostats may be a 10-ohm instrument provided UV201A tubes are used throughout, which use is strongly recommended. The grid leak resistance should be about 2 megohms.

The two tuning condensers, C_2 and C_4 , should be .0005 microfarad instruments, preferably provided with
(Concluded on next page)

How to Mount New Superdyne

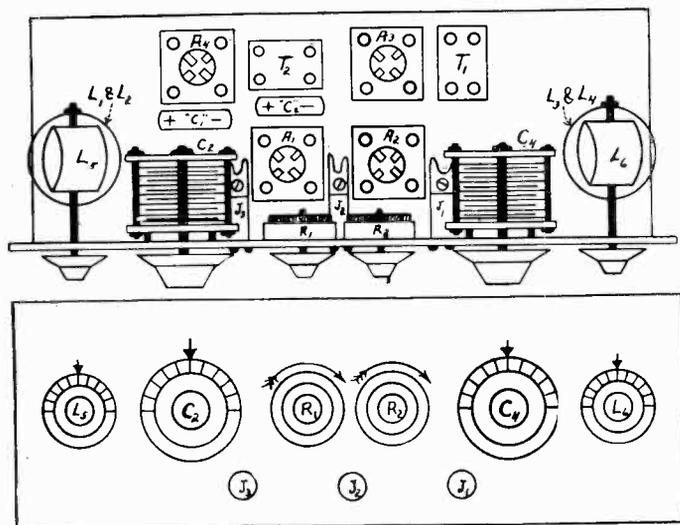


FIG. 2 (lower diagram) shows the panel layout for the Double Superdyne. The baseboard layout is shown in the other drawing (Fig. 3).

(Concluded from preceding page)

vernier adjustments. C_1 , the grid condenser, should have a capacity of .0001 to .00025 microfarad and it should be of the mica dielectric type. C_3 is a high frequency by-pass across the primary of transformer T_1 and across the B battery. Its value should be .001 microfarad.

The A battery should be a 6-volt storage battery for best results. For short service and in emergencies a 6-volt dry cell battery may be employed. This should consist of not less than eight cells—4 in series with the two groups thus formed in parallel. The B battery for the radio-frequency tubes may be 40 volts. On the two audio-frequency tubes the B voltage may be from 60 to 120. Much better results will be obtained with the higher plate voltage provided the proper grid bias is used. The grid battery C_1 should not be greater than 1.5 volts, and it may be omitted without reducing the sensitivity greatly. The value of the grid bias battery C_2 on the audio tubes should be 9 volts for 120 on the plate.

The two sets of inductance coils $L_1L_2L_3$ and $L_3L_4L_6$ are identical in construction.

Use bakelite tubing 3" in diameter and No. 24 double cotton covered wire in winding these coils, except L_5 and L_6 . Start winding the primary L_1 $\frac{3}{8}$ " from the lower end of the tube. This allows enough margin to fasten mounting lugs and two terminal lugs. Fasten the wire to one of these terminal lugs, put on 12 turns of the wire, and fasten the other end to the remaining terminal lug. Drill two holes at the upper end of the tube for the two secondary terminals and two holes for the tickler shafts. Wind the secondary in the same direction as the primary without leaving any space between the two. Put on 45 turns of the secondary and fasten the terminals to the lugs at the upper end. The length of the tube should be about 3" or $3\frac{1}{4}$ ".

The tickler coils, L_5 and L_6 , each consists of 30 turns of No. 26 double cotton or silk covered wire wound on a bakelite tube 2" in diameter and $1\frac{3}{8}$ " long. Fifteen turns should be wound on each side of the shaft, which should be made of $\frac{3}{16}$ " brass tubing. Flexible wire leads should be used to the ticklers. These should be thoroughly insulated and be run through a hole in the shaft tubing and out at the rear end of the shaft.

Fig. 2 shows a suitable panel layout for the circuit shown in Fig. 1. The small dial at the extreme left controls the negative tickler L_5 as marked. Then comes the first tuning condenser, the two rheostats, the sec-

ond tuning condenser, and, at the extreme right, the negative tickler L_6 . The three jacks are placed in the center of the panel and below the two rheostats.

Fig. 3 shows a possible layout for the baseboard to match the panel layout shown in Fig. 2. The two sets of coils are shown at the extreme ends of the cabinet, placed in similar positions with their axes parallel. This is permissible because of the great distance between them and the fact that negative ticklers are used. All the parts are labelled to correspond with the same parts on the circuit diagram and the panel layout. A slight readjustment may be desirable from the one shown in Fig. 3. The detector tube A_2 which is now behind rheostat R_2 may be put on the right of transformer T_1 and back of condenser C_4 . This will avoid reflexing the leads to and from the detector and hence will shorten them considerably.

In operating this receiver, tickler L_5 should be adjusted to such a position that the first tube will not break into oscillation while tuning in, that is, it should be operated considerably below maximum sensitivity. This is to prevent radiation from the receiver which will cause interference in the neighborhood. Tickler L_6 may be operated much nearer the point of maximum sensitivity, because if the detector tube should break into oscillation no appreciable radiation will result. When the circuit has been tuned in, L_5 may be adjusted for increased sensitivity, but care should be exercised to prevent oscillation.

When tuning in first set condenser C_2 on zero and tune in with condenser C_4 . Then tune with C_2 until the signal is maximum. If greater sensitivity is desired reduce the negative feed-back by means of L_6 , and finally with L_5 . Tickler L_6 should be mounted so that the inductive feed-back may be made positive in case there is not enough stray coupling, that is, this coil should be mounted so that it can be rotated through an angle of 180 degrees.

The size of the panel used in this circuit is 7x21x3/16. If the builder desired to use a 24-inch panel he may do so without changing the arrangement of the apparatus except spreading them out a little.

PARTS NEEDED

Two variable air condensers, .0005 microfarad, vernier type preferred.

Two radio-frequency transformers with tickler rotors as described.

Two 3 inch dials and two 2 inch dials.

Two 10-ohm rheostats.

Two double circuit jacks and one single circuit jack.

Two audio-frequency transformers.

Four standard vacuum tube sockets.

Four UV201A or similar tubes.

One grid leak, 2 megohms.

A 9-volt dry cell grid battery and one 1.5 volt cell.

One panel 7x21x3/16 and a baseboard 7x19 $\frac{1}{2}$ x $\frac{3}{4}$.

A cabinet to match.

Six binding posts.

A short piece of brass tubing 3/16 inch diameter.

Bus bar wire, solder, wood and machine screws and nuts.

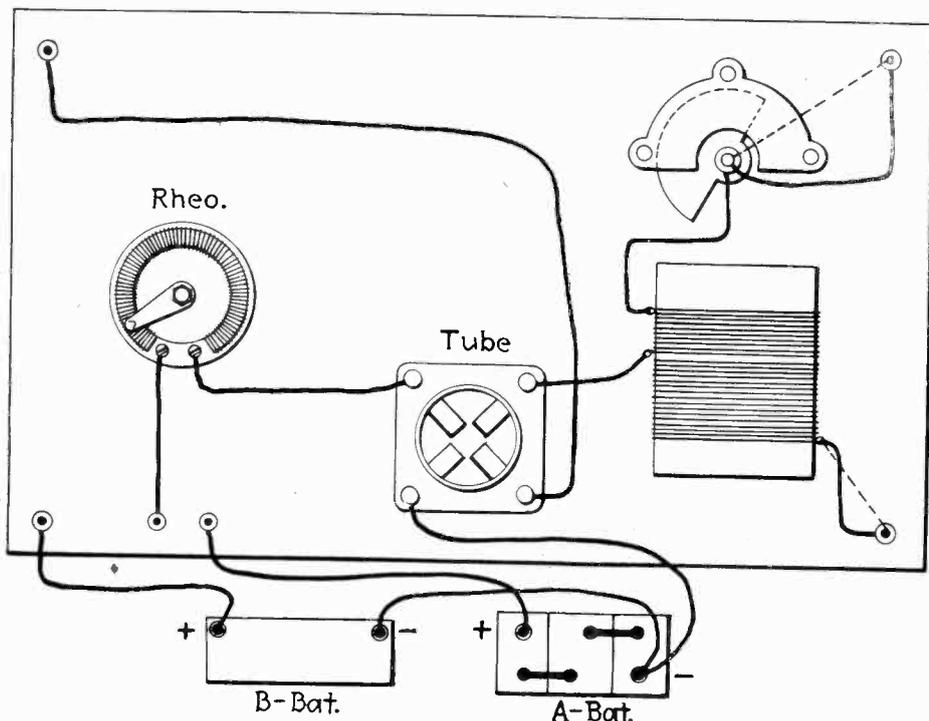
A shield 6x18, tin or copper foil or sheet brass or copper.

One by-pass condenser, mica dielectric and .001 microfarad capacity.

One grid condenser, mica, .0001 to .00025 microfarad.

In connecting the coils, run the first or bottom terminal of L_1 to the antenna binding post, the second terminal to ground, the first terminal of L_2 , which is adjacent to the second terminal of L_1 , to the negative of " C_1 ," or to ground, and run the second, or upper, terminal of L_2 to the grid. The bottom terminal of L_3 is connected to one side of tickler L_5 while the other terminal is connected to the positive side of "B." The first terminal of the secondary goes to the rotor of the second condenser, while the top terminal goes to the grid condenser.

Give These Four Don'ts Their Due



DON'T use long leads in wiring a set. Make 'em short and snappy. (Fig. 1.)

WIRING in a set, whether it be of simple design or a multi-tube affair of intricate design, shows how good a radio mechanic you are. While a great number of the home-made outfits are wired with the conventional bus bar, some builders seem to make the longest possible leads to a given connection just to get that right-angular effect, which, when carried to extremes, doesn't do any good.

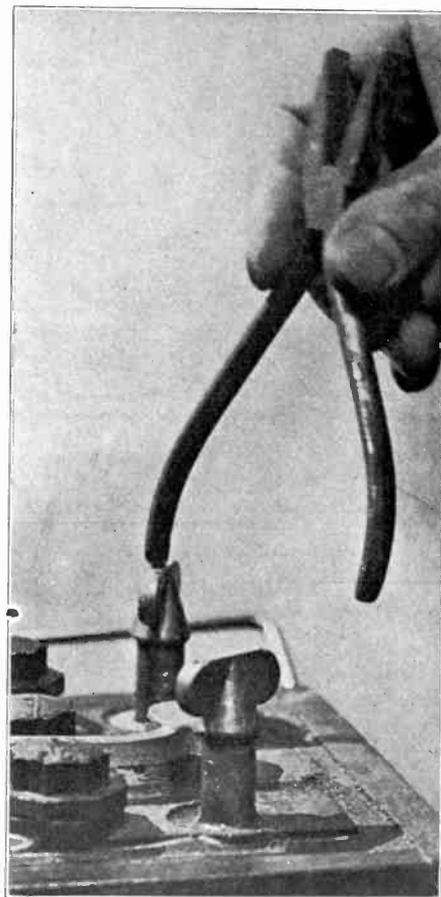
Fig. 1, although it does not show a real circuit, gives an idea of some of the waste which can easily be eliminated. The leads from the two binding posts at the right, shown in heavy lines, are from 50 to 100 per cent too long. These leads might just as well have been run in the



(Foto Topics).
DON'T test your head phones across batteries in this manner. You may ruin the phones. They're delicate.

manner shown by the dotted lines. The same applies to the leads from the tube socket to the binding posts at the left hand side. A glance into your own cabinet may show you several wires which can be run more direct to their termination at a saving of signal strength, and resulting in increased efficiency all around.

Fig. 2 is a gentle hint to radio fans of the fairer sex, showing them how not to sit when near a storage battery. The fabric in the dress, coming in contact with any moisture containing acid, will be de-

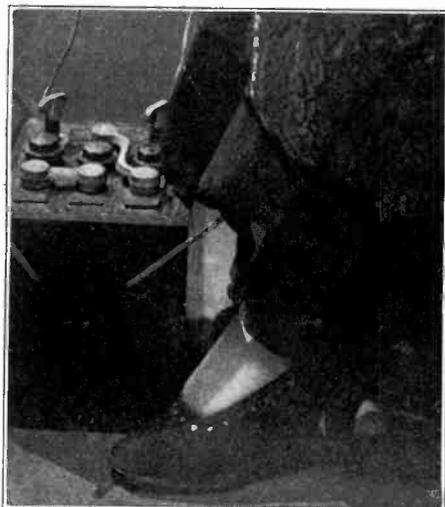


(Foto Topics).
DON'T test your storage battery by the short-circuit method. Use a hydrometer.

stroyed beyond repair. The battery should be placed in a glass or other insulating tray and set back out of everyone's way. An excellent method to prevent sulphation at the battery terminals is to spread a thin film of vaseline over the entire terminal, also a little on the wire or spring connector which fastens onto the terminal. It is a good idea to go over the battery weekly with a damp rag to take off the accumulation of dirt on the top between the various cells and vent holes.

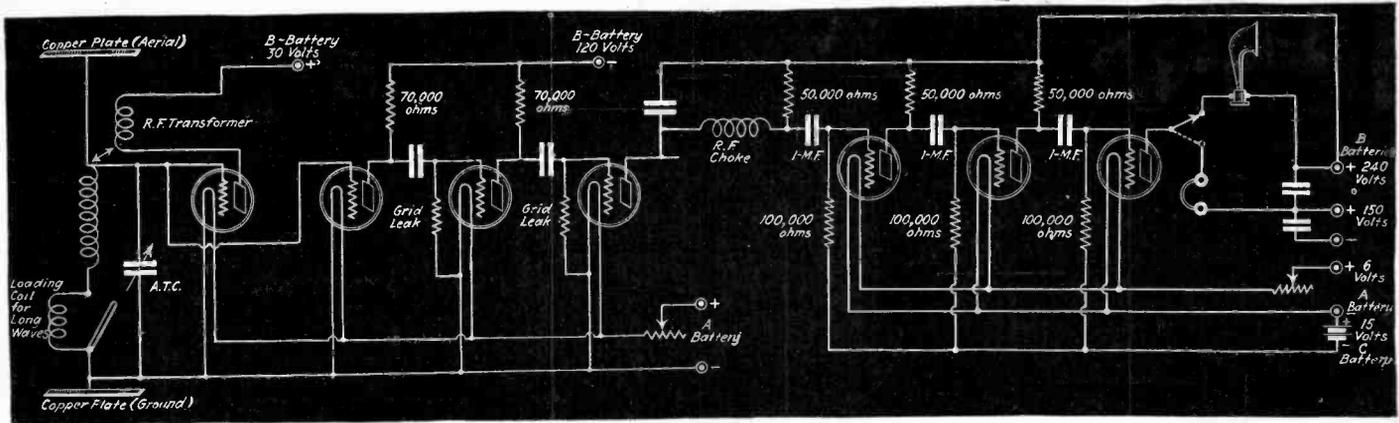
Fig. 3 pictures an excellent method of how to test your head phones—if you are anxious to buy another set. Although there are only six volts in the storage battery, the high amperage will injure the delicate wire with which the phone magnets are wound. The man in the photo will get a loud click, he may even get a number of loud clicks—but the kick he will raise when he finds out that the phones are spoilt will be much louder than all the clicks and clucks combined.

Fig. 4 is an ideal way to test your storage battery, from the viewpoint of the battery repair man. Use a hydrometer to test any storage battery.



(Foto Topics).
DON'T, oh dear ladies, please don't ruin your dresses by getting them in contact with storage battery acid. (Fig. 2.)

How to Build a Set Like King George's



CIRCUIT DIAGRAM of the set used by King George in Windsor Castle and Buckingham Palace. The diagram was made for RADIO WORLD by the expert who built the set, A. G. D. West, assistant chief engineer of the British Broadcasting Company. Mr. West told about the set in RADIO WORLD, issue of May 24. Now, Charles H. M. White gives full data on how to build such a set, suggesting some changes in keeping with American requirements. For instance, he advises omitting the loading coil (extreme left of diagram), as our wavelengths are not so high as those abroad. Also, 100,000-ohm resistances, easy to obtain, may be used instead of those marked 70,000. The RF choke coil may be a DL250.

Resistance-Coupled RF Is an Outstanding Feature of This Circuit and a Novelty to Americans. Mr. White Says Such RF Amplification Is the Coming Thing

By Charles H. M. White

Consulting Engineer

MANY of the radio fans who read in RADIO WORLD, issue of May 24, a description by A. G. D. West of the receiver used by King George of Great Britain have expressed a desire to build the set for either experimental or home use.

The receiver illustrates very graphically the difference between English and American radio engineering. It must be remembered that from the very beginning regeneration, as we use it, has been prohibited by law in England, while in our country we have had no such regulation and therefore the development of our radio problem took an altogether different form. Hence, to get distance and sensitivity in England it was necessary to resort to radio-frequency amplification of one sort or another, while in America the sensitivity of the ordinary detector tube was increased by a feedback action, called by us regeneration and by the English reaction. Also, American broadcasting had its birth as an amateur or experimental affair and therefore from the very start and until the present it has been confined to short wavelengths, while in foreign countries longer wavelengths are very common. The great amount of trouble first experienced here with radio-frequency amplification of short wavelengths, such as used by our broadcasting stations, made many resort to the easier method of regeneration.

Public sentiment has so risen against the noise and howls created by poorly designed and constructed regenerative receivers that our full attention is called to radio-frequency and without doubt next year will find us almost 90 per cent. radio-frequency enthusiasts. Although we are at present by a vast majority working on radio amplification, still, owing to the fact that our broadcasting frequencies are much higher (shorter wavelengths) our style of radio-frequency amplification has been along the transformer-coupled type, rather than the resistance-coupled type, as shown in the King George receiver. Again, our engineers were forced to the transformer-coupled type because 90 per cent. of our amateur vacuum tubes were not made for radio-frequency amplification with resistance coupling be-

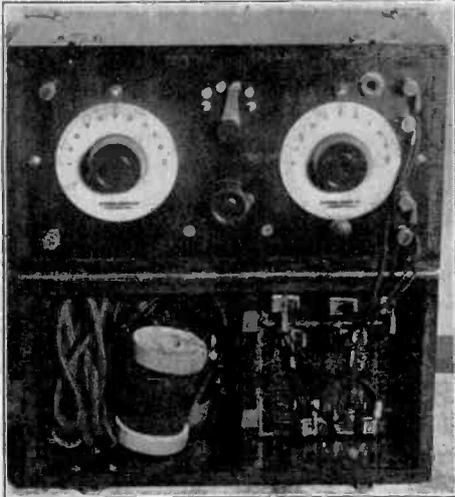
cause the capacity between the elements was so large as to cause very slight amplification at our high frequencies. English tubes have for the past year been so constructed that this capacity is purposely kept low in order that very efficient resistance-coupled amplification may be obtained even at the shorter wavelengths.

At present there is only one tube on the amateur radio market here which fulfills this requirement for satisfactory operation by keeping the element capacity low and that is the Myers tube. If the King George receiver were constructed and operated with the ordinary style of vacuum tube very poor results, if any at all, would be obtained. In fact, any three-tube receiver of American design, with transformer-coupled RF, would give better results. But if the Myers tubes be used, very excellent results can be easily secured. Resistance coupling, while not as selective as transformer coupling, gives purer and clearer tones, since distortion does not enter to any appreciable extent. This is true because the pure resistance offers approximately the same impedance to all frequencies and does not select. This is especially a very desirable feature when audio-frequencies are amplified. On the other hand, since there is no ratio of transformation such as in a transformer, all the amplifying must be done by the amplification of the tubes, therefore more tubes are necessary to obtain the same volume as obtainable from a good transformer-coupled AF amplifier. Hence, you will note from the diagram, that three tubes of audio-frequency amplification are used in place of our ordinary two. Also, you will note that higher plate voltages must be used to force an appreciable amount of plate current through the vacuum tubes. But even taking these disadvantages into consideration I think that resistance coupling is a coming radio-frequency and audio-frequency development.

There is really nothing very difficult in the construction and the problem simply resolves itself into adaptation to our present supply and market. For the main aerial tuning coil, which is called an RF transformer, I would suggest that an ordinary 90-degree vario-coupler be used, taking the stator across the variable tuning condenser marked A. T. C. and the rotor in the plate circuit of the first tube. The loading coil for long waves should be omitted because for ordinary broadcast reception we use short wavelengths exclusively. It will be noticed that this first tube acts somewhat regeneratively, but is counterbalanced to some degree by tube number two, which operates in

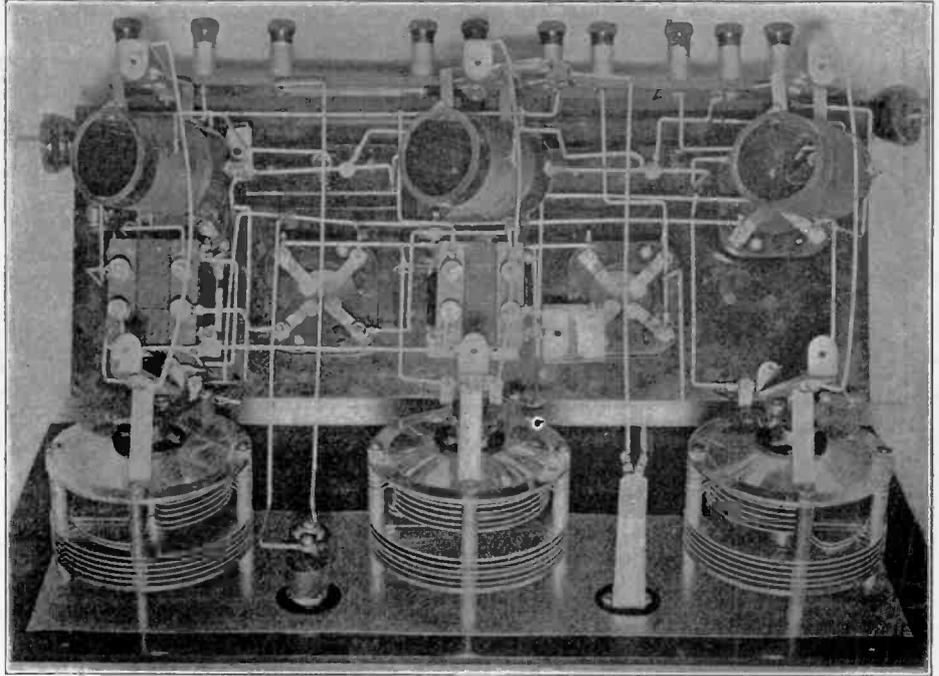
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Neutroformers on Swivels a New Idea



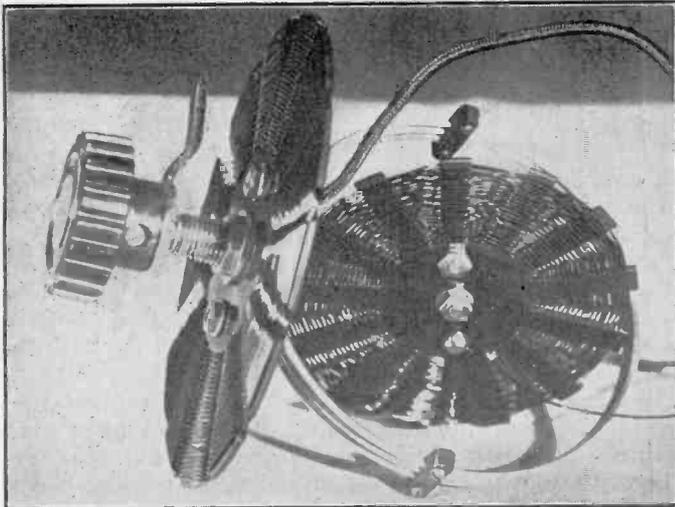
(International Newsreel)

A NEW and handy portable radio receiver, built by J. Howard Bennett, of New York City, uses only one tube. Everything is self-contained, including the aerial, which is seen in the photo rolled up on a spool. This lightweight outfit is just the thing for canoeing and hiking trips where space counts. The left-hand dial is for the variocoupler. The one at the right actuates the variable condenser.



