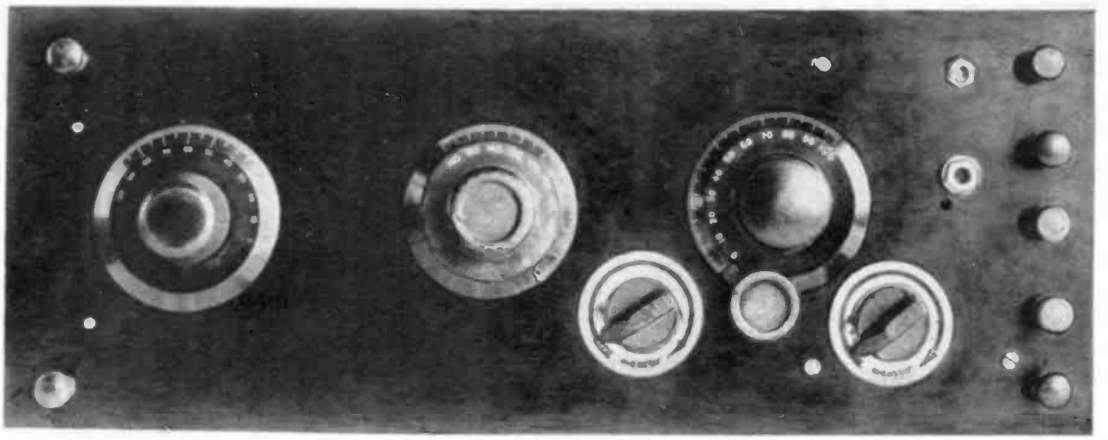


*The set makes a very neat appearance when mounted in this way on a panel*

# A Favorite Circuit Simplified

By W. FRANCIS GOODREAU

SOME TIME ago, when in the hospital where I spent a few years, I formed the habit of experimenting with radio receiving circuits. It's a good habit, though at times a very expensive one.

Now that I am home once more I still experiment, and once in a while I find a new circuit, one that can truly be called an improvement on other circuits. More often I find a method of improving a standard circuit—one that has been tried by many radio fans and not found wanting.

There are many circuits. Some are good, many are not. Some are complications of standard circuits, with a few useless parts added and given a high-sounding name. You have seen many of these circuits; perhaps you have dismantled your set to try them and been disappointed with the results. I, too, in the days when my knowledge of radio was nil, have dismantled my set in order to try the latest so-called new circuit. Now I can tell at a glance whether or not it is new, or the same old circuit with a nice new name and some extra parts. I have learned this by experience, an experience which has cost money and many hours of labor. However, it has been worth while.

I, too, am guilty of changing standard hookups, but my changes are made to simplify whenever possible the hookup, so that other apparatus may be used, and still remain as efficient as before. Not to complicate, and give a new name to old circuits, but to *simplify* old circuits so that they will be more useful.

In this article I wish to introduce you to an old friend of mine—one who helped to pass the long dreary hours away, when hours were weeks, and weeks seemed months and often years.

It is a standard circuit. It was a standard circuit when I first knew it. It is a standard circuit today. I have changed nothing in the wiring diagram; all I have changed is the type of parts used.

It is best known as a honeycomb coil circuit. It is very good as a honeycomb coil circuit, but many fans (and I am one) do not wish to use honeycomb coils in our broadcast receivers. The main reason for my objection to them is the fact that they take up too much room. If mounted on the front of a panel they do not look well; if used in back of panel they take up too much space.

What I have done is to simplify the circuit and to adapt it to apparatus that will compare well with our other broadcast receivers.

What have I used in place of the honeycomb coils? A Kellogg split variometer How have I simplified it? By reducing the number of controls. In the original circuit using honeycombs, there are the following controls: Coupling, which is variable; tickler coil, also variable, and two variable condenser controls. In the set as I use it the controls are as follows: Variable tickler and two variable condensers. The coupling between primary and secondary is fixed, thereby doing away with one control. I have tried the original, and the one I describe, and I find them equally efficient. They are sensitive, selective and the distance and volume are all that could be desired.

To build this receiver you will need the following parts:

One variable condenser, Cap. .0005 Mf. (Vernier if desired).
One Vernier Variable Condenser, Cap. .0005 Mf.
One Split Variometer.
Two Standard tube sockets.
One Variable Grid Leak.
One Grid Condenser, Cap. .00025 Mf.
One Audio Transformer, ratio about 5 to 1.
One By-pass Condenser, Cap. .001 or .002 Mf.
One Open Circuit Jack.
One Double Circuit Jack.
Three Dials for Variometer and Condensers.
Seven Binding Posts.
One Radion Panel, size 7x18x3-16.
One Base, size 5x7 in. May be of Radion or wood.
Two Rheostats. 30 Ohms.
Two Mounting Brackets for mounting panel and base.

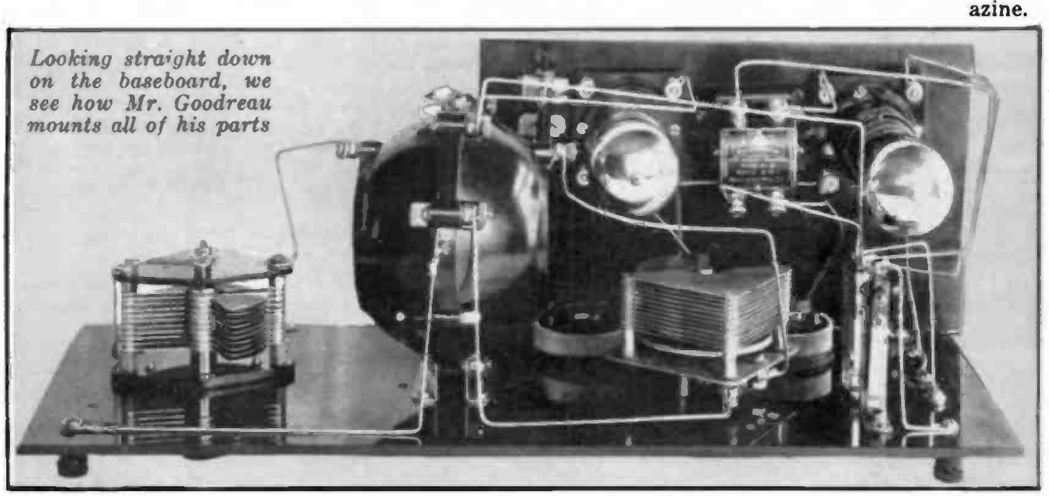
Before we start to build this set, a few words about the parts used would not be amiss. The variable condensers may be of any good make. If you are not sure what a good condenser is like, I suggest that you look in the advertising columns of this magazine. You will find several there from which you may choose, and any one of them will prove satisfactory, as this magazine does not accept advertising of any apparatus that will not pass standard tests.

The grid leak should be variable.