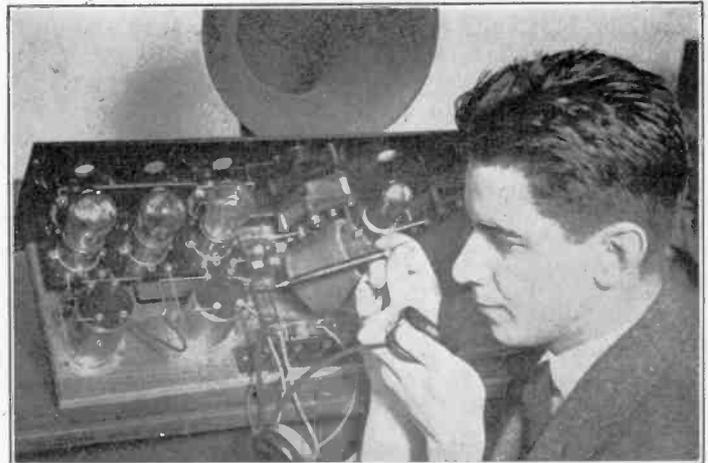
(Foto Topics)

NEUTROFORMERS fastened to swivels, mounted in the rear of the set, instead of to the variable condensers, is a new idea. The first and second dials operate on the same settings conjunctively.



(Foto Topics)

ZERO CAPACITY COUPLING is achieved by the use of two spider-web windings. Signals are louder and selectivity is better. The construction is rigid and light.



(Kadel & Herbert)

TO SPEAK through your own loud speaker, connect phones across primary of the first AF transformer, the B battery connection remaining. Then talk into the headset.

Resistance-Coupled RF Is Effective

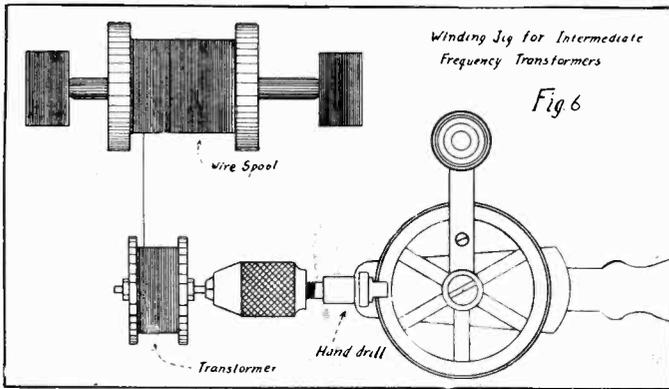
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parallel with it. Actually, tube number one simply compensates for the losses in the tuning circuit, thereby causing more signal current to flow. In place of the 70,000-ohm resistors in the radio-frequency stages I would use the Daven Radio Company's 100,000-ohm resistors, which will amply serve the purpose. For the by-pass condenser connected with these resistors any capacity not lower than .01 mfd. will suffice. The grid leaks should be approximately 2 megohms. RF choke coils can now be purchased, but if you experience any difficulty in so doing a DL250 honeycomb coil will work just as well in its place. For the 50,000-ohm and 100,000-ohm units used in the AF amplifier, Daven resistors can be purchased in exactly the same sizes. You will note that the 50,000-ohm units act as stabilizers to prevent audio oscillation in the audio-frequency

tubes. For the by-pass condenser across the B batteries .002 mica condensers can be substituted. It will not be necessary to use quite as much B battery voltage as indicated on the diagram. About 180 volts maximum will generally be sufficient.

The main tuning condenser marked A. T. C. should be an 11-plate variable, and the aerial should be a copper plate as shown. But, if it is desired to use an outside aerial and a real ground connection, then it will become necessary to insert a coupling condenser in the lead wire from the aerial to the top of the stator coil. The movable plates of this coupling condenser, which is a standard 23-plate condenser, should be attached to the antenna. The reason for the insertion of this condenser is because it is hard to approach sensitivity with short waves if a long outside aerial is directly connected to the grid of the first tube.

Winding "Super-Het" Inductances



HOW to clamp a hand drill in a vise for use in winding intermediate transformers for J. E. Anderson's Super-Heterodyne.

[The third instalment of an article by J. E. Anderson on the construction of an eight-tube transcontinental Super-Heterodyne is published herewith. Part I appeared in the issue of May 31, and Part II was published June 7. The article will be concluded in the June 21 issue.]

By J. E. Anderson

PART III

TWO grid biasing batteries E_1 and E_2 , are used in the circuit. Each of these is made up of two $4\frac{1}{2}$ -volt dry batteries as used for flashlights. A bias of four and one-half volts is used on the muffle tube and on the two intermediate frequency amplifiers, while a bias of nine volts is used on the modulator tube, the detector, and the two audio frequency amplifiers. Two bias batteries are used in order to shorten the leads and to separate the high frequency grid circuits from the intermediate and audio frequency grid circuits.

A large by pass condenser having a capacity of about one microfarad might be connected across the 60-volt plate battery to good advantage, in order to exclude all high frequency currents from the battery. This condenser is not shown in the drawing, but it might be connected at the most convenient point between the positive 60-volt bus bar and the negative, grounded bus bar.

Winding the Inductance Coils

The specifications of the various coils which are given below are based on the assumption that the maximum value of each of the three tuning condensers in the circuit is .0005 microfarad, and that the desired tuning range is from 200 to 600 meters. This range is wide enough to include all broadcasting stations. Actually the circuit may tune to waves somewhat below 200 meters so that amateur waves may be received.

The coils may be wound either with double silk or double cotton covered wire, using sizes No. 22, No. 24, and No. 26. No. 24 double cotton covered copper wire is recommended.

The cores upon which the coils are wound may be tubing of cardboard, hard rubber, bakelite, or other low loss insulating material, and the diameter should be three inches.

Coils L_1 and L_5 each contains 12 turns; coils L_2 , L_4 , and L_6 , 48 each, and coil L_3 , 8 turns. Three pieces of tubing will be needed, each $2\frac{1}{2}$ " in length. This length allows $\frac{3}{8}$ " margin at each end if No. 24 wire is used. If heavier wire is used the tubes should be slightly longer.

Coils L_1 and L_2 are wound on one tube, L_3 and L_4 on the second, and L_5 and L_6 on the third.

Drill two holes at each end of the tubes, $\frac{1}{4}$ " from

the edge, and insert small machine screws for binding posts. Use two soldering lugs on each post, one for the coil terminal and one for the lead to the coil; or else use a single two way lug so that when the set has been soldered there is no high resistance joint.

In winding L_1 and L_2 anchor the end of the wire at one of the binding posts and put on 12 turns. Cut the wire and put the end through a small hole in the tubing. Leave the end long enough so that it will reach either end of the tube. Then anchor the end of the wire yet on the spool on one of the binding posts temporarily, bringing it through a small hole in the tubing and leaving the end several inches long. Wind in the same direction as before until 48 turns have been put on. Cut the wire and fasten the end to the nearest binding post. The two ends of wire at the middle of the tube are now fastened to the remaining binding posts. Whether to bring out the terminals of the two coils at the same or opposite ends depends on the manner in which the coils will be mounted, which can best be determined when the layout has been decided on. The method which gives the shortest and most convenient wiring should be used.

The other two tubes are wound in the same manner, except that taps are brought out from coils L_4 and L_6 . L_4 is tapped at the 12th turn from the end nearest L_1 , and L_6 is tapped at the middle point. There may also be a separation of about $\frac{1}{8}$ " between L_5 and L_6 since the tube holding these contains fewer turns than the others.

How to Connect Terminals

In connecting L_1L_2 , the antenna and grid terminals of the windings should be farthest apart, while the low potential terminals should be together. In L_3L_4 , the plate and grid terminals should be farthest apart, while the "B" battery terminal of L_3 and the grid battery terminal of L_4 should be close together. There is not much choice in the connection of L_5L_6 . Both ways of connecting L_5 may be tried.

Tuning condensers which may be obtained on the market vary considerably as to their maximum and minimum capacities. For this reason the tuning range of the circuit when the coils given above are used will not always be from 200 to 600 meters. If the maximum capacity of the condenser is larger than the rated value, the receiver will tune to waves longer than 600 meters; and if the maximum capacity is less, the receiver will not reach that wave length. Also if the minimum capacity is excessive, the circuit will not tune down to 200 meters.

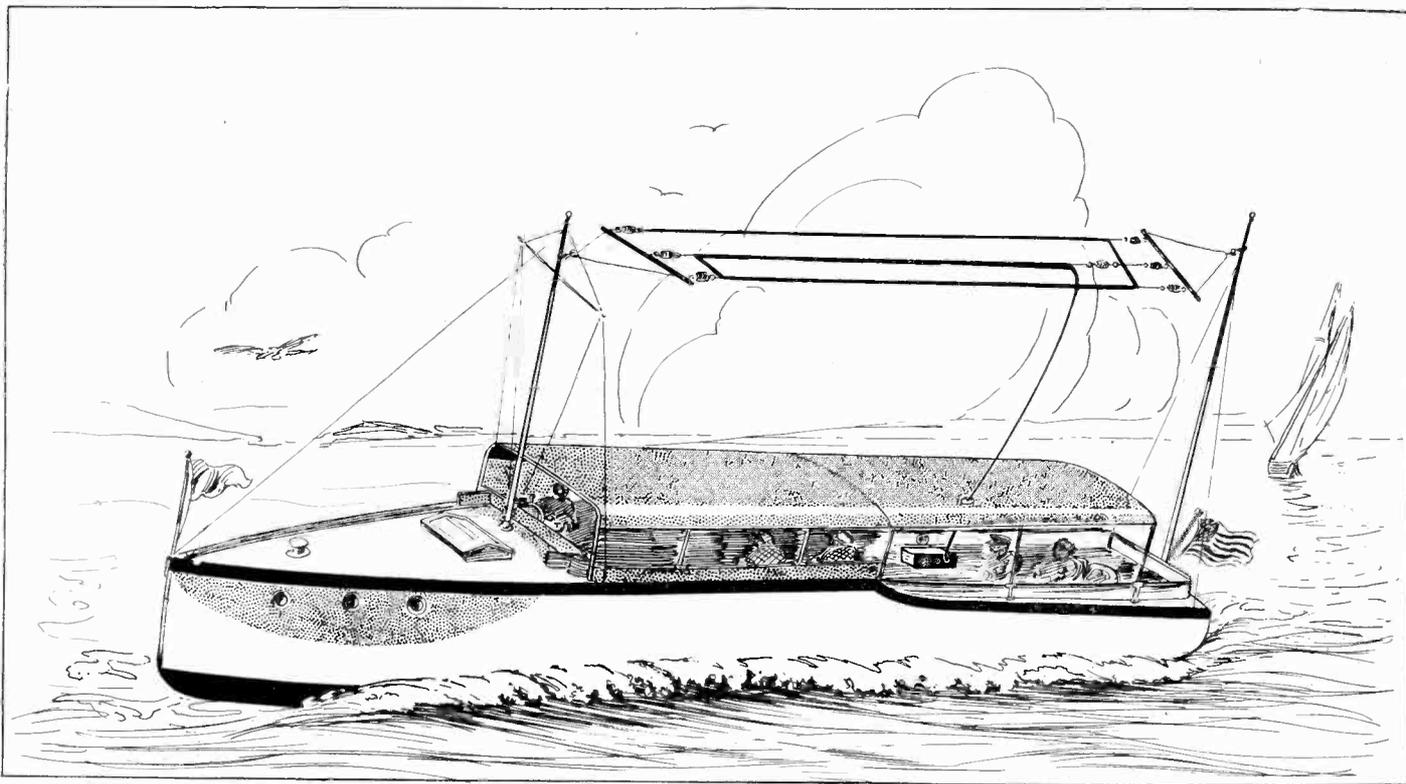
There may also be slight variations in the size of wire used, the thickness of the insulation on the wire, and the size of the tubing. These factors will change the inductance of the coils, and hence the tuning range of the receiver. This effect is very small, however, and may be neglected.

Another factor which will change the tuning range is the distributed capacity of the coils and the circuit with which they are connected. This adds to the minimum capacity of the condensers, and narrows the effective tuning range of the receiver. The leads to the tubes should be made as short as possible to keep the distributed capacity to a minimum.

If the circuit will not tune down to the desired wave length due the excessive value of distributed, a few turns may be removed from coils L_2 , L_4 , and L_6 . If the range 175—550 meters is desired, these coils should each have 43 turns instead of 48. The failure of many

(Concluded on page 19)

The Best Aerial for a Pleasure Boat



THIS type of antenna, a sort of folded-up single wire, or modified loop, can be put up on a pleasure boat where the overall length from bow to stern averages about 25 feet. Taking into consideration space required for spreaders and insulators, the effective length of each strand in such a case is about 20 feet. An actual length of 60 feet, then, can be obtained by stringing three wires on the spreaders without connecting all the ends together, as shown in the illustration. The lead-in is taken from the end of the middle wire. The lead-in is connected only to the middle strand.

By Lieut. Peter V. O'Rourke

(Formerly Navigating Officer, United States Merchant Marine; Well-Known Yacht Race Navigator.)

RADIO made its debut on the water. Most of the pioneering and development was conducted on the sea with crude home-made apparatus.

The then famous C. Q. D., since changed to S. O. S., added more impetus and created greater publicity for the art than any other element. The rapid progress of wireless telegraphy and telephony is due in no small measure to those men who go down to the sea in ships. It is befitting therefore that all lovers of the water should share in the fruits of their labor.

The Radio Shack, a sea-going expression for the compartment where Sparks, as the operator is known, "does his stuff," is ever popular with the crew and passengers of a ship.

News, music, time signals, weather reports, sporting events, etc., are all eagerly sought.

Yachtsmen and boat owners realize its enchantment and have fallen in line with their deep-sea mates in making use of radio as an aid to navigation and inter-communication during cruises and regattas. Yacht clubs are installing sending outfits which will be useful in many ways.

Every yachtsman knows what it is to try to make out a megaphone message and that it is equally difficult to make himself understood by the same method. Radio will help here. Also, radio is a big factor in providing entertainment. The only real problem aboard a pleasure boat is the aerial.

Novices may encounter difficulties after following marine aerial instructions apparently to the letter. Some experts are not exempt from this condition, but usually possess more patience, and a certain confidence. Knowing there is a way of making the thing work. For the

beginner to obtain the best and also the surest results he should install a thoroughly tested and reliable set, whether it is a ready made store set or one built to order by a professional or an outfit constructed by himself.

There are so many jobs to do aboard a boat incidental to its operation and upkeep that the radio is likely to be neglected if it doesn't function properly from the start.

It should be borne in mind that unless you have an elaborate receiver requiring no aerial at all the aerial plays a very important part.

Also remember that where it is intended to use the wire rigging for an aerial that if any part of it is submerged it becomes grounded and is useless as an antenna.

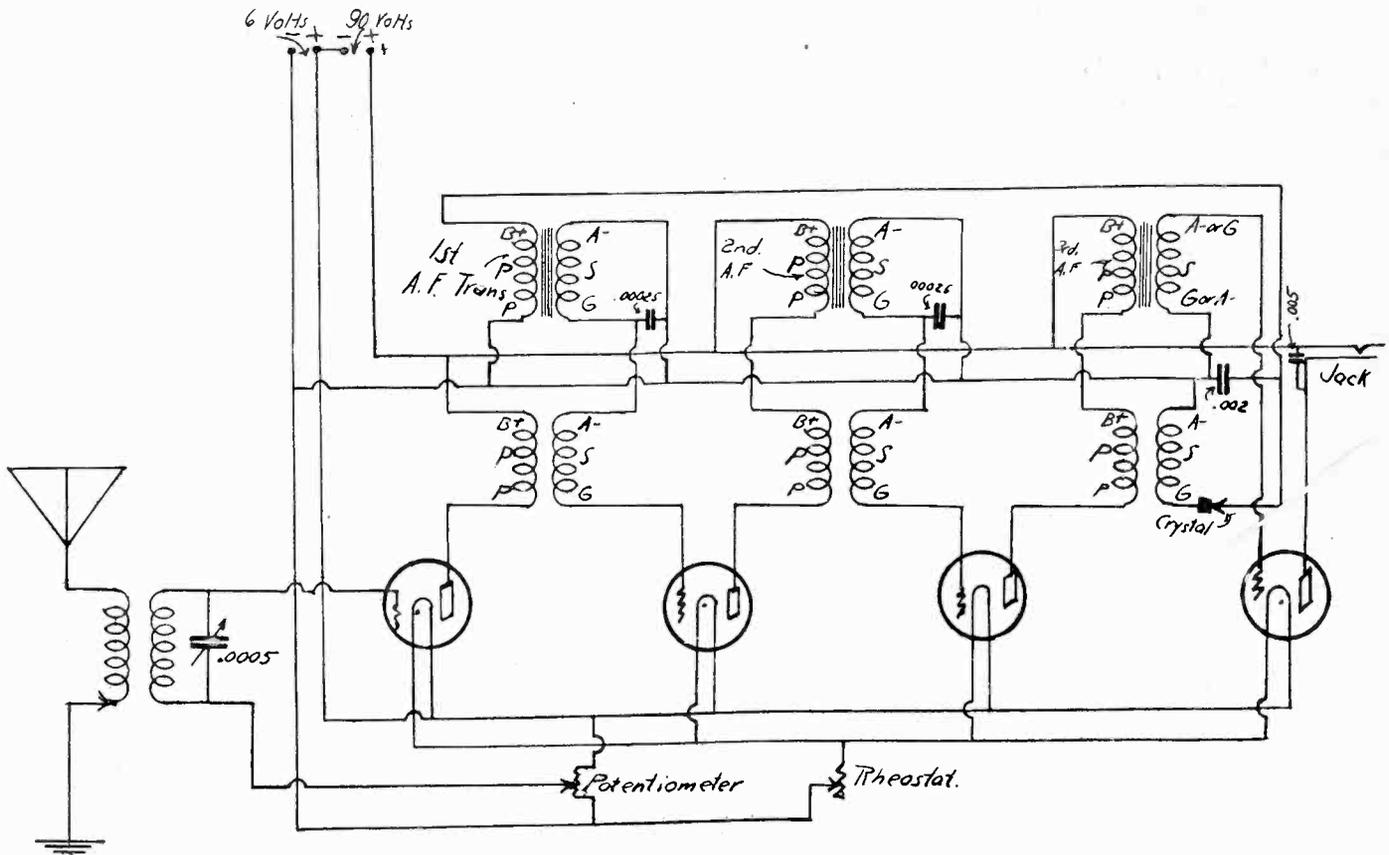
A single wire strung in zigzag fashion or describing the letter N in a horizontal plane may be employed successfully. Carry the terminals as far fore and aft as the construction of the boat will permit, always keeping in mind not to run afoul of running rigging and gear that may be needed in an emergency, such as davits, ground tackle, etc. The N aerial and the folded-up I antenna (Fig. 1) are of the same effect and give best results.

Place the aerial aloft as high as possible, using portable or jury masts. Make good ground connections below the waterline and submerged; the deeper the better.

When grounded to the engine, the propeller is naturally the submerged element.

Boats lying at anchor or moored in sheltered harbors may string temporary antennae from one to another or to an elevated point ashore, making due allowance for swinging in a tideway. Pulleys and weights can be used to advantage where it may be necessary to take up slack.

A Super-Power 4-Tube Reflex



COMPLETE WIRING DIAGRAM of Byrt C. Caldwell's 4-tube super-power reflex. The tuning is accomplished by means of the variocoupler and variable condenser. A short indoor antenna or a loop may be used as a collector. This outfit may also be built into a convenient carrying case for portable vacation use.

By Byrt C. Caldwell

[This is the fifth and final article of a series by Byrt C. Caldwell. Each article called for the construction of a set ready for tuning in, but each successive stage makes the receiver more sensitive.]

WITH this article we complete the construction of a Super-Power Receiver. This time we add one more tube, employed

as an audio-frequency amplifier. The receiver will now be an extremely sensitive instrument, capable of receiving broadcasts thousands of miles away on the loud speaker. And generally this may be done with about thirty or forty feet of wire strung around the room behind the picture moulding or elsewhere, and a ground connection. On the stations not more than several hundred miles away, the receiver will operate a loud speaker with sufficient volume to fill a large

hall. The new apparatus needed is a tube socket and tube, another audio-frequency transformer, a .002 mfd. fixed condenser, and a 50 turn honeycomb coil.

Take all of the wiring from the receiver this time and arrange all of the apparatus as shown in the picture diagram.

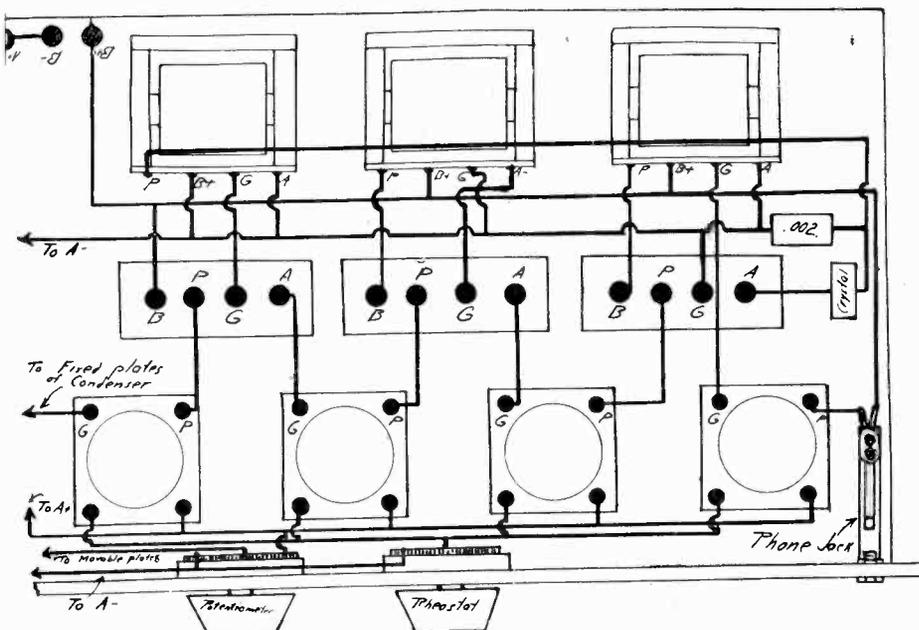
By this time the builder should be real expert and should have an easy time at wiring. However, use more care than ever this time, and follow both diagrams in every detail. When connecting in the crystal, slide a piece of spaghetti tubing over the long lead from the audio transformer to the crystal, and slide a piece of Belden Braid or copper tubing over this. Take good care that the Braid does not project over the end of the spaghetti and touch the bus wire. Connect the Belden Braid to the A- of the last audio frequency transformer.

Remove the rotor of the variocoupler, and remove all but twenty turns. If a variocoupler is used which has the winding in two sections, leave ten turns on each side of the rotor. Now put the rotor back, and at the point marked X in the hook-up insert the 50 turn honeycomb coil. This serves the purpose of sharpening the tuning.

When the receiver has been finished, connect all the batteries, the phones, and the antenna and ground, after plugging in the lines and testing to make sure that the B battery is not connected across the filament terminals.

Turn the potentiometer to the right as far as it will go, and then, placing the first dial at about 150° if the coupler is one of the 180° type, and at about 80° if it is the ordinary type, tune with the second dial, going over the entire scale of this dial. If nothing is heard, turn the potentiometer to the left a short distance, and try again. When a station is heard, tune as sharply

(Concluded on next page)



SCHEMATIC WIRING DIAGRAM of the super-power reflex, showing position of the tube sockets and transformers. The actual wiring should be done exactly as shown for best results. The arrows at the left go to the grid tuning condenser and the battery binding posts, as explained fully in the text.

Why the Senate Sessions Should Be Broadcast

By Ralph B. Howell

United States Senator from Nebraska, and introducer of the resolution to have the Senate proceedings broadcast.

BELIEVING that fundamentally and basically the safety of the Government rests on the widest and fullest publicity of what the Government is doing and contemplates doing, I introduced a resolution in the Senate requesting the Secretaries of War and the Navy to cooperate in the appointment of a joint commission of radio experts from their respective departments to investigate and report to the Senate upon the equipment of the Senate chamber with electrical transmission apparatus so that the proceedings may be adequately heard by every one in the chamber and so that the proceedings may be broadcast.

Some of the details I had in mind were the placing of loud speakers in each Senate cloakroom and in each Senator's office, so that if a Senator were compelled to be absent from the chamber itself he might be able to know exactly what matter was being considered by the Senate and to what stage it had progressed. This idea could of course be extended to the office of the President and other high Government officials.

There is often confusion of voices in the Senate chamber due to the low tone of voice used by some Senators and also to the proclivity of people to get together in a corner and discuss something. I had in mind a receiving and sending apparatus at each Senator's desk. When a Senator starts to speak this could be turned on; all other receiving apparatus in the chamber would then be turned off. Any Senator who was not hearing clearly could turn on his receiving apparatus, and turn it off when he chose. In this way every word spoken which should be heard would be heard and could of course be broadcast.

My idea was to use the existing Army and Navy stations. Immediately upon the announcement of my resolution the Radio Corporation of America volunteered to undertake this broadcasting. The Senate has adopted the resolution. The War and Navy departments are now looking into the matter as set forth in the resolution.

I believe that many meritorious measures would be acted upon and other proposals, which do not deserve approval, or consideration, would not be passed, if the people knew at the exact time at which they were being considered that these measures were up. Broadcasting of the Senate's proceedings would bring the people into closer touch with what their representatives are doing and would thus stimulate interest in the issues before the country. The galleries of the Senate would be extended to the farthest borders of the country. Many people do not read much, but these same folks are interested in radio and would listen in.

Undoubtedly much of the irrelevant and extraneous talk and debate would be escaped if my plan were put into effect. The reaction from constituents resulting from the waste of time by unnecessary debate would more than offset the desire to make speeches for political effect.

ALWAYS USE A TEMPLATE

IN drilling holes in the panel for the shafts of condensers, variocouplers and variometers, always use a template, so the shaft won't bind.



T R O



The Weekly Rebus

CAN you decipher this rebus? Send your answer to Rebus Editor, RADIO WORLD, 1493 Broadway, New York City. Mention Rebus No. 5. The names and addresses of those answering correctly will be published.

REBUS NO. 1

- H. V. Petrie, Box 357, Hazelton, Kas.
- H. V. Arney, 430 Elm St., Wabash, Ind.
- J. K. Flitcraft, 225 E. Second St., Peru, Ind.
- F. S. Merrill, Sebec Station, Me.
- W. C. Schott, 305 S. Tisdale St., Ottumwa, Ia.

REBUS NO. 2

- H. V. Petrie, Box 357, Hazelton, Kas.
- Frank J. Capone, 515 La Salle St., Berwick, Pa.
- Ray Love, 328 E. 12 St., New Albany, Ind.
- Geo. P. Fee, 32 Pleasant St., Nantucket, Mass.
- O. T. Sommers, 347 53rd St., Brooklyn, N. Y.
- F. C. Arnold, 104 North West St., Waukegan, Illinois.
- Alexander Schomburg, 65 West 46th St., New York City.
- H. G. Bergman, 5217 Ellis Ave., Chicago.

REBUS NO. 3

- Calvert Curry, Box 64, Franklin, Tex.
- George P. Fee, 22 Pleasant St., Nantucket, Mass.
- Howard Ault, 204 W. George St., Arcanum, O.
- Wm. G. Wheat, 2607 Benton Blvd., Kansas City, Mo.
- B. J. Killeen, 34 Indiana St., Wheeling, W. Va.

Super-Power 4-Tube Reflex

(Concluded from preceding page)

as possible with the second dial. Then loosen the coupling between the primary and secondary of the coupler until the signals can just be heard, and then retune very carefully with the condenser. It will be found that the signals this time are very much louder and the tuning is sharper than before. The potentiometer may now be turned to the left. This will greatly increase the volume. Turn it until it just starts to howl, and then turn it back slightly. This is the most sensitive position. The rheostat may need some adjustment. It will often be found that there is a certain spot on the rheostat where the volume increases several times. The dials may now need some slight adjustment.

If the set howls and it cannot be stopped by tightening the coupling of the variocoupler or by turning the potentiometer to the right, reverse the connections of the primary of the second audio frequency transformer. If this does not stop it, change the connections back to their original positions, reverse the secondary connections of the same transformer, and connect a 50,000 ohm leak across the small fixed condenser which is connected across the secondary of the first audio transformer. (This is not shown in the picture diagram.) If a resistance of this value is not at hand, fasten a piece of fibre to the condenser with two small machine screws, placed through the eyelets in the ends of the condenser. Then get the set to howling, and with a pencil, draw lines on the fibre, connecting the two machine screws, until the howling stops. Do not put more lead on than is necessary, or the volume will be reduced. Even if the set does not howl, it is a good plan to do this last thing, as it will considerably improve the quality of the tone in many cases.

Now, when we have finished following the directions given in this article, we have a four-tube reflex receiver, one of the most sensitive, efficient and all-round satisfactory receivers yet designed.

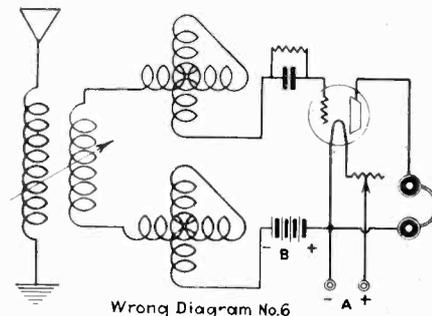
ENGLISH BROADCASTING EXCELS THAT OF U. S., SAYS KNOPF

ENGLAND is ahead of the United States in radio broadcasting programs, according to Samuel Knopf, member of the publishing firm of Alfred A. Knopf, who told of some of his observations in Europe, whence he returned to New York City on the White Star liner Homeric.

"In England the radio has been recognized as the medium of a new form of art," said Mr. Knopf. "The first play ever written expressly for radio production is the work of a young English dramatist, Richard Hughes. It is a thrilling tragedy entitled 'Danger,' and made a powerful impression on all who heard it."

WHAT'S WRONG HERE?

STUDY this Wrong Diagram. Send in what you think is the correct solution. Address Wrong Diagram Editor, Radio World, 1493 Broadway, New York City. Specify Wrong Diagram No. 6. The names and addresses of those sending in



correct answers will be published. The following were among those who sent in correct answers:

WRONG DIAGRAM NO. 1

- Dan D. Church, Sec. A., Chanute Field, Rantoul, Ill.
- Scott Ferguson, Seaforth, Ontario, Can.

WRONG DIAGRAM NO. 2

- H. Verne Arney, 430 Elm St., Wabash, Ind.
- John K. Flitcraft, 225 E. Second St., Peru, Ind.
- Mrs. A. W. Wallace, 310 N. Second St., Monroe, La.

WRONG DIAGRAM NO. 3

- Glenn W. Slater, 62 E. Huron St., Detroit.
- F. C. Arnold, 104 North West St., Waukegan, Ill.
- Paul H. Kellam, 809 S. Macon St., Greensboro, N. C.
- Dr. A. W. Hinchman, Burch Bldg., Breckenridge, Tex.
- Wm. G. Wheat, 2607 Benton Road, Kansas City, Mo.
- Robt. S. Shull, 136 East Queen St., Chambersburg, Pa.
- Rollin Jenney, 414 Jackson Ave., Endicott, N. Y.
- E. E. Ledbetter, Carrollton, Tex.
- La Verne Auché, 37 N. Sibley St., Fond-du-Lac, Wis.
- Frank J. Capone, 515 La Salle St., Berwick, Pa.
- C. Albach, Jr., 469 East 136th St., N. Y. C.
- Lee Atherton, 809 N. Cleveland Ave., Sherman, Tex.

WRONG DIAGRAM NO. 4

- Mrs. A. W. Wallace, 310 No. 2nd St., Monroe, La.
- David Krantz, 1650 Amsterdam Ave., N. Y. C.
- John A. Rose, 32 West 40th St., N. Y. C.
- Arthur Koenig, 9 Britton Ave., Elmhurst, L. I.
- Rollin Jenney, 414 Jackson Ave., Endicott, N. Y.

RADIO WORLD

Title Reg. U. S. Pat. Off.

TELEPHONE: LACKAWANNA 2062, 6976
PUBLISHED EVERY WEDNESDAY
(Dated Saturday of same week)
FROM PUBLICATION OFFICE,
1493 BROADWAY, NEW YORK, N. Y.
HENNESSY RADIO PUBLICATIONS CORPORATION
ROLAND BURKE HENNESSY, President
M. B. HENNESSY, Vice-President
FRID S. CLARK, Secretary and Manager
1493 BROADWAY, NEW YORK, N. Y.
Boston Representative: Chas. H. M. White, 18 Stuart
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Cincinnati Representative: Samuel H. Jaffee, 1117
Provident Bank Bldg., Cincinnati, O.
European Representative: The International News Co.,
Breems Bldgs., Chancery Lane, London, Eng. Paris,
France. Brentano's 38 Avenue de l'Opera.

EDITOR, Roland Burke Hennessy
MANAGING EDITOR, Herman Bernard
TECHNICAL EDITOR, N. N. Bernstein

SUBSCRIPTION RATES

Fifteen cents a copy, \$6.00 a year, \$3.00 for six
months, \$1.50 for three months. Add \$1.00 a year
extra for foreign postage. Canada, 50 cents.
Receipt by new subscribers of the first copy of RADIO
WORLD mailed to them after sending in their order, is
automatic acknowledgment of their subscription order.
Changes of address should be received at this office two
weeks before date of publication. State whether sub-
scription is new or a renewal.

ADVERTISING RATES

FLAT RATE—Page, 7 1/2 x 11", \$150; half page, 8 1/2
D. C. or 5 1/2 x 3 col., \$75; quarter page, 4 1/2 D. C.,
\$37.50; one col., 2 1/2 x 11", \$50—\$5 per inch. Back
cover page, two colors, \$250. Preferred positions 20%
extra.

CLASSIFIED ADVERTISEMENTS

Five cents per word. Minimum, 10 words. Cash
with order.

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

JUNE 14, 1924

A Novelty for the Experimenter

ONE of the tempting things about radio experimenting is the wide choice afforded and the still large domain of unexplored territory. While it is true that in ten years there has been no great upheaval, nothing revolutionary, there has been a steady advance, an orderly procession of improvements, adding to selectivity and quality. But still much mystery remains, and there is a fascination in mystery. It tempts the experimenter. Keen minds are matched in an entrancing competition. And frequently something new to the reader crops up and he turns his experimental efforts in that direction.

Not much has been done by the great body of experimenters in the United States regarding the use of resistance-coupled radio-frequency amplification. With the publication in RADIO WORLD, issue of May 24, of the authentic diagram of the set used by King George, of Great Britain, in Windsor Castle and Buckingham Palace, an interest was suddenly created in the resistance type of RF coupling. The diagram was drawn by the expert who built His Majesty's set—A. G. D. West, assistant chief engineer of the British Broadcasting Company.

A Curious Attack:

Transformer-Coupled Audio-Frequency Amplification Gets Some Foul Blows.

By Herman Bernard

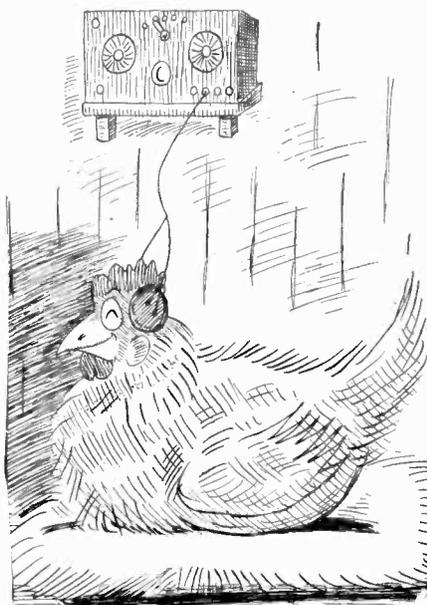
THE virtues of resistance-coupled audio-frequency amplification are well known to the radio experimenter. Clear, undistorted loud-speaker volume is obtained from three stages of such amplification, about the same amount of volume as from two stages of transformer-coupled audio-frequency amplification. RADIO WORLD has published several articles and hookups for the resistance type and approves its use. The cost of the circuit is about the same as that of two stages of the transformer amplification.

It is possible, as not all technical writers seem willing to admit in print, that two different forms of achieving about the same result may both be excellent. Recently there was published elsewhere an article in which transformer coupling was severely denounced as producing distortion and its use strongly discouraged. Whatever inspired such advice is not quite clear, but a strict regard for accuracy was not the primary motive. Today in thousands on thousands of homes in the United States two stages of transformer-coupled audio-frequency amplification are producing loud speaker volume of splendid quality and affording immeasurable satisfaction and joy to the auditors. To attempt to convince these satisfied users of the transformer method that they are listening to harsh noises instead of beautiful music is to insult their intelligence. But the attempt boomerangs, so that its main ultimate result is to sully the name of the author of such false advice.

It would be a pity if any one were actuated by any motive except that of service to his readers in writing any article giving emphatic advice to them as to what to buy.

It is a fact that if good quality transformers are used signals will be excellently amplified. If bad parts or equipment are used in constructing even the best of circuits, only poor results need be expected. And nobody can complain that the American market is lacking in audio-frequency transformers of fine quality. You will find them in the best and most expensive sets made in the world's leading radio factories, right here in the United States, with only American-made parts used throughout. Radio set manufacturers who have spent millions for the purchase of patent rights to the best circuits, for research to improve them, and for plants in which to make them, are jealous of the quality of tone obtained from their products. Their use of transformer coupling in the audio-frequency side of their sets is an authoritative verdict which fortunately no misguided author has enough weight or authority to upset.

A Radio Set



Letters From Our Readers

EDITOR, RADIO WORLD:

IN connection with your commendable campaign to curb radiation from radio sets, may I give my views on one angle of the matter?

I don't mind so much a little interference from a neighbor if he would keep a station after he gets it, but when he spends the whole evening trying to see how many stations he can get, then my evening is completely ruined.

Its all very well to say that DX fans will stop as soon as they are shown they are causing trouble, but the fact of the matter is that lots of them do not. G. A. YOUNGER,
13 Le Breton St., Ottawa,
Ontario, Canada.

New World Record Made by Amateurs

HARTFORD, CONN.

THE breaking of a world's record coupled with other long distance work, during the Pan American amateur radio tests just concluded by the American Radio Relay League in co-operation with the Revista Telegrafica, demonstrates that the South American amateurs are becoming as efficient in short wave transmission as those in this country.

Carlos Braggio of Bernal, near Buenos Aires, operating amateur station CB8, is the outstanding figure of the Latin American tests through his successful two-way communication with J. H. O'Meara at Gladstone Road, Gisborne, New Zealand. This is the farthest two-way contact ever made on amateur waves.

New Edition of U. S. Circular on Radio

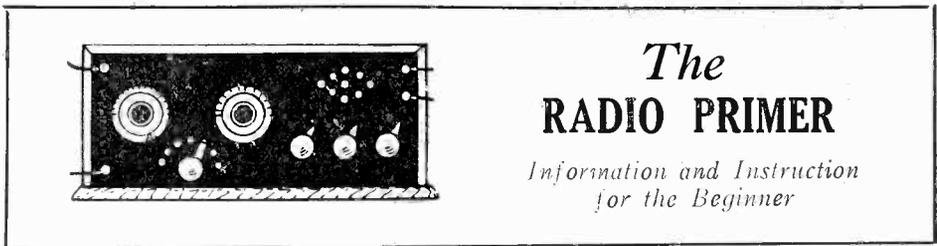
A SECOND edition of Bureau of Standards circular 74 on radio instruments and measurements has been issued. This circular presents information regarding the more important instruments and measurements actually used in radio work and is planned to be of use to government officers, radio engineers, etc. It makes no attempt to deal with the operation of apparatus in sending and receiving, but other publications by the bureau on that and other subjects are listed in Appendix 2.

The first edition of this circular was issued March 23, 1918. The new edition contains a number of corrections and revisions. Many of the matters dealt with are or have been under investigation in the laboratories of the Bureau of Standards, and are not treated in previously existing publications.

University of the Air a Feature at KGO

MOUNTAINS and deserts of the great West need no longer be barriers to anyone seeking an education, for the Radio College is now a reality and on Mondays at 8 p. m. thousands tune in on KGO, Oakland, Cal., the Pacific Coast Station of the General Electric Co., and receive instruction in agriculture, language, music, economics and literature.

A course in Spanish, by Professor Oscar Galeno, is so organized that listeners may send KGO stamped envelopes and receive in return leaflets which will aid them in taking instruction.



The RADIO PRIMER

Information and Instruction for the Beginner

How to Tune in Distant Stations

SOME novices who have radio receiving sets capable of bringing in distant stations are at a loss to know whether it is necessary to have ear phones, since they already have a loudspeaker. Anybody desiring to tune in distant stations so as to achieve true resonance—the only condition which produces real quality—should use the ear phones for tuning in. All commercially constructed radio sets are provided with facilities for hearing only the detected signal. Usually there is a jack placed at the detector tube marked DET. and when the person tuning in desires to get a distant station, he or she should insert the plug in the detector jack and then adjust the dials.

The signals are heard in the ear phones, which are connected to the plug. There are plugs on the market which enable one to insert tips of phone cords in two holes, and the two terminals of the loud speaker cord in two other holes, a switching arrangement permitting the cutting out of one or the other. This facilitates the changing over to loud speaker operation from phone detector and obviates the necessity of disengaging the phone cord tips from the plug. The girl in a picture on page 17 is using phones to tune in distant stations.

A common method of tuning in for far-off broadcasting stations is to dispense with the ear phones and rely solely on the loudspeaker. There is nothing harmful in this method, and to anybody who is not particular about the quality of the received signals the speaker tuning method is all right.

However, one cannot reasonably expect distant stations to come in regularly with the same volume and quality as local ones. Only highly selective receivers can get a variety of distant stations at all. Therefore, as an adjunct to the realization of all the selectivity that the set possesses, tune in with phones.

The audio-frequency amplifier, which is that part of the circuit which increases the volume, acts only upon such signals as pass through the detector tube. If the signal is not in the detector tube it

cannot come out of the amplifier circuit. The amplifier is like a magnifying glass—what is not there the glass does not reveal.

Beginners' Dictionary

EAR PHONES—Two flat shaped head telephones connected in series by means of a flexible conductor, the two leads being brought out at the end of the cord and connected to metallic tips, convenient to fasten under screw-heads or to suitable connectors such as phone plugs. Each phone has a set of two permanent magnets, each wound with a quantity of very fine wire. When the signals pass through these fine wire coils, they actuate the magnet, which in turn cause the metal diaphragm over the magnet ends to vibrate, thus causing the air immediately surrounding the diaphragm to vibrate likewise. The air vibrations, varying over the entire audible scale, is the sound heard by the ear.

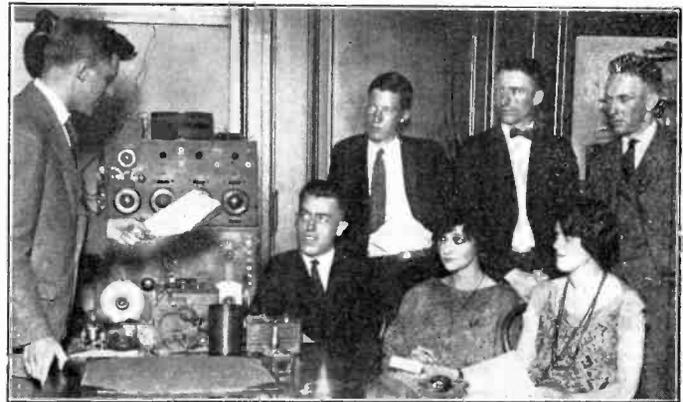
* * *

PLUG—An instrument whereby the phones or loud speaker may be connected into any part of a circuit, predetermined by the insertion of a jack, or receptor for the plug, in that part of the circuit. The plug consists of a handle of solid insulating material such as hard rubber or bakelite, to which is fastened a double shank. The shank, starting from its extremity, consists of a brass ball ¼ inch round, to which is screwed a threaded rod about 1½ inches long. An insulating collar or washer is placed under the ball where it fastens to the screw, and a piece of insulating tubing slipped over the screw. A piece of brass tubing, usually about ⅞ inch long, is slipped over this tubing and up to the washer under the ball. The whole is now threaded to a suitable metal base, and convenient screws for fastening the phone cord tips are placed thereon.



(Foto Topics)

PROBABLY the first formal radio christening was held in the home of Deputy Police Commissioner Harriss, in charge of New York traffic (at right). The occasion was a housewarming to celebrate a new installation. Watching the Commissioner (left to right) were A. Goodman, C. L. Hugo-Schollkopf, Deputy Commissioner Geo. McDonald and John Ringling.



(Kadel & Herbert)

"HELLO GIRLS" now spreads to radio. Formerly it referred only to telephone operators. Now girls are becoming amateur radiophone operators. Notice the two girls listening to talk of J. W. Swanson, inspector, N. Y.

BROADCAST PROGRAMS

KEY

Abbreviations: G. M. T., Greenwich Meridian Time; E. S. T., Eastern Standard Time; C. S. T., Central Standard Time; M. T., Mountain Time; P. T., Pacific Time; m, meters; k kilocycles.
D. S. T.—Daylight Saving Time.
E. S. D. S. T.—Eastern Standard Daylight Saving Time.

How to tune in a desired distant station at just the right time—Choose your station from the big list published herewith. See what time division the station is under (E. S. T., C. S. T., etc.); then consult the table below. Add to or subtract, as directed, from the time as given on the PROGRAM. The result will be the same BY YOUR CLOCK that you should tune in. The table:

If you are in	And want a station in	Subtract	Add
E. S. T.	C. S. T.		1 hr.
E. S. T.	M. T.		2 hrs.
E. S. T.	P. T.		3 hrs.
C. S. T.	E. S. T.	1 hr.	
C. S. T.	M. T.		1 hr.
C. S. T.	P. T.		2 hrs.
M. T.	E. S. T.	2 hrs.	
M. T.	C. S. T.	1 hr.	
M. T.	P. T.		1 hr.
P. T.	E. S. T.	3 hrs.	
P. T.	C. S. T.	2 hrs.	
P. T.	M. T.	1 hr.	

If you are under Daylight Saving Time, and the station you want is under that time, too, or if both are under Standard Time, the above table will hold.

If you are under Daylight Saving Time, and the station operates under Standard Time, add one hour to the table result.

If the station uses Daylight Saving Time, and you are under Standard Time, subtract one hour from the table result.

Wednesday, June 11

WLW, Cincinnati, O., 309m (970k), E. S. D. S. T.—4 P. M., concert for the "Shut Ins" by the Wurlitzer concert company. 4:25 P. M., French lesson from Crosley University. 5:15 P. M., baseball results. 8 P. M., program by Ricker's Melody Ten. 8:30 P. M., talk: "Bees," Dr. W. C. Herman. 8:40 P. M., original compositions by H. H. Walker; songs by Miss Mary Steele; pianologues by Miss Sade Elizabeth Huck. 9 P. M., one-act play: "The String of the Samisen" by Rita Wellman.

WGI, Medford, Mass., 360m (830k), E. S. T.—6:30 P. M., closing stock market reports; world market survey; Boston police reports; message to Camp Fire Girls by Chas. W. Casson. 7 P. M., meeting, Amrad Big Brother Club. 7:30 P. M., evening program: "Health-o-gram" by Rev. B. M. Heald; musicale; popular song hits, Don Ramsey at the piano; weather report and time.

WNAC, Boston, 278m (1080k), E. S. D. S. T.—10:30 A. M., WNAC Women's Club talks. 1 P. M., concert by Shepard Associates. 3 P. M., baseball game, play by play report, Harvard vs. Dartmouth. 6 P. M., children's half-hour. 6:30 P. M., WNAC dinner dance, Checker Inn orchestra. 8 P. M., concert program by pupils of the Lister studio.

WOO, Philadelphia, 509m (590k), E. S. D. S. T.—12 noon, luncheon music by the Tea Room orchestra. 12:55 P. M., time signal. 4:45 P. M., grand organ and trumpets. 7:30 P. M., sports results and police reports; dinner music by the Hotel Adelphia concert orchestra. 8:15 P. M., grand organ recital, Mary E. Vogt. 8:45 P. M., "What Radio Means to the Blind," Mrs. Isabel Kennedy. 9 P. M., WOO orchestra.

WJZ, New York, 455m (660k), E. S. D. S. T.—7 P. M., story for boys and girls. 7:20 P. M., financial developments of the day. 7:30 P. M., Selzer's Cafe Boulevard orchestra. 7:45 P. M., "Golf," by Innis Brown. 8 P. M., Selzer's Cafe Boulevard orchestra. 8:30 P. M., city official series talk. 8:45 P. M., Jack Trot, bassist, accompanied by Keith McLeod. 9 P. M., "Bald Head Club" talk by John Rodemeyer. 9:10 P. M., MacDowell Sisters, songs with ukelele and guitar. 10:30 P. M., Emil Coleman's Trocadero orchestra.

PWX, Havana, 400m (750k), E. S. T.—7 P. M., concert at Malecon band stand, General Staff Band of the Cuban Army, national and foreign music.

KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.—6 P. M., baseball scores; dinner concert continued. 6:30 P. M., "Two Little Plays for Little Girls and Boys," courtesy Drama League of Pittsburgh. 6:45 P. M., news bulletins. 7 P. M., baseball scores. 7:05 P. M., program by League of American Pen Women. 7:40 P. M., National Stockman and Farmer market reports. 8 P. M., opera, "The Violin Maker of Cremona." 9:55 P. M., time signals; weather forecast; baseball scores.

KYW, Chicago, 536m (560k), C. S. D. S. T.—5:45 P. M., children's bedtime story. 6 P. M., dinner concert from Congress Hotel. 7 P. M., Violet Brady Stewart, soprano; Frederick T. Blum, baritone; Sallie Menkes, accompanist; Louise Field and Her Society orchestra. 8:05 P. M., "Good Roads" talk. 8:45 to 11:30 P. M., Midnight revue.

WBZ, Springfield, Mass., 337m (890k), E. S. T.—6 P. M., dinner concert by the WBZ Trio. 7 P. M., results, baseball games. 7:30 P. M., bed-

time story for the kiddies. 7:40 P. M., concert by the St. John's Episcopal Church quartet. 8:30 P. M., Mrs. Philip Shotlander, soprano; Philip Shotlander, tenor; George Fitzgerald, baritone; C. P. Keene, accompanist; Boston Studio. 9 P. M., Mildred Taylor, violinist; Gladys Berry, cellist; Susan Williams, pianist, Boston Studio. 10:55 P. M., time signals and weather reports. 11:30 P. M., Leo Reisman and his orchestra. 12:30 A. M., songs by Bill Coty and Jack Armstrong.

WRC, Washington, 469m (640k), E. S. T.—3 P. M., to be announced. 6 P. M., Children's Hour, by Peggy Albion.

WHN, New York, 360m (830k), E. S. D. S. T.—7:30 P. M., Roseland dance orchestra. 8 P. M., Dr. Samuel Friedman, Union of Orthodox Jewish Cong. America talk, "The Health of the Working Class." 8:10 P. M., Cantor Chas. Katzmannsky in songs. 8:20 P. M., John Paaluh's Hawaiian orchestra. 8:50 P. M., Mildred Rosenberg singing. 9 P. M., Dan Gregory's Dancing Carnival orchestra. 9:30 P. M., J. C. Wolfe, baritone. 9:35 P. M., Joseph Reich, concert violinist; J. Fuchman, accompanist. 9:45 P. M., Fletcher Henderson's Alabam Club orchestra. 10:15 P. M., Victor Wilbur, baritone.

WDAR, Philadelphia, 395m (760k), E. S. D. S. T.—4:30 P. M., Rebecca Berg, pianist. 5:15 P. M., program of dance music. 5:45 P. M., baseball and othersportsresults. 7:30 P. M., Dream Daddy with the boys and girls. 8 P. M., Pennsylvania male quartet. 10 P. M., recital from studio.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.—7 A. M., WOR morning gym class. 6:15 P. M., "Music While You Dine," Baudistel's Olympic Park orchestra. 6:55 P. M., resume of the day's sports. 9:45 P. M., Edward Morris, pianist-composer, and William Ryder, baritone. 10:15 P. M., program by "The Carolinians."

WIP, Philadelphia, 509m (590k), E. S. D. S. T.—1:30 P. M., weather forecast. 3 P. M., Dagmar Johnson, soprano; Mrs. Horatio Batesell, soprano; Louis H. Drueding, baritone; Emilie Loeben, pianist, and Ethel Munder Devlin, reader. 6 P. M., weather forecast and final baseball scores. 6:05 P. M., dinner music by the St. James Hotel orchestra. 6:45 P. M., Agriculture Livestock and Produce Market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children.

Thursday, June 12

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.—6:30 P. M., closing stock market reports; agriograms; Boston police reports. 6:45 P. M., code practice. 7 P. M., meeting, Amrad Big Brother Club. 7:30 P. M., evening program, talk by Geoffrey L. Whalen, "The Radio Movie Man." 7:45 P. M., "Bernie and His Bunch." 8:15 P. M., Federated Film Night, direction of Geoffrey L. Whalen; weather report and time.

WNAC, Boston, 278m (1080k), E. S. D. S. T.—10:30 A. M., WNAC Women's Club talks. 1 P. M., Shepard Colonial orchestra. 4 P. M., Shepard Colonial orchestra; Bertha B. Morse, soprano; Wilhelmina Wagner, violinist. 6:30 P. M., WNAC dinner dance. 8 P. M., concert program arranged by Harrison Crofford, reader and baritone; J. Albert Baumgartner, pianist, and the Mozart Ladies Quartet.

WOO, Philadelphia, 509m (590k), E. S. D. S. T.—12 noon, luncheon music by the Tea Room orchestra. 12:55 P. M., time signals. 4:45 P. M., grand organ and trumpets. 7:30 P. M., sports results and police reports. 10:55 P. M., time signal and weather forecast.

WJZ, New York, 455m (660k), E. S. D. S. T.—1 P. M., Hotel Pennsylvania orchestra. 4 P. M., Eleanor Gunn's fashion talk. 4:30 P. M., "Progress of the World" talk. 4:45 P. M., fashion talk. 5 P. M., Edith Harrison, soprano. 5:30 P. M., agricultural reports; Farm and Home reports; closing quotations, N. Y. Stock Exchange; news. 7 P. M., Uncle Dave Cory's Jack Rabbit stories. 7:20 P. M., financial developments of the day. 7:30 P. M., Cafe Savarin ensemble. 8:15 P. M., Wanamaker concert. 9:15 P. M., U. S. Army Night. 10:30 P. M., Hotel Majestic orchestra.

WJY, New York, 405m (740k), E. S. D. S. T.—7:30 P. M., Fitzpatrick Brothers, "Old Time Songs." 7:45 P. M., "Photoplay Writing," Roy C. Jones. 8 P. M., choir of Church of the Good Shepherd. 8:30 P. M., "Safety Talk" by Charles E. Hill, General Safety Agent, of the N. Y. Central. 8:45 P. M., Frank Wright and Frank Bessinger, popular songs.

KPO, San Francisco, 423m (710k), P. T.—2:30 P. M., violin, saxophone, trombone and piano solos by members of the Entella Cafe orchestra; tenor solos by Wm. M. Conway. 4:30 P. M., Rudy Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories. 7 P. M., Rudy Seiger's Fairmont Hotel orchestra. 8 P. M., organ recital by Theodore I. Irwin. 9 P. M., Etta Wilson, soprano; Norman Simon, baritone; and Festo G. Aspre, violinist. 10 P. M., Max Bradford's Versatile Band.

KHJ, Los Angeles, 395m (760k), P. T.—6 P. M., Art Hickman's concert orchestra. 6:45 P. M., children's program; the little Hughes girls, singers; Jane Adele Riley, reader; bedtime story by Uncle John. 8 P. M., program, courtesy Fitzgerald Music Co. 9:15 P. M., program, courtesy Clifford Lott; chorus of 60 voices. 10 P. M., Art Hickman's dance orchestra.

KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.—5:30 P. M., dinner concert by the KDKA Little Symphony orchestra. 6 P. M., baseball scores. 6:30 P. M., "The Sleeping Beauty," for the radio children. 6:45 P. M., "The Flag and the Schools." Hon. Wm. H. Stevenson. 7 P. M., baseball scores; "Your Garden," radio garden editor. 7:15 P. M., farm program. 8 P. M., concert by KDKA Little Symphony orchestra. 9:55 P. M., time signals; weather forecast; baseball scores. 10 P. M., concert.

KYW, Chicago, 536m (560k), C. S. D. S. T.—5:02 P. M., news; financial markets. 5:45 P. M., children's bedtime story. 6 P. M., dinner concert

from Congress Hotel. 6:35 P. M., talk on "Sports" by Leo Fisher. 6:45 P. M., talk on "Finance and Markets," T. T. Hoynes. 7 P. M., "Twenty Minutes of Good Reading," by Rev. C. J. Perrin. 7:20 P. M., Minnetta Smith, soprano; William Hoke, tenor; Don Lang, dramatic reader; Geraldine Lacey, pianist; Sallie Menkes, accompanist.

WBZ, Springfield, Mass., 337m (890k), E. S. T.—6:30 P. M., dinner dance program by Leo Reisman and his orchestra. 7 P. M., results of baseball games. 7:10 P. M., letter from New England Homestead; "At the Theatres," with A. L. S. Wood, dramatic editor. 7:30 P. M., bedtime story for the kiddies. 8:15 P. M., concert arranged by the Boston Conservatory of Music. 9:15 P. M., concert by Durell String Quartet. 10:55 P. M., time signals and weather reports; Boston and Springfield market reports.

WRC, Washington, 469m (640k), E. S. T.—5:15 P. M., instruction in international code. 6 P. M., Children's Hour by Peggy Albion. 6:30 P. M., baseball scores. 7:45 P. M., talk on mtorbing. 8 P. M., piano recital by Robert L. Fuerstein. 8:15 P. M., Arthur Middleton, basso. 8:30 P. M., talk by Colonel Levi G. Nutt, head of Federal Narcotic Division. 8:45 P. M., dance program, Pete Macias' L'Aiglon orchestra. 9:55 P. M., time signals and weather forecasts.

WHN, New York, 360m (830k), E. S. D. S. T.—9:30 P. M., Al Reiser's Dancing Carnival orchestra. 10 P. M., Florence Seligman and Evelyn Barton, jazz piano duets. 10:10 P. M., Sara V. Turits, soprano. 10:20 P. M., All Nation's program. 11 P. M., Fletcher Henderson's Alabam Club orchestra. 11:30 P. M., Harry Hock and his entertainers. 11:40 P. M., Flo Williams, soprano. 11:50 P. M., Ross Fowler, baritone.

WDAR, Philadelphia, 395m (760k), E. S. D. S. T.—2 P. M., Arcadia concert orchestra. 4:30 P. M., recital from the studio. 5:30 P. M., short educational talk, member of faculty, Peirce School. 5:45 P. M., baseball and other sports results. 7:30 P. M., Dream Daddy with the boys and girls.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.—7 P. M., WOR morning gym class. 6:15 P. M., Albert E. Sonn, technical editor, weekly talk on "Radio for the Layman." 6:30 P. M., "Music While You Dine," Tom Cooper's Country Club orchestra. 7:20 P. M., resume of the day's sports.

WMAQ, Chicago, 448m (670k), C. S. D. S. T.—6 P. M., Chicago Theatre organ. 6:30 P. M., Hotel LaSalle orchestra. 8 P. M., talk by Rockwell R. Stephens, automobile editor. 8:45 P. M., Royal F. Munger, investment editor. 9 P. M., lecture from University of Chicago. 9:15 P. M., Hyde Park Boys' Glee Club.

WLAC, Minneapolis, Minn., 417m (720k), C. S. T.—2:40 P. M., broadcasting National Republican Convention direct from Cleveland. 4 P. M., magazine reading. 5:30 P. M., Children's Hour, Ellen Nye. 6 P. M., sport hour. 6:15 P. M., dinner concert. 7:30 P. M., farm lectures.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.—6 P. M., weather forecast and final baseball scores. 6:05 P. M., dinner music by Harold Leonard's Red Jackets orchestra. 6:45 P. M., Agriculture Livestock and Produce Market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children. 8 P. M., "Timely Topics for Motorists," by Gene Hogle. 8:15 P. M., "The Cuckoo Nest," by Abe Lipschutz, Y. M. H. A. 9 P. M., talk on camp life by Dr. C. O'Brien. 9:15 P. M., special concert by the Music Lovers Quartet. 11:15 P. M., radio chess match between Univ. of Penn. and Univ. of Pittsburgh. WIP will broadcast moves Pennsylvania, KDKA broadcast moves Pittsburgh.

WOC, Davenport, Ia., 484m (620k), C. S. T.—9 A. M., market quotations. 10 A. M., garden and household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 12 Noon, chimes concert. 12:15 P. M., weather forecast. 1 P. M., closing stocks and markets. 3:30 P. M., educational program. 5:45 P. M., chimes concert. 6:30 P. M., Sandman's Visit. 6:50 P. M., sport news and weather forecast. 9 P. M., orchestra program.

WLW, Cincinnati, O., 309m (970k), E. S. T.—5:15 P. M., baseball results. 10 P. M., Times-Star Radio Club. 10:10 P. M., special program Glee Club, spirituals and folk-songs. 10:45 P. M., program by Woodward High School Instrumental Trio. 11 P. M., popular entertainment, Doherty Melody Boys.

WOAW, Omaha, Neb., 526m (570k), C. S. T.—6 P. M., speaker's half hour. 6:30 P. M., dinner program by Yost's orchestra. 9 P. M., Scotch program arranged by Mrs. Margaret R. Burns.

Friday, June 13

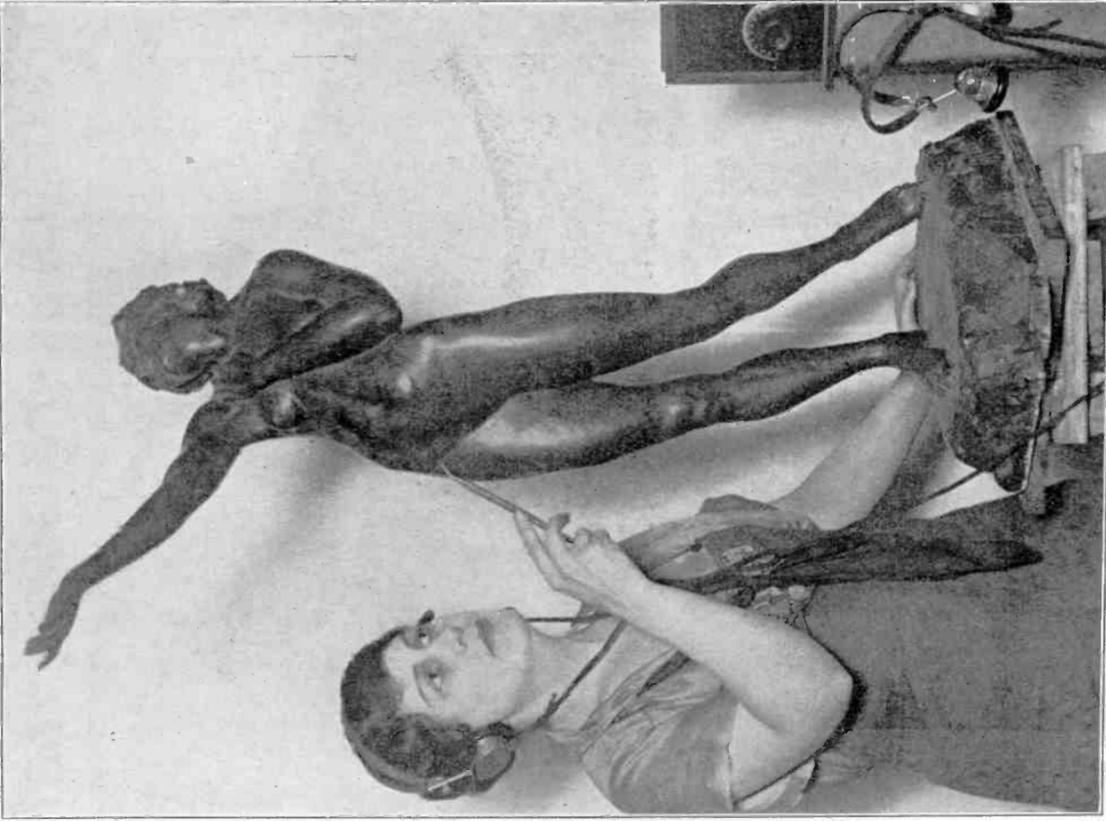
WGI, Medford, Mass., 360m (830k), E. S. D. S. T.—6:30 P. M., closing stock market reports; code practice; Boston police reports. 7 P. M., meeting, Amrad Big Brother Club. 7:30 P. M., evening program: C. L. H. Wagner, radio poet; late Ampico releases; Red Cross health talk by Henry C. Green. 8 P. M., musicale; weather report and time.

WOS, Jefferson City, Mo., 441m (680k), C. S. T.—7:45 P. M., Jewell Mayes, Missouri State Board of Agriculture, "A Few More Missouri Secrets." 8 P. M., address by George A. Pickens. 8:20 P. M., musical program, announced by radio.

WNAC, Boston, 278m (1080k), E. S. D. S. T.—10:30 A. M., WNAC Women's Club talks. 1 P. M., Shepard Colonial orchestra. 2 P. M., broadcast from Harvard Stadium, preliminaries and finals in the Olympic team tryouts. 6 P. M., children's half hour. 6:30 P. M., WNAC dinner dance, Checker Inn Orchestra. 8 P. M., program arranged by Mrs. E. B. Heywood. 9 P. M., Kalua Hawaiian Trio.

WOO, Philadelphia, 509m (590k), E. S. D. S. T.—7:30 P. M., sports results and police reports; dinner music by the Hotel Adelphia concert orchestra. 8:15 P. M., Penn. Railroad Night; Atlantic Division Band. 9:45 P. M., grand organ recital, Mary E. Vogt. 10:15 P. M., dance program by Hotel Adelphia orchestra.

The Radio Woman Finds Set Helps Her in Studio, Home and in Furthering Her Career



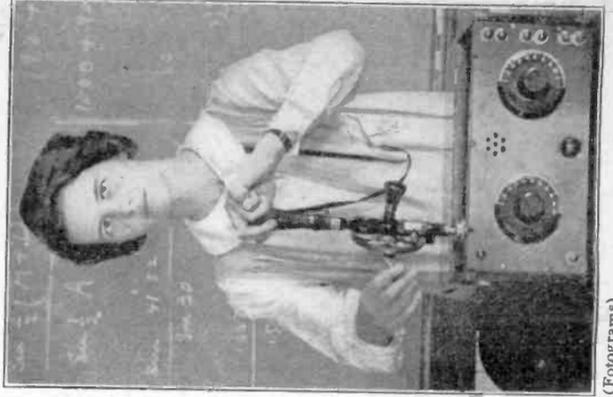
(Photo Topics)
BONNIE MacLEARY, noted sculptress, finds the radio in the studio a source of inspiration while she's at work. Every hitch of the child that produced the graceful dancing figure in bronze was executed while the sculptress was listening in.



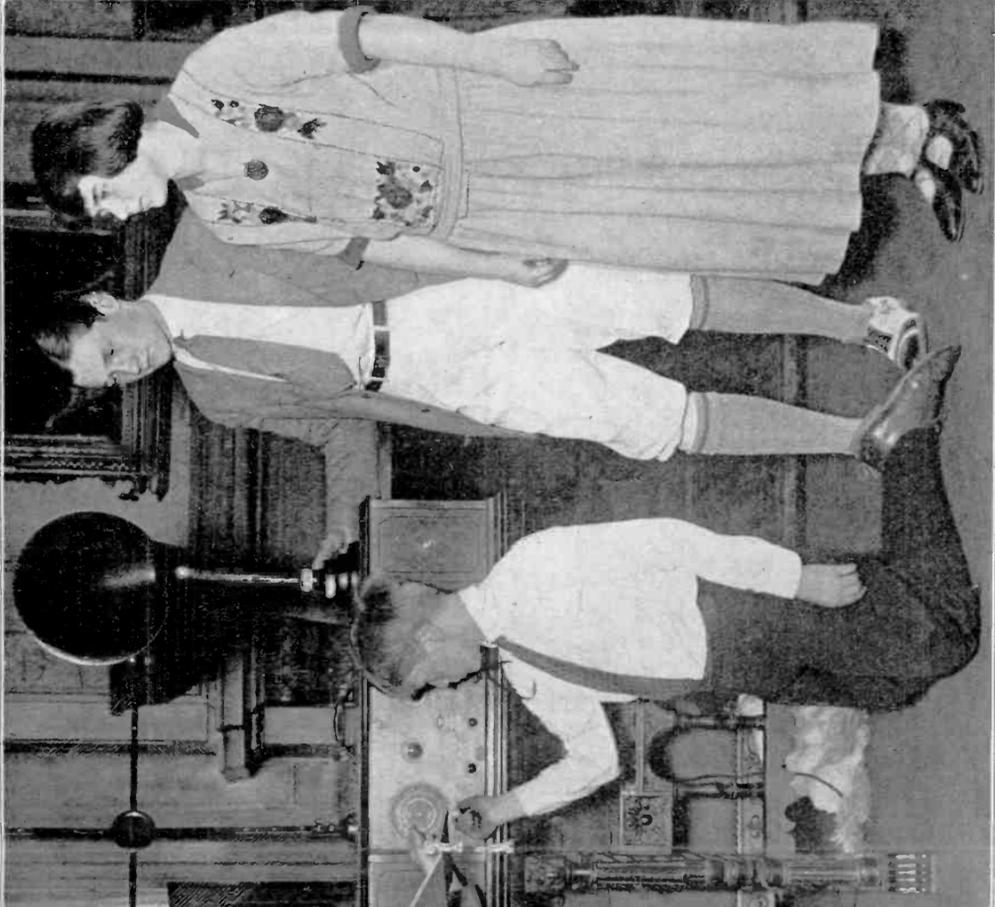
(Underwood)
A CLASS FOR GIRLS at a Chicago continuation school has been instituted for the teaching of construction of radio sets.



(United)
MRS. FRANK A. VANDERLIP, wife of the noted financier, and herself a prominent publicist, finds the radio enhances home life. She is shown with her children at her palatial home, Scarborough, N. Y.



(Photograms)
PRESIDENT of the Radio Club of Connecticut College is the honor bestowed on **Gloria E. Hollister**, who builds her own sets.

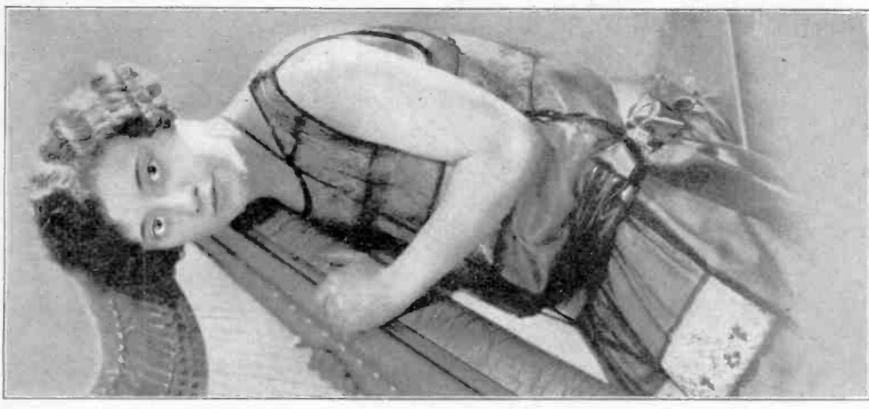


MANY APPLAUSE CARDS were received at **WJZ**, Radio Corporation station at New York City, when special broadcast given from that station by **Ann Pinet**, hostess. She finds that playing before the microphone is instrumental in gaining still greater success in her chosen career. Her soft, soothing music has an entrancing effect, the authors of applause cards write, and they add: "Give us some more." And she has promised that she will.



ABOVE—The art of soulful expression, practiced before the microphone will bring you a commanding personality. **Oliver Ann Alcorn** has found "The Body Beautiful" is her chosen topic. Broadcast from **KFI** (E. C. Anthony, Inc., Los Angeles). Too bad television isn't a success yet.

AT LEFT—The canoe, the tennis court, even tempting viands may have great attraction, but the Summer girl finds radio is irresistibly first. She tunes in on a DX set, using earphones to get the station, then switching on the loud speaker. She thus demonstrates the correct way to tune, an article on which subject is published in the Radio Primer in this issue.



KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.—5 P. M., baseball scores. 6:30 P. M., organ recital by Paul Fleege. 6 P. M., baseball scores; dinner concert. 6:30 P. M., "Peter, Peter, Pumpkin Eater," for the radio children. 6:45 P. M., feature. 7 P. M., baseball score. 7:40 P. M., National Stockman and Farmer market reports. 8 P. M., concert by Westinghouse Band. 9:55 P. M., time signals; weather forecast; baseball scores.

KYW, Chicago, 536m (560k), C. S. D. S. T.—5 P. M., news, financial and final markets; Dun's Review and Bradstreet's Weekly Review. 5:45 P. M., children's bedtime story. 6 P. M., dinner concert from Congress Hotel, Chicago. 8 to 11:30 P. M., Midnight Revue.

WBZ, Springfield, Mass., 337m (890k), E. S. T.—6:30 P. M., dinner concert by the WBZ Trio. 7 P. M., results of baseball games. 7:10 P. M., "A Modern Don Quixote," dramatized story. 7:30 P. M., bedtime story for the kiddies. 10 P. M., Henry Volk, violinist; Marion Ryan, pianist; Montgomery Male Quartet. 11 P. M., concert by the Smith College Students' orchestra and Glee Club; program by WBZ Trio.

WJZ, New York, 455m (660k), E. S. D. S. T.—5:30 P. M., agricultural reports; Farm and Home reports; closing quotations, N. Y. Stock Exchange; news. 7:20 P. M., financial developments of the day. 7:30 P. M., weekly French lesson. 8 P. M., Antonio Pesci, tenor; Edith Balkwell, accompanist. 8:15 P. M., Time's Pop Question Game. 8:30 P. M., Flora Adler, harpist. 8:45 P. M., Olympic gymnastics. 9:15 P. M., Olympic boxing team. 9:25 P. M., Mayor Hylan's people's concert. 10:15 P. M., Warner Hawkins, pianist. 10:45 P. M., Paul Specht's Alamac orchestra.

WJY, New York, 405m (740k), E. S. D. S. T.—7:30 P. M., Jean Walker, baritone. 8 P. M., Looseleaf Current Topics. 8:15 P. M., surprise program. 10 P. M., Olympic wrestling team. 10:10 P. M., Madalena Hauff, soprano. 10:25 P. M., Olympic rowing team. 10:35 P. M., Madalena Hauff, soprano.

CKAC, Montreal, 430m (700k), E. S. T.—1:45 P. M., Rex Battle and his Mt. Royal Hotel orchestra. 4 P. M., weather, news, stocks. 4:30 P. M., J. C. Smith and his Mt. Royal Hotel orchestra.

KPO, San Francisco, 423m (710k), P. T.—12 noon, time signals. 1 P. M., Rudy Seiger's Fairmont Hotel orchestra. 2:30 P. M., organ recital by Theodore J. Irwin. 4:30 P. M., Rudy Seiger's Fairmont Hotel orchestra.

KHJ, Los Angeles, 395m (760k), P. T.—12:30 P. M., program of music and news items. 2:30 P. M., program, courtesy of Barker Bros., arranged by Claire Forbes Crane. 6 P. M., Art Hickman's Concert orchestra. 6:45 P. M., children's program; bedtime story by Uncle John. 8 P. M., Louise Gunning, soprano. 10 P. M., Art Hickman's dance orchestra.

WRC, Washington, 469m (640k), E. S. T.—3:00 P. M., to be announced. 6:00, Children's Hour by Peggy Albion.

WHN, New York, 360m (830k), E. S. D. S. T.—6:00-7:00 P. M., at the Festive Board. 9:30 P. M., Hotel Carlton Terrace Orchestra. 10:00 P. M., Mae Paine, soprano. 10:15 P. M., Don Roberts, tenor. 10:30 P. M., Roseland Dance Orchestra. 11:30 P. M., S. S. City of Seattle Orchestra.

WDAR, Philadelphia, 395m (760k), E. S. D. S. T.—4:30 P. M., program of dance music. 5:45 P. M., baseball and other sports results. 7:30 P. M., Dream Daddy with the Boys and Girls. 7:50 P. M., book review. 8:00 P. M., authors' and poets' corner; Arcadia Concert Orchestra. 10:00 P. M., Howard Lannin's Dance Orchestra.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.—6:15 P. M., Agnes Leonard in songs for children. 6:30 P. M., "Man in Moon" stories for children. 7:00 P. M., "Music While You Dine," Kenneth Kitchen's Club Orchestra. 7:20 P. M., resume of the day's sports.

WMAQ, Chicago, 448m (670k), C. S. D. S. T.—2:35 P. M., concert from Lyon and Healy concert hall. 4:20 P. M., items of interest to women. 4:30 P. M., pupils of Bush Conservatory. 6:00 P. M., Chicago Theatre organ. 6:30 P. M., Hotel LaSalle Orchestra. 8:00 P. M.—Wide-Awake program and nature study club. 8:40 P. M., French lesson by Morin De Cologny. 9:00 P. M., weekly lecture from the Field Museum. 9:15 P. M., Hazel O'Neil, soprano; Virgil Smith, pianist.

KSD, St. Louis, Mo., 546m (550k), C. S. T.—8:00 P. M., Silverman's Orchestra from Lyric Skydome. Program subject to Postponement to 9:30 P. M., if there is a night session of the Republican National Convention.

WLAG, Minneapolis, Minn., 417m (720k), C. S. T.—2:40 P. M.—National Republican Convention direct from Cleveland. 4:00 P. M., magazine reading. 5:30 P. M., children's hour. 6:00 P. M., sport hour. 7:30 P. M., farm lecture. 9:15 P. M., business message. 9:30 P. M., musical program.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.—1:30 P. M., weather forecast. 3:00 P. M., Lois S. Kershaw, soprano; Vieta Hoffman, soprano; Lynore McNulty, mezzo-soprano; Mildred Bruce, mezzo-soprano; William Clark, tenor; Samuel Moser, tenor; Frank Oglesby at the piano. 4:00 P. M., "Light in the Modern Kitchen," talk by Frank Grove. 6:00 P. M., forecast and final baseball scores. 6:05 P. M., dinner music by the Jordan Lewis Orchestra. 6:45 P. M., agriculture, livestock and produce market reports. 7:00 P. M., Uncle Wip's bedtime stories and riddle call for the children.

WOC, Davenport, Ia., 484m (620k), C. S. T.—9:00 A. M., market quotations. 10:00 a. m., garden and household hints. 10:55 A. M., time signals. 11:00 A. M., weather and river forecast. 11:05 A. M., market quotations. 12:00 M., chimes concert. 1:00 P. M., closing stocks and markets. 3:30 P. M., educational program. 5:45 P. M., chimes concert, chimes concert. 6:30 P. M., Sandman's Visit. 6:50 P. M., sport news and weather forecast. 8:00 P. M., musical program; band concert by the Savannah Boys' Band. 9:00 P. M., weekly tourists' road bulletin.

"The Thrill of a Lifetime"—

Says Jerry Hoffman, Speaking of Listening In on the Radio

Wedding of Wendell Hall



(Foto Topics)

WENDELL HALL and Marian M. Martin being married at the studio of WEAF, New York City, by the Rev. Dr. Idelman.

By Jerry Hoffman

I GOT one of the big thrills of my life when I listened in on the WEAF program and attended via the ether the marriage of Marian M. Martin to Wendell Hall, "the red-headed music maker." The introduction by the announcer was most appropriate. The ceremony was broadcast from the combined stations of WEAF, New York; WJAR, Providence; WCAP, Washington, and WGN, Chicago.

The description of the bride and bridegroom, of the bridesmaid, Miss Dorothy Fullerton, daughter of Hugh Fullerton, the sports writer, and of the best man, Thomas E. Campbell were all that could be desired, and let us know exactly what they were wearing. A preliminary thrill came when the organ started playing various selections, but when it played the Lohengrin Wedding March, I'll confess I hadn't felt so sentimental since I stepped before the altar myself. **I wonder how many women cried on hearing it?**

The Rev. Dr. Idelman performed the ceremony and did it beautifully. And when it was over, and the congratulations of the couples' friends in the studio could be heard through the loud speaker I, as thousands of others must have done, inwardly wished Mr. and Mrs. Hall all the happiness in the world. Both spoke to the radio fans, and if Mrs. Hall is only half as sweet as her voice, Wendell sure knew what he was talking about when he said, "The sun's come out to stay, and I don't mean if or but, or maybe. And— 'It Ain't Gonna Rain No Mo.'"

WLW, Cincinnati, O., 309m (970k), E. S. T.—10:30 A. M., weather forecast and business reports. 12:45 P. M., language lesson. 1:30 P. M., market reports. 3:00 P. M., stock quotations. 4:00 P. M., special program. T. C. O'Donnell lectures on "Journalism."

WOAW, Omaha, Neb., 526m (570k), C. S. T.—6:00 P. M., speaker's half-hour. 6:30 P. M., dinner program by Parrakeet's Orchestra. 9:00 P. M., Silvus family program. 9:30 P. M., program by Frank Buckingham, banjo, mandolin and guitar.

Saturday, June 14

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.—6:30 P. M., code practice; New England weather forecast; New England crop notes. 7 P. M., meeting, Amrad Big Brother Club. 7:30 P. M., talk on current events by David M. Cheney; musicale; weather report and time.

WNAC, Boston, 278m (1080k), E. S. D. S. T.—10:30 A. M., WNAC Women's Club talks. 1 P. M., Shepard Colonial orchestra. 2 P. M., broadcast from Harvard Stadium, preliminaries and finals in the Olympic team tryouts. 6:30 P. M., WNAC dinner dance. Shepard Colonial orchestra. 8:15 P. M., State Ballroom orchestra. 9:15 P. M., Hotel Westminster orchestra. 10:15 P. M., Copley-Plaza orchestra.

WGY, Schenectady, N. Y., 380m (790k), E. S. T.—11:30 A. M., stock market report. 11:40 A. M., produce market report. 11:55 A. M., U. S. Naval Observatory time signals. 8:30 P. M., dance music by orchestra of Hotel Ten Eyck, Albany.

WFAA, Dallas, Tex., 476m (630k), C. S. T.—12:30 P. M., address, "The Flag and the Duty," Hon. Alvin Owsley. 3:30 P. M., music by old fiddlers, led by Charles Cornett. 8:30 P. M., musical recital by Dr. Richard Mandell and assist ing musicians and entertainers. 11 P. M., Adol-

phus Hotel orchestra, playing in Bambooland. **WOO, Philadelphia, 509m (590k), E. S. D. S. T.**—12 noon, luncheon music by the Tea Room orchestra. 12:55 P. M., time signals. 4:45 P. M., grand organ and trumpets. 7:30 P. M., sports results and police reports. 10:55 P. M., time signals and weather forecast.

WJZ, New York, 455m (660k), E. S. D. S. T.—2:30 P. M., Flag Day exercises, J. Thurston Noe, organ; Edna Bloom, soprano; Gen. Robert Lee Bullard, oration; Glorio Trumpeters. 4:30 P. M., Olympic cycling team. 4:40 P. M., Sara V. Turtis, soprano. 5 P. M., Olympic fencing team. 5:10 P. M., Edna Walter, pianist. 5:30 P. M., agricultural reports; Farm and Home reports; closing quotations, N. Y. Stock Exchange; news. 7 P. M., "Flag Day," Alice Durrell Stueck. 8:15 P. M., surprise program. 10 P. M., Mary Harris, soprano; I. Piroshnikoff, concertina. 10:30 P. M., Club Lido Venice orchestra.

CKAC, Montreal, 430m (700k), E. S. T.—7 P. M., kiddies' stories in French and English. 7:30 P. M., Rex Battle and his Mt. Royal Hotel concert orchestra; Herbert Spencer, organ. 8:30 P. M., special studio entertainment. 10:30 P. M., Joseph C. Smith and his Mt. Royal Hotel orchestra; Teddy Brown, xylophone and saxophone.

WCAE, Pittsburgh, 462m (650k), E. S. D. S. T.—12:30 P. M., news; weather reports. 3 P. M., Billy Zoffer's Music Box cafe orchestra and assisting soloists and entertainers; baseball scores. 6:30 P. M., dinner concert from William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores; vocal selections by Lew Kennedy, baritone. 8:30 P. M., Miss Ada Kelly, pianist; Jack Smalley, baritone soloist; Miss Esther Davies, soprano soloist; Miss Alice Ullstroom, accompanist.

WWJ, Detroit, 517m (580k), E. S. T.—7:30 P. (Continued on page 18)

The Radio Woman Finds Set Helps Her in



(Foto Topics)

BONNIE MacLEARY, noted sculptress, finds the radio in the studio a source of inspiration while she's at work. Every notch of the chisel that produced the graceful dancing figure in bronze was executed while the sculptress was listening in.



(United)

MRS. FRANK A. VANDERLIP, wife of the noted financier, and herself a prominent publicist, finds the radio enhances home life. She is shown with her children at her palatial home, Scarborough, N. Y.



(Underwood)

A **CLASS FOR GIRLS** at a Chicago continuation school has been instituted for the teaching of construction of radio sets.



(Fotograms)

PRESIDENT of the Radio Club of Connecticut College is the honor bestowed on Gloria E. Hollister, who builds her own sets.

Studio, Home and in Furthering Her Career



MANY APPLAUSE CARDS were received at WJZ, Radio Corporation station at New York City, as the result of a special concert given from that station by Anna Pints, harpist. She finds that playing before the microphone is instrumental in gaining still greater success in her chosen career. Her soft, soothing music has an entrancing effect, the authors of applause cards write, and they add: "Give us some more." And she has promised that she will.



ABOVE—The art of soulful expression, practiced before the microphone, will make one a commanding personality, Olive Ann Alcorn has found. "The Body Beautiful" is her chosen topic, broadcast from KFI (E. C. Anthony, Inc., Los Angeles). Too bad television isn't a success yet.

AT LEFT—The canoe, the tennis court, even tempting viands may have great attraction, but the Summer girl finds radio is irresistibly first. She tunes in on a DX set, using earphones to get the station, then switching on the loud speaker. She thus demonstrates the correct way to tune, an article on which subject is published in the Radio Primer in this issue.

Programs

Monday, June 16 (continued from page 15)

M. services at St. Paul's Episcopal Cathedral. 4 P. M., concert by Schmemman's concert band. 5 P. M., Detroit News orchestra.

WRC, Washington, 469 m (640k), E. S. T.— 5:15 P. M., instruction in International code. 6:00 P. M., children's hour by Peggy Albion. 6:30 P. M., baseball scores. 7:30 P. M., Bill Reeves and his Original Peacock Orchestra. 8:15 P. M., Bible talk. 8:30 P. M., Marx E. Kahn, reader; Theodore Roth, violinist, and Paul D. Gabel, pianist. 8:45 P. M., Roy K. Easter, baritone. 9:55 P. M., time signals and weather forecasts. 10:00 P. M., concert of Hawaiian Music by The Honoluluans.

WHN, New York, 360m (830k), E. S. D. S. T.— 7:30 P. M., Jones and His Royal Poincianna Orchestra. 8:00 P. M., Jimmy Flynn, tenor. 8:15 P. M., Lucia Bianco, soprano. 8:30 P. M., Maybaum's Clambake Orchestra. 9:00 P. M., B. Free, baritone. 9:15 P. M., "Flag Day" by Mr. Robert E. Condon. 9:30 P. M., Alfred Dulin, concert pianist. 10:00 P. M., Fitzpatrick Brothers, old time melodies. 10:15 P. M., George Roberts and Jimmy Doyle, popular songs. 10:30 P. M., Jimmy Clarke and His Entertainers. 11:00 P. M., Maidia Dantzer, soprano.

WDAR, Philadelphia, 395m (760k), E. S. D. S. T.— 12 M., organ recital from the Stanley Theatre. Features from the studio, Arcadia Concert Orchestra, Feri Sarkozi, Director. 2:00-3:00 P. M., Arcadia Concert Orchestra. 4:30 P. M., dance program. 5:45 P. M., baseball and other sports results. 7:30 P. M., Dream Daddy with the boys and girls.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.— 8:00 P. M., Gene Ingraham's Bell Record Orchestra. 8:55 P. M., concert by the Regal Male Quartet. 9:05 P. M., program of patriotic music. 9:20 P. M., talk by Miss Elisabeth Marbury. 9:40 M. M., the Gloria Sextette. 10:40 P. M., concert by the WOR-IORS.

WMAQ, Chicago, 448m (670k), C. S. D. S. T.— 6:30 P. M., Hotel LaSalle Orchestra. 8:00 P. M., Wicker Park School Orchestra. 9:00 P. M., weekly Balaban & Katz Chicago Theatre Revue.

KSD, St. Louis, Mo., 546m (550k), C. S. T.— 8:00 P. M., Missouri Concert Orchestra and specialties from Missouri Theatre.

WLAG, Minneapolis, Minn., 417m (720k), C. S. T.— 8:30 A. M., announcements. 10:45 A. M., household hints. 2:40 P. M., National Republican Convention direct from Cleveland. 7:30 P. M., business messages. 9:30 P. M., dance program.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.— 6:00 P. M., weather forecast. 6:05 P. M., dinner music by Harold Leonard's Red Jackets Orchestra. 6:45 P. M., agriculture, livestock and produce market reports. 7:00 P. M., Uncle Wip's bedtime stories and roll call for the children. 8:00 P. M., grand opening, Atlantic City Control Room of WIP, located on the famous Steel Pier at Atlantic City. The greater portion of programs from Station WIP will be broadcast from the Steel Pier during the summer months. Addresses by Governor Silzer, Edward Bader, Mayor of Atlantic City, and Ellis A. Gimbel, Sr. Special musical program by Oreste Vasselli and his famous band, the Symphony Orchestra under Roy Comerford and special musical numbers by well known soloists.

WOC, Davenport, Ia., 484m (620k), C. S. T.— 12:00 M., chimes concert; 12:15 P. M., weather forecast. 3:30 P. M., educational program, Williamson Brothers. 5:45 P. M., chimes concert. 6:30 P. M., Sandman's Visit. 6:50 P. M., sport news and weather forecast. 9:00 P. M., orchestra program, the Palmer School Radio Orchestra.

WBAP, Fort Worth, Tex., 476m (630k), C. S. T.— 7:00 P. M., review of interdenominational Sunday School lesson and radio Bible Class by Mrs. W. F. Barnum.

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

WOAW, Omaha, Neb., 526m (570k), C. S. T.— 6:00 P. M., Sicilian program arranged by Joe Lovely. 9:00 P. M., program arranged by Eugenie Whitmore Dinkins.

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NEXT WEEK—AN IMPORTANT ARTICLE ON A NEW SYSTEM OF RECEPTION—"BETTER THAN THE SUPER-HETERODYNE."

KPO, San Francisco, 423m (710k), P. T.— 12 noon, time signals. 1 P. M., Rudy Seiger's Fairmont Hotel orchestra. 2:30 P. M., Sam Schildkret, flutist. 3:30 P. M., tea dansant, E. Max Bradford's Versatile band. 8 P. M., Art Weidner and his popular artists.

KHJ, Los Angeles, 395m (760k), P. T.— 6 P. M., Art Hickman's concert orchestra. 6:45 P. M., children's program presenting bedtime story by Uncle John. 8 P. M., De Luxe program. 10 P. M., Art Hickman's dance orchestra.

PWX, Havana, 409m (750k), E. S. T.— 7 P. M., concert at the studio, dancing music by Messrs. Armando R. Marrero, piano; Francisco Delabat, flute; Antonio Perez, clarinet; Eduardo Goicochea, violin, and Tomas Gonzalez, goud.

KFNF, Shenandoah, Ia., 266m (1130k), C. S. T.— 7:30 P. M., concert by Henry Field Seed Co., and friends.

KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.— 5:30 P. M., dinner concert. 6 P. M., baseball scores. 6:30 P. M., "Tom, Tom, the Piper's Son, for the Radio Children." 6:45 P. M., last minute sports to teachers. 7 P. M., baseball scores; sport review by James J. Long. 7:30 P. M., banquet of the American Flag Day Association. 9:55 P. M., time signals; weather forecast; baseball scores.

KYW, Chicago, 536m (560k), C. S. D. S. T.— 5:02 P. M., news, financial and final markets. 6 P. M., dinner concert from Congress Hotel. 8 P. M., talk by Vivette Gorman, Home Economics. 8:15 P. M., short stories, articles and humorous sketches. 9:15 P. M. to 12:30 A. M., late show.

WBZ, Springfield, Mass., 337m (890k), E. S. T.— 6 P. M., concert by Leo Reisman Ensemble. 6:45 P. M., dinner dance music by Leo Reisman and his orchestra. 7 P. M., results of baseball games. 7:30 P. M., bedtime story for the kiddies. 7:40 P. M., concert by Hotel Kimball Trio. 8:30 P. M., concert by the Jorson Trio. 10:55 P. M., time signals and weather reports.

Sunday, June 15

WOS, Jefferson City, Mo., 441m (680k), C. S. T.— 8 P. M., Union open air religious services broadcast from Capitol lawn; music by Missouri State Prison band.

WGY, Schenectady, N. Y., 380m (790k), E. S. T.— 9:30 A. M., service of Zion Lutheran Church, Schenectady, sermon by Rev. Otto C. Busse. 6:30 P. M., service of Zion Lutheran Church, Schenectady.

WFAA, Dallas, Tex., 476m (630k), C. S. T.— 6 P. M., Radio Bible Class; Bible study and Gospel song. 9 P. M., sacred song recital, Riggs Memorial Presbyterian Church choir. 9:30 P. M., Jack Gardner and his seven symphonizing syncopators.

KGW, Portland, Ore., 492m (610k), P. T.— 6 P.

M., church services, Sunnyside Congregational Church, Rev. J. J. Staub, pastor. 7 P. M., George Olsen's concert orchestra in dinner program; baseball scores.

CKAC, Montreal, 430m (700k), E. S. T.— 4:30 P. M., sacred concert.

WDAF, Kansas City, Mo., 411m (730k), C. S. T.— Baseball scores at 3:30, 4, 4:30 and 5 o'clock. 4 P. M., Saul Bernat and Harry Bernat, violinists, and Donald Johnstone, pianist.

WCAE, Pittsburgh, 462m (650k), E. S. D. S. T.— 3 P. M., People's Radio Church services conducted by Rev. Jennie F. Millwood, the first woman to receive license to preach. 6:30 P. M., dinner concert from William Penn Hotel.

WWJ, Detroit, 517m (580k), E. S. T.— 8 A. M., setting-up exercises 9:30 A. M., "Tonight's Dinner" and a special talk by the Woman's Editor. 9:45 A. M., public health service bulletin and talks of general interest. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 3 P. M., Detroit News orchestra. 3:30 P. M., official weather forecast. 3:35 P. M., market reports and baseball scores. 5 P. M., baseball scores. 7 P. M., Detroit News orchestra.

KFNF, Shenandoah, Ia., 266m (1130k), C. S. T.— 3 P. M., religious services by Men's Gospel Team.

KYW, Chicago, 536m (560k), C. S. D. S. T.— 10 A. M., Central Church service from Orchestra Hall, Dr. F. F. Shannon, pastor; musical program. 1:30 P. M., studio chapel service, Chicago Church Federation.

WHAS, Louisville, Ky., 400m (750k), C. S. T.— 9:57 A. M., organ music. 10 A. M., church service, Fourth Avenue Seventh Day Adventist Church, music by the choir. 4 P. M., concert, direction of Mrs. Jane Webster Murrell.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.— 11 A. M., morning service broadcast from Holy Trinity Church, Rev. Floyd W. Tompkins, DD., rector.

WBAP, Fort Worth, Tex., 476m (630k), C.S.T.— 11 A. M., complete service, First Methodist Church, Rev. J. W. Bergen, pastor. 4 P. M., organ concert from Rialto Theatre. 3 P. M., memorial services, Woodmen of the World. 7 P. M., sport review. 11 to 12 midnight, popular program by Fred Cahoon's orchestra.

WOAW, Omaha, Neb., 526m (570k), C. S. T.— 9 A. M., radio chapel service, conducted by Rev. R. R. Brown. 9 P. M., musical chapel service by North Presbyterian Church, Rev. J. M. Hamilton, pastor; Hugh Wallace, choir-director; Mrs. Deyo Crane, organist.

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

WGL, Medford, Mass., 360m (830k), E. S. T.— 4 P. M., twilight program—1, Adventure Hour; 2, musical. 8:30 P. M., evening program—talk, auspices Greater Boston Federation of Churches; musicale.

KFI, Los Angeles, 469m (640k), P. T.— 10 A. M., L. A. Church Federation service. 4 P. M., Mme. Sprotte's Choral Society. 6:45 Hattie Mueller, pianist and others. 8 P. M., Ambassador Hotel concert. 9 P. M., Examiner concert. 10 P. M., Packard Six Orchestra.

Monday, June 16

WOS, Jefferson City, Mo., 441m (680k), C. S. T.— 8 P. M., "Destruction of Trees and Forests" and "Insecticides and Fungicides," by Arthur T. Nelson, State Marketing Commissioner. 8:20 P. M., musical program by the Missouri State Prison orchestra and Harry M. Snodgrass, pianist.

WGY, Schenectady, N. Y., 380m (790k), E. S. T.— 11:30 A. M., stock market report. 11:40 A. M., produce market report. 11:45 A. M., weather report. 11:55 A. M., U. S. Naval Observatory time signals. 1 P. M., music and humorous readings. 5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:15 P. M., review of wee's sports. 7:40 P. M., baseball scores. 7:45 P. M., musical program by Salvation Army band, Albany.

CKAC, Montreal, 430m (700k), E. S. T.— 1:45 P. M., Mount Royal Hotel luncheon concert. 4 P. M., weather, news, stocks. 4:30 P. M., Mount Royal Hotel the-dansant orchestra.

KGW, Portland, Ore., 492m (610k), P. T.— 11:30

(Continued on page 24)

Who Is America's Most Popular Radio Entertainer?

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

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

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

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

Dear Sir:

My favorite entertainer is Station

Name

Street Address

City and State

In RADIO WORLD, issue of June 7, was published a complete canvass of the number of votes cast up to the time of going to press. Another list will be published soon.

Making Intermediate Transformers

(Concluded from page 8)

Super-Heterodyne receivers is due to the improper design and adjustment of the intermediate frequency transformers. There is not the amplification per stage that should be expected. This is due to the fact that they do not match—neither from the point of view of impedances nor from the point of view of tuning. They must be very closely adjusted to the same frequency, or the circuit will neither be efficient nor selective.

How to Make Transformers

The transformers must be selective enough to exclude all but the desired wave length; yet they must not be so selective that they suppress the higher audio frequencies to a noticeable extent. The latter condition is readily attainable, and must be avoided. This may be done by using a rather fine wire in the windings. No. 36 double cotton covered magnet wire is satisfactory.

Many of those who build the circuit described herein will probably want to make their own intermediate frequency transformers. The design given below may be used.

Three wooden spools, preferably hardwood, will be needed. They may be turned on any high speed lathe, and they will cost very little. The dimensions of these spools were given in Fig. 2. The diameter of the core is $1\frac{3}{4}$ " and the winding length is exactly one inch. The overall diameter is $2\frac{1}{2}$ ".

The arrangement of the binding posts or terminals was also indicated in that figure. They may all be brought out on one end of the spool as shown, and they should be marked in ink with the appropriate letters. Mark the positions of these terminals, and at each place screw down two copper soldering lugs by means of small, round head wood screws. One dozen of these screws and two dozen of the soldering lugs will, therefore, be needed.

Drill small holes in the flanges of the spool at the appropriate distances from the edges and cut small grooves from these holes to the respective terminals so that the fine wires will not be exposed. When the wires have been put in place these grooves may be filled with beeswax for protection against abrasion.

Start the winding by threading the end of the wire through the hole near the terminal marked P and wrap the end around the lug. Then put on 300 turns as evenly as possible. This will require about four layers of wire. Then cut the wire, bring the end through the hole near B, and wrap it around that terminal. This completes the primary winding.

Now wind several layers of thin paraffined paper over the winding to insulate it from the secondary.

Start the secondary winding by attaching the end of the wire to the terminal marked F in the same manner as before. Then wind on 1,200 turns of wire as evenly as possible. This will require 16 layers of wire. Unless extreme care is taken in winding it is difficult to wind so many layers of fine wire evenly. A layer of thin paper every five layers of wire will help to preserve the evenness of the winding. However, it is not absolutely necessary to keep the winding even. It merely prevents the spool from becoming overfull.

When the 1,200 turns have been put on, bring out the end of the wire and wrap it around the terminal marked G.

A half pound spool of the kind of wire specified will be sufficient.

If the transformers are wound by hand it will be a long and tedious process, and it will require a great deal of patience. Time may perhaps be saved if the experimenter rigs up a winding machine, with which the actual winding may be done in less than an hour. If it so happens that

The Funoflex Circuit

IM THE MOST UNPOPULAR GUY IN THE WORLD



BUT THAT WAS BEFORE HE INSTALLED ONE OF THOSE WORLD WIDE RADIO OUTFITS

FINE!

GREAT

Z-Q-B STATION AUSTRALIA



(Illustration by Bud Stan)

"The horn was designed by a snake charmer."

FUNOFLEX EDITOR:

SINCE I have had a radio set in my home I find that I am a very popular guy. Formerly I didn't win visiting friends so readily, though I longed for such guests. In desperation I once offered a fellow \$2 to visit me at my home, but he refused and hasn't spoken to me since. Maybe my price was too low. I don't know the market figures on commercialized hospitality. The stations don't include them in their broadcast market quotations. What my radio doesn't bring in I don't get, including visitors, and knowledge. I seldom read, except radio articles and news, for you can't hook a newspaper to a loud speaker and get very good results.

Now, however, I'm learning fast. I crave knowledge. If there's a nice instructress giving hints on success, I'll listen, unless my set happens to be tuned to some station broadcasting jazz. I'm not a dial twister, so I lazily leave the jazz come in, though I much prefer baritone lady lecturers and cooking recipe hounds.

Since the neighborhood moved into my house and my radio gained popularity, which I bashfully share, my bills for eats have been amplified at least three stages. My battery charger is kept as busy as the Light Brigade along the charging lines.

But I do enjoy being flattered over the success of my radio. I bought it "as is"

and paid a guy to install it and the aerial. He told me to connect the ground binding post of the set to the cold water pipe, but I use the hot water pipe, because our hot water is always colder than the cold water. The man who built the house had consideration for ordinary tenants, but the woman who owns it thinks that catering to radio needs by giving an optional choice of cold water pipes is the highest form of service to mankind. She makes no extra charge for this service. She explained to me that the cold water pipe is warmer than the hot water one (and hence the hot water pipe is best for a ground connection) because our cold water pipe runs nearer to the hot pipes of the house next door.

I'd rather have a DX station fade out than lose my landlady. She is a true friend of radio and is one of the many who camp at my quarters to hear the radio. I don't charge her any rent, because she owns the house, while I don't even own the set until my last installment is paid.

I don't know why my radio is so much more popular than other folks' sets, because I never serve anything stronger than ice cream. However, the horn was designed by a snake charmer, and the horn may be constantly emitting an audible potion, if you get what I mean.

P. S.—Please publish a hook-up for a good, reliable non-radiating short circuit.

SYL. LEE.

a good lathe is available this may be used, provided absolute control may at all times be exercised over the motion. It may be necessary to stop it instantly in order to correct faulty winding. Some friction clutch should be used so that the spool alone may be stopped when it becomes necessary to do so. If a lathe is employed use a revolution counter to count the turns.

A simpler winding machine may be made out of an ordinary hand drill. Clamp this in a horizontal position in a vice so that the handle may be turned freely. To chuck the spools, drill a small hole through each of them, and drive a small brass rod through the hole. Let this rod extend out of the spool far enough to allow the drill chuck to get a good hold of it. The hole through the spool must be exactly through the center and the rod must be absolutely straight. Otherwise the spool will wobble as the handle of the hand drill is turned, and make it impossible to wind the coils evenly.

The spool from which wire is taken should be supported on a rod placed parallel to the spindle of the hand drill, and it should be of such diameter that the spool will turn freely.

In winding, turn the handle of the drill with one hand and guide the wire with the other. A little tension on the wire, applied by means of friction, will aid in getting a firm and even winding.

Before starting the actual winding, the operator should determine the gear ratio

of the drill so that the number of turns may be counted by counting the number of revolutions of the drill handle rather than the revolutions of the spindle and the spool. This ratio may be 5 to 1, 4 to 1 or some odd ratio like 78 to 17. The total number of turns divided by this ratio gives the number of turns required on the handle. A few turns will be left after the nearest whole number of turns of the handle has been put on, but these may be counted directly on the spindle.

When the winding has been completed solder all the terminals except the one marked G. Make a good temporary connection here.

The coils are now ready to be tuned. This may be done in two ways. A fixed condenser may be connected across the secondary winding and the number of turns in the coil varied until it tunes to the desired frequency; or the turns may be left fixed and a small variable condenser connected across the secondary, which is then varied until the coil is tuned to the desired frequency. If the former method is used, the condenser should be a good, fixed mica condenser of about .0001 microfarad capacity. If the latter method is used, a five plate variable air condenser or its equivalent may be used. Or the small fixed condenser may be used for approximate tuning, and a vernier condenser connected in parallel with it for final tuning. These tuning condensers are represented by C₁, C₂, and C₃.

WGY's Medicine Man Makes Rain Out of Peas

THE realistic rain effect broadcast recently from WGY, the Schenectady broadcasting station, during the production of "The Fortune Hunter," was caused by the rolling of dried peas through a paper tube.

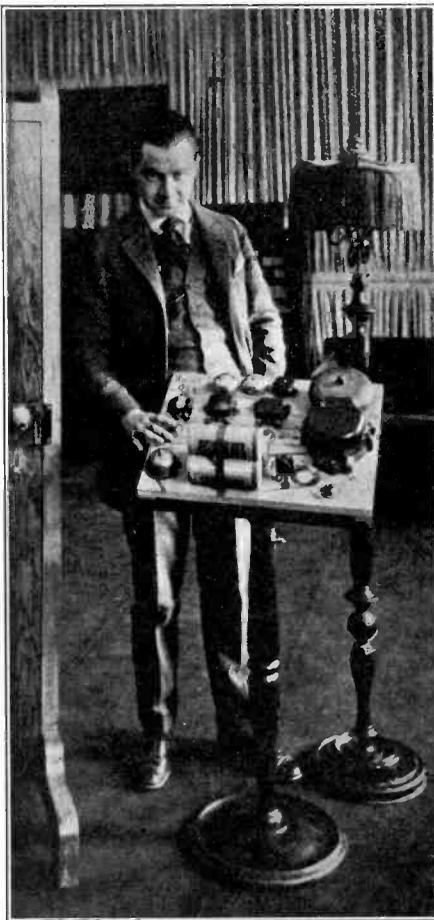
In "The Storm," the forest fire was produced at WGY by means of a plumber's gasoline blow torch, the breaking of match sticks and the crushing of paper. The torch produced the effect of rushing wind and flame, and matches and paper, brought close to the microphone, sounded like the crackling of burning tree limbs.

Successful transmission of a dramatic production by radio is dependent upon sound properties. Atmosphere is created and action is simulated by sound, the devices varying with the needs of a particular production.

At WGY, where the radio drama has been a popular weekly feature since August, 1922, special pains were being taken in the preparation of a play for the air to see that maximum sound results are obtained. Considerable experimenting is frequently necessary to produce the sound desired. Two of the most frequently used sound properties of WGY are the door and the bell board. The bell board consists of a convenient arrangement of five bells of different tones and a buzzer. All are connected to dry cells and may be operated by the pressure of a button.

There are door bell, telephone bell, an alarm bell which may be sounded for fire, ambulance or as a burglar alarm. A clock chime is in the group, as is a tap bell.

Probably no property is more important than the portable door and door frame, for it is only by the closing of the door, in interior scenes, that the entrance or the exit of a character may be conveyed to the radio listener. The door is one of the peculiar conventions of the radio drama. Whereas in the home a softly closing door is considered desirable, it is quite important in the radio drama that the sound of the door and clicking of the lock be loud enough to actuate the microphone. The WGY door is made of thin oak and has a peculiar resonant quality and is easily recognized as a door by its sound.



(Kadel & Herbert)

TO MAKE RADIO PLAYS more realistic and give the necessary atmosphere, the arrangement shown in the photo produces all manner of sounds that go with the "action" of the play. There are door bells, phone bells, alarm bells, buzzers, etc., all arranged for easy manipulation. Edward H. Smith, of WGY, who engineers the layout, must be careful not to sound the door bell when the burglar enters the scene. About the only thing this outfit can't do is get in the lighting effects that go with a scene. In the future, we may hope to see as well as hear these radio plays, when television is made practical.

Fan Possessing "Squealer" Set Kills King's Reception

LONDON.

WHAT do you think? Somebody prevented King George from enjoying a special Easter program, including music from "Parsifal" and a sermon by the Bishop of London! Radiated interference did it.

The King, since a wireless set was presented to him recently, has shown the

keenest interest in broadcasting, and even took the set to Windsor for nightly use during his residence there. However, even the King's magnificent set was not proof against interference.

The British Broadcasting Company has issued a special appeal to listeners and amateur senders to refrain from oscillation.

Pennsylvania R. R. Finds Radio Messages Solve Problem

EXTENSIVE tests, to determine the availability of the radio telegraph for transmitting railroad messages (other than train orders) in the event of extensive prostration of the wire systems, have just been conducted through cooperation between members of the American Radio Relay League, operating under Federal licenses, and the Pennsylvania Railroad System management. After many arduous days of experi-

menting, the tests, which covered the principal operating points on the Pennsylvania Railroad system between the Atlantic seaboard on the east and the Mississippi River on the west, proved in the main highly successful and, in the opinion of the railroad management, demonstrate that the service of the radio telegraph stations embraced in the League offers a practical means of emergency communication.

MAGNAVOX Radio Products



A1—\$27.50

MAGNAVOX Audio-frequency Power Amplifiers

THESE instruments offer the most ideal method for amplification of audio-frequency waves before they are reproduced into sound.

Wherever ordinary audio-frequency is replaced with Magnavox Power audio-frequency, stations previously out of range can be reproduced in excellent volume.

The new one-stage Magnavox Power Amplifier A1, illustrated above, is just what is needed in many cases to bring in the distant stations.

Magnavox Reproducers

- R2 with 18-inch curvex horn \$50.00
- R3 with 14-inch curvex horn \$35.00
- M1 with 14-in. curvex horn. Requires no battery for the field \$30.00
- M4 also requires no battery \$25.00

Magnavox Combination Sets

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

Magnavox Power Amplifiers

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

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

The Magnavox Company
Oakland, California

New York Office: 350 West 31st Street
Canadian Distributors
Perkins Electric Limited, Montreal

MR. D. X. HOUND

Radio World's Own Artist Creates An Enjoyable Character

By HAL SINCLAIR



The Radio Trade

Joint Conventions Planned for Trade; Bid by New York

THE first national convention of the radio associations of the United States will likely be held in New York City late in September, if plans now on foot carry through, according to announcement by the National Radio Trade Association.

"We have been invited to hold our annual convention in New York by the Radio Trade Association of New York, a branch organization," a statement by President Henry M. Shaw said. "With the local association furnishing the invitation we believe a number of other national organizations in the radio industry will be persuaded to meet at the same time, giving radio in effect a national convention of associations rather than having the annual meetings scattered

Clark Named Official Delegate to Convention of Advertising Clubs

THE following letter was sent to Fred S. Clark, manager of RADIO WORLD:

It gives me real pleasure to appoint you one of the official delegates of the Advertising Club of New York in regard to the Twentieth Annual Convention of the Associated Advertising Clubs of the World, to be held in London at the Wembley Exposition, July 12 to 18.

Please let us have your letter of acceptance in order that your name may go forward to the Executive Officers of the Associated Advertising Clubs of the World.

Very cordially yours,
H. H. CHARLES,
President.

Mr. Clark sent in his acceptance of appointment as an official delegate to attend the convention.

PHONOGRAPH DEALERS PROFIT FROM RADIO

A CHANGE in the attitude of manufacturers of phonographs and records toward the development of radio has resulted in more favorable business for the phonograph companies since the beginning of this year. During the greater part of 1922 and 1923 when the radio industry was growing fast, the phonograph industry was combating it on the ground that it was affecting sales of machines and records. Since the beginning of the current year, however, phonograph manufacturers have gone into the manufacture of combination radio and phonograph instruments, and the results are reported to be decidedly favorable.

That the radio had cut seriously into the sales of phonographs and records was never denied. But now many of the leaders have entered the radio industry.

In view of the uncertainty which prevailed regarding the outlook for the phonograph industry the Standard Daily Trade Service investigated the situation and in a recent bulletin it said:

"Having found it increasingly difficult to sell phonographs in competition with radio apparatus, many manufacturers of talking machines have been following a new course since the beginning of 1924; i. e., that of selling their products in combination with radios. Several of the large phonograph companies have already become important radio apparatus producers.

"The new course taken by the phonograph manufacturers has thus far proved entirely satisfactory."

RADIO-PHONOGRAPH DEALERS TO HOLD A SHOW

WHILE no definite date has yet been set for the forthcoming industrial show to be held under the auspices of the Talking Machine and Radio Men, Inc., plans are under way for the event. It is the intention of the organization to hold the affair some time during the months of September, October or November. The place has not yet been selected, although it is understood that the committee has several locations in view in New York City which would be suitable for an affair of this kind.

According to present plans there will be an extensive display of radio sets on view at the show. The displays will be restricted to talking machine dealers, and accessories manufacturers and radio and accessory manufacturers.

TRADE WANTS ADVANCE FACTS ON NEW MODELS

A PROPOSAL has been made that the Radio Trade Association set a definite time in the year when models of radio set should be revised and changed, the new models being announced to the trade and public much after the fashion of the automobile industry.

A committee appointed by the association reported that in their opinion new models should be announced to the trade between July 1 and September 1, deliveries being started then, giving the trade plenty of chance to clean old stock before the fall radio shows started, when the models would be brought to the attention of the public in a definite manner.

WORLD'S FAIR ANTICIPATES NEED OF MORE SPACE

V. J. HERRMAN, managing director, and James F. Kerr, general manager, have taken an option on the 69th Regiment Armory, New York City, as they feel the radio exposition they will conduct at Madison Square Garden, September 22 to 28, may need more room. The armory is nearby.

The exposition is under the auspices of the Radio Manufacturers' Show Association and has been given the title of "The First Radio World's Fair."

R. C. A. OWNS BOTH TUBE PATENTS, SAYS HARBORD

THE Radio Corporation of America now holds the rights of both Armstrong and De Forest in the invention of the present vacuum tube oscillator to which both lay claims, General J. G. Harbord, president, announced. Regardless of the outcome of the legal fight of the two inventors, he said, "The radio public will continue to obtain Radio Corporation products using the regenerative invention."

Tradiograms

A MEMBERSHIP DRIVE is being begun by the Radio Trade Association, 1133 Broadway, New York City. Every member is urged to speak to friends in the trade. Committees on membership have been appointed and the slogan "One Thousand Members" has been adopted. The Radio Trade Association of New York already has more members than any other trade organization in the country except the National Radio Trade Association.

TUBE REPLACEMENTS on all types of tubes are reported as moving nicely in the East. Dealers sending tubes in for replacement are urged to remember to label the tube rather than the carton. A sticker should be pasted on the glass of the tube, but no pencil marks should be made on the sticker, as they form a high resistance and may decrease the value of the tube. If a date is desired it should be rubber-stamped on the sticker.

The New Magnavox Uses Semi-Dynamic Plan

THE Magnavox Company are distributing to the trade a new model reproducer, designated M4. This instrument makes use of the semi-dynamic operating principle, developed by Magnavox engineers and first employed by them in the M1 Reproducer brought out a little less than a year ago. The M4 represents a further perfecting of this principle, especially the new magnetically balanced armature, the improved type of diaphragm supported by hollow rubber gaskets, and an extremely high resistance winding which makes M4 unusually sensitive. It is said that by eliminating moving parts, joints and other mechanical connections, the semi-dynamic operating principle makes possible a consistently high quality of musical tone, without use of a battery for operation. Some of the other features are a special large permanent magnet obviating use of field battery; a sound chamber designed on acoustic principles, and a correct balance between size of diaphragm and vibrating air column in horn.

Specify Delivery Date, Is Court's Warning

A WARNING to buyers of merchandise to see that contracts for goods state explicitly the time when they expect deliveries to be made is given in a decision of the Appellate Division, New York, in which a suit for \$39,697 damages was dismissed because of the failure of the buyer to take this precaution.

The court holds that provisions of the Sales Act, which is construed in the case, protect the seller but not the buyer. The decision is said to be the first in which this question has been directly involved.

Business Opportunities Radio and Electrical

Rates: 40c a line; Minimum 3 lines.
BUSINESS OPPORTUNITIES

RADIO TUBE OPPORTUNITY—Men of integrity everywhere to become our authorized distributors; \$50 to \$500 cash required to carry delivery stock; this means splendid yearly income to radio enthusiasts. Schicklering Products Mfg. Co., Inc., Knickerbocker Building, 42d St.-Broadway, New York, licensed manufacturers; tubes nationally advertised.

MANUFACTURER of well-known radio instruments has developed a new receiving set superior to the neutrodyne; needs capital to place in production for Fall distribution. Box X, Radio World.

INVENTORS—Have your models made at Herman's, 64 Lafayette St., N. Y. C. Phone Franklin 1485.

RADIO CORPORATION FOR SALE—Incorporated D. C., \$250,000, with patents; low production cost receivers and parts; nominal capital required; principals only. Address E. C. Joppa Machine & Bronze Co., 12th and Oxford Sts., Philadelphia, Pa.

RADIO—New improved tone loud speaker unit; low manufacturing cost; have full knowledge manufacturing and sales; need financial assistance, active or silent. Box 1, Radio World.

MR. RADIO MAN—Somewhere there is a man who has dreamed a vision and who has worked and completed his dream to perfect the Ford of Radios. I want to find this man—to offer him the fullest scope of financial backing. The right man with the right set will find unlimited manufacturing facilities. Therefore, either if you are the man or know of him have him write to Box 824,

\$15 Set Gets 2,000 Miles

The Essex Radio Special, the receiving set with a conscience, gets you more distant stations clearer and sweeter than sets costing ten times its price. \$15 Set complete with cabinet, without tube or batteries. \$20—Set complete with cabinet, tube and batteries.

ESSEX RADIO SERVICE

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

Broadcasting of Republican Convention Being Shared

CLEVELAND.

THE following were plans adopted for broadcasting of the Republican Presidential Convention that opened Wednesday in Cleveland:

First—Broadcasting to be taken care of by the three big commercial broadcasting stations already in operation in the Cleveland territory, rather than by a city owned plant located in Public Hall, where convention sessions will be held. These stations are WJAX, the Union Trust Company; WTAM, the Willard Storage Battery Company, and WHK, the Radiovox Company.

Second—Each station to be given a certain portion of the day's program to broadcast.

Third—The keynote speech of the temporary chairman, all nominating speeches for candidates for President and Vice-President, the reading of the platform and the convention roll calls by States to be broadcast.

Fourth—Attempt to be made to give the people of the nation an idea of the "mass sound" of the convention, especially in the event of favorite son booms or attempted stampedes and the final clamor when the convention has completed its work.

Fifth—Convention events, besides being transmitted by radio from local stations, to be transmitted over A. T. and T. lines to distant points and there broadcast, much in the same manner as was observed in the transmission of President Coolidge's Lincoln Day address.

Sixth—Establishment of a big loud speaker outside Public Hall, so that "overflow" crowds will be able to hear what is going on inside the big hall.

Seventh—Establishment under either private or city control of outdoor loud speakers at various points in the city, so that Cleveland itself may listen in on the big meet.

Harbord Is Boomed for Vice-President

WASHINGTON.

A BOOM for Major Gen. James G. Harbord, former chief of staff of the A. E. F. and now President of the Radio Corporation of America, as a candidate for the Vice-Presidency on the ticket with President Coolidge, was launched here. General Henry J. Reilly of Chicago, a member of the Illinois American Legion and editor of The Army and Navy Journal, is one of the leading spirits in the movement. He arrived here to interest former service men in Congress in the movement.

Coming Events

JUNE 11 ON—Continuation Republican National Convention, Cleveland. Speeches nominating candidates for President and Vice-President will be broadcast.

JUNE 11 TO 14—Radio show, Manchester, N. H., under auspices of Radio Corporation of America.

JUNE 24—Opening of Democratic National Convention, Madison Square Garden, N. Y. C. Speakers nominating candidates for President and Vice-President will be broadcast.

JULY 7 TO 12—Radio show, Bangor, Me., auspices R. C. A.

JULY 21 TO 26—Radio show, Burlington, Vt., auspices of R. C. A.

AUG. 16-21—Radio Exposition, San Francisco, conducted by Pacific Radio Trade Association.

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

OCT. 2-11—Exposition, Grand Central Palace, New York City, under auspices of American Radio Exposition Co.

10,000,000 Sets Being Tuned for Convention, says President Hubbell

SPEAKING of the future of radio science, S. B. G. Hubbell, of New York City, president of the Federal Telephone & Telegraph Company, radio manufacturers of Buffalo, said the radio science was projected into the world's necessities particularly to furnish an economic and easy method in overcoming growing lack of political faith and understanding.

He said that for the first time in the world's history there is an opportunity for close exchange of political ideas. Most of the important political speeches will be broadcast. The Republican speaker will be listened to by Democratic voters and vice-versa, and a very general and fair-minded interchange of political thought will be possible, without the heat of political passion. He added:

"There are now 10,000,000 radio sets in operation in this country, all tuned and waiting for such events. People, who have not heretofore been interested in radio are fast installing sets and thousands of them are being daily tuned in for the express purpose of listening to the political thoughts coming from this political campaign.

"To my mind, our new sciences are not merely works of man. I believe they are commands of destiny—of necessity—and I believe that radio—the greatest of all scientific developments—was brought forth largely to furnish the means of preserving our political structures through easy methods of wide and economic distribution of political knowledge."

New Corporations

DELAWARE

Stranahan, Harris & Oatis, Ohio bonds and securities, \$500,000.

Empire Electric Products Corp., Del., make radio sets, 1,000 shares common stock, no par value.

Wireless Dry Cells, Inc., Canada, batteries, \$300,000.

Cities Service Export Oil Co., Del., oil and gas productions, \$5,000.

Kentucky Alcohol Corp., Del., distillery products, 50,000 shares common stock, no par value.

DESIGNATIONS IN NEW YORK STATE

The Secretary of State is named representative in each instance.

Williamson Battery Co., Del., electric batteries, 5,000 shares preferred stock, \$100 each; 200,000 common, no par value.

Continental and Commercial Securities Co., Ill., \$1,000,000.

Heins & Bolet Radio and Electric Supply Corp., New York City, \$10,000. N. F. Heins, N. Bolet, I. Baily. (Attorney, D. W. Kahn, 120 Broadway.)

Klosner Radio Corp., Bronx, New York City, 50 shares common stock, no par value; H. and M. and D. Klosner. (Attorney, S. D. Cohen, 152 West 42d St.)

Gotham Wireless, New York City, to make radio supplies, \$100,000; R. Byron, E. Alexander. (Attorney, O. M. Lazarus, 38 Park Row.)

John W. Weber, Jr., Brooklyn, N. Y., radio sets, \$20,000; C. U. and J. W. Weber, Jr., W. J. Ford. (Attorneys, Latson & Tamblin, 66 Broadway, New York City.)

Radio Service and Engineering Laboratories, Queens, N. Y., \$5,000; P. and M. Flowerman, W. Reinmuth. (Attorneys, Epstein & Dolen, 305 Broadway, New York City.)

Operadio Sales Corp., Illinois, radio, \$1,500. Rep., Secretary of the State of New York.

NAME CHANGES

Radio Extract Co., New York City, to Radio Food Products Corp.

Gigantic Radio Net Being Formed by U. S.

WASHINGTON.

A GIGANTIC radio net of transmitting stations is being developed throughout the United States, which will eventually connect every city and town, and practically every household, as far as reception alone is concerned. Under the supervision of the Department of Commerce, this means of disseminating important information, especially in times of emergency, would reach more individuals than there are telephone subscribers, and a larger number than the combined newspaper readers of the nation. Amateurs are an integral part of the system.

9 Stations Listed for Broadcasting Democratic Meet

PLANS for reporting by radio the speeches and proceedings of the Democratic National Convention, which opens June 24 at Madison Square Garden, New York City, have been completed and a list of nine stations throughout the country which have already arranged to send the report broadcast was made public.

The American Telephone and Telegraph Company and the Radio Corporation of America will each install microphones and wires in Madison Square Garden. Stations served by the A. T. & T. wires which have already agreed to send the reports broadcast are WEAQ, New York; WCAP, Washington; WGR, Buffalo; KDKA, Pittsburgh; WMAQ, Chicago; KSD, St. Louis, and WDAF, Kansas City. The local station WJZ and station WGY, Schenectady, will send out the Radio Corporation report.

Speeches at the convention will be broadcast through two microphones, one for each company, which will be installed just in front of the speakers' stand. In addition, each company will send out a running commentary on the convention, explaining each development, and which is expected to be of particular interest during the balloting. J. Andrew White will be the announcer for the Radio Corporation. The announcer for the A. T. & T. is yet to be selected. Observers stationed at strategic points in the convention hall will assist the announcers by telephoning information to them.

Other stations may be added to those which have already made arrangements for the service, as the local convention committee made it a condition that any station desiring to get the service might do so.

Literature Wanted

IF you want radio literature from dealers, jobbers and manufacturers, send your name and address to Service Editor, RADIO WORLD, 1493 Broadway, New York City.

Joe Schmidlin, dealer, 911 Ann St., North Bergen, N. J.
Glenn W. Slater, 62 E. Huron St., Pontiac, Mich.
Frank E. Whedbee, Seabrook, Ind.
C. B. Tyler, 4602 Eastside Ave., Dallas, Tex.

PROGRAMS, Monday, June 16
(Continued from page 18)

A. M., weather forecast. 3:30 P. M., literary program, Portland Library Association. 7:30 P. M., baseball scores, weather forecast and market reports. 8-10 P. M., program by Miller's Merry-makers.
WFAA, Dallas, Tex., 476m (630k), C. S. T.—12:30 P. M., address, Prof. J. P. Boon, "Astronomical Effects in Meteorology." 8:30 P. M., B. M. Taylor and his vocal quartet and double quartet.
WDAF, Kansas City, Mo., 411m (730k), C. S. T.—baseball scores at 3:30, 4:30, 5 and 6 o'clock.

3:30 P. M., The Star's radio trio. 5 P. M., weekly Boy Scout program, Kansas City Council. 5:50 P. M., marketgram, weather forecast, time signal and road report. 6 P. M., speaker from the University of Kansas; weekly "Request Story Night"; music, Hotel Muehlebach orchestra. 8 P. M., The Star's radio orchestra and the WDAF minstrels. 11:45 P. M., (Nighthawk Frolic), the Plantation Players.

WCAE, Pittsburgh, 462m (650k), E. S. D. S. T.—12:30 P. M., news, weather reports. 3:30 P. M., baseball scores; library news. 4:30 P. M., stock market reports. The Sunshine Girl. 6:30 P. M., dinner concert from William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores. 8:00 P. M., silent period. 8:30 P. M., Miss Mary Cahill, pianist; Miss Catherine Cahill, violinist; Miss Esther M. Dunn, soprano; Miss Francis Victor, entertainer. 11:00 P. M., late concert by Johnson's Pennsylvanians.

WWJ, Detroit, 517m (580k), E. S. T.—8:00 A. M., setting-up exercises. 9:30 A. M., "Tonight's Dinner" and special talks, Woman's Editor. 9:45 A. M., public health service bulletins and talks of general interest. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 12:00 M., Detroit News Orchestra. 3:00 P. M., Concert by Schmeiman's Concert Band. 3:50 P. M., weather forecast. 3:55 P. M., market reports and baseball scores. 8:30 P. M., concert by Schmeiman's Concert Band. 9:30 P. M., Detroit News orchestra. Miss Claudine Secor, soprano; Miss Jane Robinson, contralto.

WHAS, Louisville, Ky., 400m (750k), C. S. T.—4 P. M. selections by Alamo Theatre Orchestra; police bulletins; weather forecast; soprano solos, Mrs. Palmer K. Miller, accompanied by Miss Susie Elvira Williams; piano solos, Miss Susie Elvia Williams; selections by Walnut Theatre Orchestra; late news bulletins. 4:50 P. M., live-stock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., central standard time.

WBAP., Fort Worth Tex., 476m (630k), C. S. T.—9:30 to 10:45 P. M., concert by the Fife, Drum and Bugle Corps, quartet and soloists of the Fort Worth Boy Scouts.

WHAZ, Troy, N. Y., 380m (760k), E. S. T.—9 P. M., concert by Miss Rosamond Burgess, pianist; Mrs. Middlebrook, saxophonist; Mrs. Amelia Spenard Carpenter, contralto; Miss Lappetus, soprano; Miss Isabel Merwitz, reader. 10 P. M., dance music by Girls' Bluebird Orchestra.

KGO, Oakland, Cal., 312m (960k), P. T.—1:30 P. M., New York stock exchange and U. S. weather bureau reports. 3 P. M., short musical program. Speaker courtesy Parent-Teacher Associations, San Francisco Bay District. 4 P. M., Hotel St. Francis Dance Orchestra. 6:45 P. M., final reading, stock exchange and weather reports, and news items. 8 P. M., educational program, with musical numbers. Courses in Agriculture, Spanish, Music, Economics, and Literature.

KFI, Los Angeles, 469m (640k), P. T.—5 P. M., Evening Herald news bulletins. 5:30 P. M., Examiner news bulletins. 8 P. M., Evening Herald concert. 9 P. M., Examiner concert. 10 P. M., Ambassador-Max Fisher's Coconut Grove Orchestra.

Tuesday, June 17

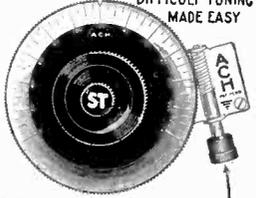
WGY, Schenectady, N. Y., 380m (790k), E. S. T.—1:00 P. M., Music and address, "Lip Reading for the Hard of Hearing," Mrs. C. A. Dingman. 5:00 P. M.—Produce and stock market quotations; news bulletins; baseball results. 5:30 P. M., dinner music, Instrumental Trio of Hotel Ten Eyck. 7:40 P. M., baseball scores. 7:45 P. M., Radiologue, "Locomotives That Make Electricity as Well as Use It," C. M. Ripley, G. E. Co. 8:00 P. M., musical program by young artists. 10:15 P. M., organ recital by Stephen E. Boisclair.

WFAA, Dallas, Tex., 476m (630k), C. S. T.—12:30 P. M., address, DeWitt McMurray in a medley of humor, pathos and wisdom. 8:30 P. M., musical recital, old fiddlers. 11:00 P. M., entertainers from the Jefferson Theatre, Pete Pate and His Jazzi-Paters and Bernie Clements and His Synco-Jazzers Orchestra.

CKAC, Montreal, 430m (700k), E. S. T.—4:00 P. M., weather, news, stocks, music. 7:00 P. M., kiddies' stories in French and English. 7:30 P. M., (Concluded on next page)

The Ultimate Radio Receiver
THE FLEX-O-DYNE CO.
 1674 Broadway (At 52nd St.)
 New York, N. Y.
 Circle 4569

AT LAST
THE MOST PERFECT ONE-TUBE REFLEX
 CLARITY — VOLUME — DISTANCE
 Inductance or Capacity Tuning or Both
NO Howling, Hissing, Squealing, Distortion, Rheostat, Potentiometer, Storage Battery (optional), Taps, Switches or dead-end losses.
 Complete hook-up and all information
PRICE ONE DOLLAR
 Checks and stamps not accepted. Curiosity seekers please remit one dollar for complete information.
MYERS RADIO SHOP
 P. O. Box 694 Oakland, California

ACH SHARP TUNER
 DIFFICULT TUNING MADE EASY

 Mail Orders Prepaid Why the A.C.H. is different
 3 in. DIAL \$2.50 (150-10-1)
 4 in. DIAL \$5.00 (215-10-1)
 5/16 REG. 1/4-3/16 BUSHINGS 5¢ EACH
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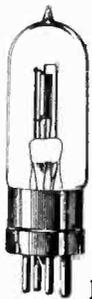
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 The "SELF-ADJUSTING" Rheostat
 PERFECT for every CIRCUIT
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BEL-CANTO LOUD SPEAKER
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WE REPAIR RADIO TUBES

WD-11	\$2.50	DV-2	\$2.50
WD-12	2.50	DV-6A	2.50
UV-200	2.50	UV-199	2.50
UV-201	2.50	C-299	2.50
C-300	2.50	UV-201A	2.50
C-301	2.50	C-301A	2.50
DV-6	2.50	Marconi	2.50
DV-1	2.50	Moorhead	2.50
6 v. Plain Detector	2.50		
6 v. Plain Amplifier	2.50		

Mail orders solicited and promptly attended to.
 Dealers and agents write for special discounts.

H. & H. RADIO CO.

P. O. Box 22-B
 Clinton-Hill Station Newark, N. J.

The "Goode" Two-o-One



Le Ton d'argent

Guaranteed



BY MAIL ONLY
\$2.39

Postpaid

QUARTER AMPERE AMPLIFIER-DETECTOR RADIO TUBE

GUARANTEED SATISFACTORY

All "GOODE" Tubes Sold Direct to the Consumer—No Dealer Profits

ONE—"Goode" Detector-Amplifier.....	\$2.39
THREE—"Goode" Detector-Amplifiers.....	\$6.42

(All postage prepaid)

The "Goode" Two-o-One A Tube amplifies or detects. It is a quarter ampere, six volts, standard base silvered tube.
 Send express or postal money order or New York draft to—

The Goode Tube Corporation

Incorporated
 EVANSVILLE INDIANA



THE YANKS ARE COMING

"The Ace of Independent Tubes." A Uniform, Clear Tone, Long Service Tube.

PRICE \$5.00

Type 201-A
 Orders C. O. D. or at your dealer.

Yankee Tube Corp.

185 Clinton Avenue
 Newark, N. J.

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RADIO WORLD gives advertisers more returns for the dollar, as proven out by many keyed tests.
FLAT RATE \$5.00 an inch, \$50.00 column, \$150.00 a page.



TOWER'S Scientific
 WEIGHS ONLY 8OZ
 Perfect Tone Mates
\$2.95
 Plus a few cents postage



OUR \$200,000.00 COMPANY STANDS SQUARELY BACK OF EVERY HEADSET

WORLD'S GREATEST HEADSET VALUE

Formerly \$6.00, now \$2.95, with Notable Improvements

Longer Cord (full 5 feet), Stronger Magnets, Higher Resistance, Increase of Sensitivity, Perfect Tone Mates
 EVERY SET TESTED BY LICENSED RADIO OPERATORS

Send no money - Order on a Post-Card

THE TOWER MFG. CO. Dept. D.98 BROOKLINE AVENUE, BOSTON, MASS.



PROGRAMS, Tuesday, June 17 (Concluded from preceding page)

Mount Royal Hotel Dinner concert. 8:30 P. M., special program by "S. S. Regina" Orchestra and entertainers. 10:30 P. M., Mount Royal Hotel Roof Garden Dance Orchestra.

KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M., weather forecast. 3:30 P. M., children's program. 7:30 P. M., baseball scores, weather forecast and market reports.

WDAF, Kansas City, Mo., 411m (730k), C. S. T.—Baseball scores at 3:30, 4:00, 4:30, 5:00 and 6:00 P. M. 3:30 P. M., the Star's Radio Trio. 5:00 P. M., weekly child talent program. 5:50 P. M., Market-gram, weather forecast, time signal and road report. 6:00 P. M., Clerin Zumwait, M.A.; the Tell-Me-a-Story Lady; music, Hotel Muehlebach Orchestra.

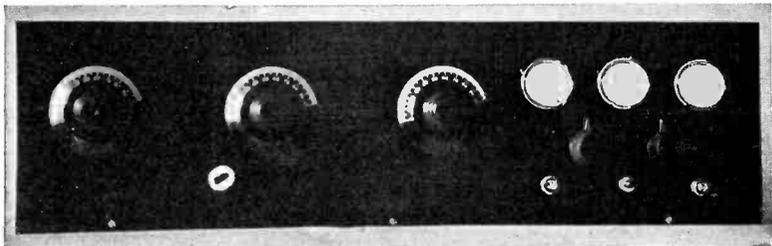
WCAE, Pittsburgh, 462m (650k), E. S. D. S. T.—12:30 P. M., news, weather reports. 3:30 P. M., baseball scores. 4:30 P. M., stock market reports. The Sunshine Girl. 6:30 P. M., Dinner concert from William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores. 8:30 P. M., musical program by Miss Bertha Gross and co-operating artists. 11:00 P. M., late concert from Loew's Aldine Theatre.

WWJ, Detroit, 517m (580k), E. S. T.—8:00 A. M., setting-up exercises. 9:30 A. M., "Tonight's Dinner" and a special talk, Woman's Editor. 9:45 A. M., Fred Shaw, pianist and popular songster. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 12:00 P. M., Detroit News Orchestra. 3:00 P. M., concert by Schmeman's Concert Band. 3:50 P. M., weather forecast. 5 P. M., market reports and baseball scores. 5 P. M., baseball scores. 8:30 P. M., concert by Schmeman's Concert Band. 9:30 P. M., Detroit News Orchestra.

KPNF, Shenandoah, Ia., 266m (1130k), C. S. T.—7:30 P. M., concert by Benedict Piano and Radio Co.

WHAS, Louisville, Ky., 400m (750k), C. S. T.—4 to 5 P. M., Walnut Theatre Orchestra; police bulletins; weather forecast; Alamo Theatre Orchestra; late news bulletins. 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., central standard time announced. 7:30 to 9 P. M., agricultural tabloid talk; concert by the Zur Schmiede Harmony Diggers; late news bulletins; baseball scores; central standard time.

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Latest Developments in the SUPERDYNE CIRCUIT In Text and Diagrams

RADIO WORLD dated May 17, 24 and 31 contains a series of three articles covering all the angles of the famous Superdyne Circuit. The original Superdyne Circuit articles appeared in Radio World last December, and the three issues in which they appeared are now completely out of print. That is the reason why we have published the Superdyne series in the May 17, 24 and 31 issues. 15c. per copy, three for 45c., or start your subscription with any number.

SPECIAL SUBSCRIPTION: Send \$6.00 for one year's subscription and we will send you our issues of May 17, 24 and 31 as a premium.

RADIO WORLD, 1493 Broadway, N. Y. City

authors. As previously announced in RADIO WORLD, the winning play, "A Million Casks of Pronto," was written by Miss Agnes Miller, of New York City, as announced recently in RADIO WORLD. It was presented at the Schenectady station of the General Electric Company June 6. Miss Miller was awarded a cash prize of \$500.

The plays written in the WGY competition which will be presented:

"The Happiness Experts," a comedy drama, by George Leber, 27 Union Avenue, Pittsburgh, Pa.
"Bootleg," a drama, by Zeh Bouck, 502 West 143d St., New York City.

"The Man Who Would Not Be King," a historical drama, by Dr. John J. Kallen, 73 St. Marks Place, New York City.

"The Fiend," a melodrama, by Charles U. Read, 232 South Hazel Street, Upper Sandusky, O.

"The Path of Glory," comedy drama, by Dr. Goodman Lipkind, 1379 Union Street, Schenectady, N. Y.

"Out of the Past," a romance, by Miss Esther Swartzberg, 150 Elmer Ave., Schenectady, N. Y.

"If the Storm Comes," a drama, by Anthony Spezia, 3964 Jerome Ave., Woodhaven, L. I.

"Hand Up," a farce, by John Kendrick Stafford, 94 Eagle Street, Troy, N. Y.

"The Much Abused," a comedy, by I. Einstein, 406 East 10th Street, New York City.

"They Just Disappear," a mystery drama, by Harry H. Stevenson, 23 Elder Street, Schenectady, N. Y.

"The Last Minute," comedy, by Harold M. Sherman, 115 West 6th Street, Marion, O.

Civil Service

THE United States Civil Service Commission announces the following open competitive examination:

Radio Engineer, \$4,000 to \$5,000 a Year
Associate Radio Engineer, \$3,000 to \$4,000 a Year
Assistant Radio Engineer, \$2,000 to \$3,000 a Year

Receipt of applications will close July 1. The examinations are to fill vacancies in the Department of Engineering, Navy Yard, Washington, D. C., in the Naval Research Laboratory, Bellevue, D. C., and vacancies in the Federal classified service throughout the United States at the salaries indicated above.

Competitors will not be required to report for examination at any place, but will be rated on their education and preliminary experience, special experience and fitness, and publications, reports, or thesis to be filed with the application.

Computer

The examination will be held throughout the country on July 9 and 10. It is to fill vacancies in the Coast and Geodetic Survey, Washington, D. C., and in positions requiring similar qualifications at an entrance salary of \$1,860 a year. Advancement in pay may be made without change in assignment to \$2,400 a year.

[Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the Secretary of the Board of U. S. Civil Service Examiners at the post office or custom house in any city.]

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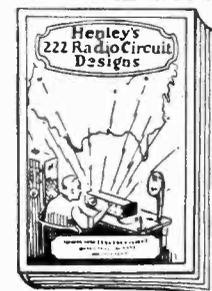
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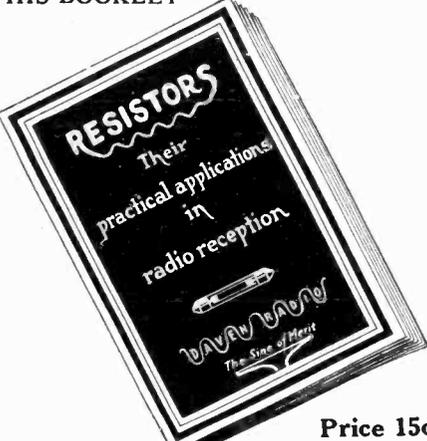


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All you have to do to join is to send in your name and address on a postcard, letter or on the attached blank.

A. B. C. EDITOR:
 PLEASE enter my name as a member of the A. B. C. I am interested in the radio game as a listener, retail salesman and helper to those who "roll their own." I have been wondering why such an organization as yours never has been started before.

I think that it would be a good thing if radio manufacturers would send their circulars to the members of this club when the names and addresses are published in RADIO WORLD, instead of waiting for the listeners to write for same.

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(Concluded from page 20)

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Probably your batteries have run down. The grid leak may also have become defective. Try another. A general overhauling of the set may disclose a broken connection, which would account for part of your trouble.

1—In getting certain stations in Chicago last night I noticed a whistling sound which at other times I do not get. As soon as I turn away from that station the whistling stops. I get this sound only once in a while, but when it starts it keeps on until I tune off that station. Is the trouble in my set, at the other end, or somewhere else? 2—I am running the tubes on dry batteries. Can I run them with a storage battery if I keep the voltage the same by use of a transformer, and what kind of transformer would be the best for this purpose?—L. J. Cole, 62 N. Brockett St., Kenosha, Wis.

The noise you hear is probably the heterodyne whistle of another broadcasting station which operates on the same wave as that station which you tune to. When two stations broadcast on an almost identical frequency, both waves, crossing each other, cause another wave to be heard in the receiving set, equal to the difference of the frequencies. For example, take two stations sending on 360 meters. One station has a frequency of 830 kilocycles and the other 831 kilocycles. Both these waves coming together will combine and result in an audible frequency of 1 kilocycle, or one thousand cycles. Therefore, a high-pitched 1000-cycle whistle will be heard in the earphones. 2—You evidently mean to use a rheostat. You do not state what kind of tubes you are using, therefore it is impossible to say what voltage or rheostat will be suitable. Restate your question, giving full details.

I am going to buy a radio receiving outfit and I find that it includes an R-3 Magnavox loud speaker. Is this speaker a good one?—H. H. Eaton, Necedah, Wis.
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Handy Hints on Shopwork

By Brewster Steel

LAYMEN think that it is necessary to have a complete machine shop in order to construct receivers. They visualize huge punches, presses, lathes, dies, and a competent staff of mechanics. Of course this equipment is necessary when turning out quantities of complete receivers. However, for the home constructor there are very few tools necessary, and most of the work can be done on the kitchen table.

For the construction of receivers, the following tools are all that are necessary. One breast drill with assorted size drills ranging from 1/32 up to 1/2". Two good screw drivers: 1 heavy point, 1 fine point. One pair of compass dividers. One marking tool. One square. One flat file. One 3-corner file. Two pair of pliers: 1 heavy electrician's pliers, 1 sharp nosed electrician's pliers. One sharp knife. One hacksaw. One set of good clamps. Some sheets of emery and fine sandpaper. One soldering iron, solder paste and solder.

With these tools and a little common sense any set can be laid out, the panel drilled, and assembled, and the finished set made. If engraving is thought necessary it is best to take the finished drilled panel to some firm that makes a specialty of engraving panels, and have it done. It cannot be done at home unless you are experienced in that line.

When you come down to brass tacks making a set is nothing more than the ability to drill holes correctly, and figure out before hand how the set should look. Always drill your panel from the front side to the back. Otherwise the panel will burr out when the drill comes through, especially if it is bakelite or condensite. If hard rubber is used this does not hold true as it is softer and more homogeneous in structure. Bakelite is made up of fine layers of highly compressed fiber, soaked in a chemical solution, which cracks easily.

When drilling bakelite, do not rush the work. This material swells and heats. Take it easy with not very much pressure on the drill. If the drill starts to work hard, stop, remove your drill and wait for the panel and the drill to cool off. Always be sure that your drills are sharp. You cannot expect a nice clean cut hole to be made with a dull drill. When buying the drills explain to the man that you intend to drill bakelite or condensite and he will give you the drill that is tempered and sharpened for that type of drilling.

When drilling holes for condensers, rheostats, potentiometers, variometers, and anything that is to be mounted directly on the panel, always work from a template. If one is not furnished with the apparatus, it is easy to make one direct from the apparatus itself. Then when you drill your condenser holes you will be sure that they are accurately done. Never scratch the face of the panel with a marker of any sort. If you find that a mark is necessary in laying out the panel, do it with a red or yellow pencil. This can be erased with a little water after drilling is done. Always start your hole by a punch mark to center the drill. To do this use your prick punch and make a mark, deep enough to hold the point of the drill. Then when you start your hole there will be no slip with a chance of a nice scratch on the panel front. Of

about equal importance is the speed with which the work is done. A nice neat job never resulted from rushing the work in order to finish.

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Neutrodyne Article
By R. L. Dougherty, March 15, 22, 29

Construction of a Battery Charger
By Walt S. Thompson, March 29, April 5

Spider Web Neutrodyne
By Byrrt C. Caldwell, April 12

Amplidyne
By Thomas W. Benson, April 19

Camper's Portable Set
By J. E. Anderson, April 26

Power-Amplification
By Chas. H. M. White, April 26

Neutrad Radio Frequency Unit
By Walt S. Thompson, May 3

Explanation of Super-Heterodyne
By Walt S. Thompson, May 3

Short Wave Adapters
By J. E. Anderson, May 10

Simplified Super-Heterodyne
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Superdyne
By N. N. Bernstein, May 17, 24, 31

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RADIO WORLD, 1493 Broadway, New York City.

Transmission on a Beam Near, Says Premier

MELBOURNE, AUSTRALIA.
DIRECTIONAL radio transmission, whereby the wave will travel in a beam, instead of in all directions, is to be

tried. Premier Bruce said the whole position of radio transmission has been radically changed "within the last fortnight," which some writers interpret as showing that Senator Marconi's prediction of the transmission of directional radio for an indefinite distance has now become possible of fulfillment through a perfection of method.

The Australian Premier told the House that he was eager to disclose the particulars, but that the British Government had not yet given permission for such publicity. The opinion is expressed here that if the "beam" system justifies the claims made for it the contemplated schemes for interempire radio transmission must be revived, and such works as the giant Hillmorton station, near Rugby, now under construction, may be regarded as already obsolete.

Senator Marconi announced development of a system of directional radio transmission early last December at a meeting of the Wireless Telegraph Company in London. The electric waves carrying the messages, he said, could under the new scheme be turned in any desired direction, like the beam of a searchlight, as opposed to the present system, whereby the waves are sent out in all directions.



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FULL LIST OF BROADCASTING STATIONS in Radio World dated May 17th, 1924, mailed on receipt of 15c or start your subscription with that number. **RADIO WORLD**, 1493 BROADWAY, NEW YORK CITY.

Choice of Right Words Improves One's Speech Over Radio 50%, Says McMillen, Noted Editor

By Wheeler McMillen

Associate Editor, Farm and Fireside, who recently broadcast from WLS, the Sears-Roebuck station in Chicago, along the same lines as the article herewith.

IN the wording of a sentence or a phrase, in the choosing of a word, hinges the success or failure of the radio speaker. The resonant quality of the voice plays a big part through the microphone, just as it does in ordinary conversation, but resonance is only half of the secret of effective broadcasting. Some voices, gifted with a clear, sharp, vibrating quality, capable of carrying to every corner of a lecture hall, are changed by the microphone to a series of incoherent blurs. The radio fan puts all the blame on the peculiar carrying power of the voice, but it also is due to a poor choice of words in the making of a sentence.

Radio phonetics is a new subject. As yet no one knows very much about it. But after a few observations I am convinced that the man whose voice is lacking in radio quality can substitute a carefully constructed speech, and the result will be at least 50 per cent improvement over ordinary efforts. Short sentences made up of simple words are the most effective. If long sentences are used, make them compound. A compound sentence is more simple than a complex. A few longer sentences always are necessary for the sake of variety. The beginning and ending of a paragraph should

be made of short, pithy sentences packed with thought.

A monosyllable with a long vowel is harder to pronounce sharply than a syllable with a short vowel. Listeners-in cannot see the periods by radio; the speaker must make them evident. This can be done if words are chosen for the endings and beginnings of sentences that are sharply defined. The sentence ending especially must never be ragged. Words are clearest and most easily pronounced that end in sharp consonants, such as "p" in handicap, "k" in overlooked, and "t" in pursuit.

Words must be carefully chosen. Of a group of synonyms, there is always one that is most easily and clearly pronounced. Toil is a better word than work, for radio use. The "t" is sharp as well as the diphthong. In the phrase—"through legislative or economic channels"—"routes" would have been a better word than channels. It is shorter. The phrase "hangs back" is stronger than the word "delays." "Put" is a better word than "place"; "start" is clearer than "began."

Radio talking is a good deal like magazine writing. The same tactics must be employed in both. There is more in the building of a good radio talk than the planning of words and sentences. That is the beginning. The word structure must be built around a general plan aimed to attract and hold the interest. The opening sentence should strike the keynote of the speech.

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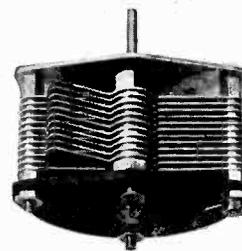
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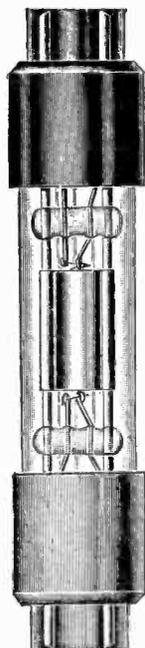
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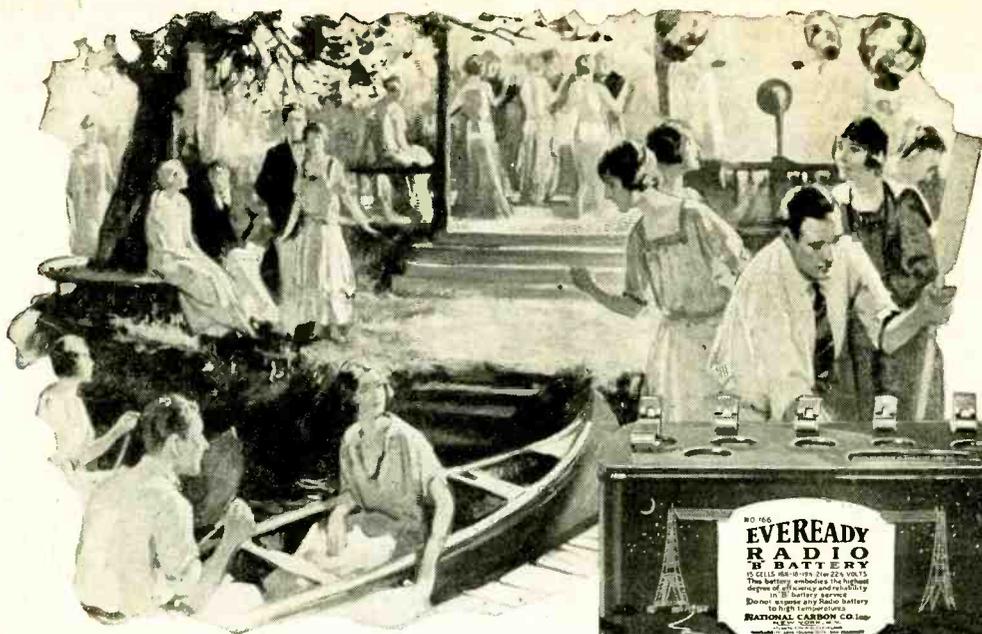
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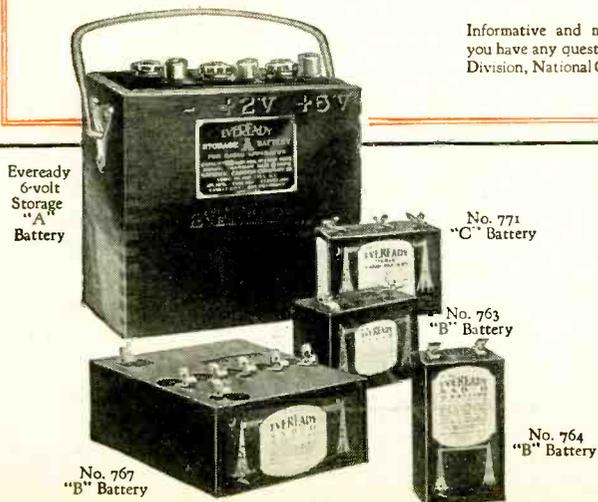
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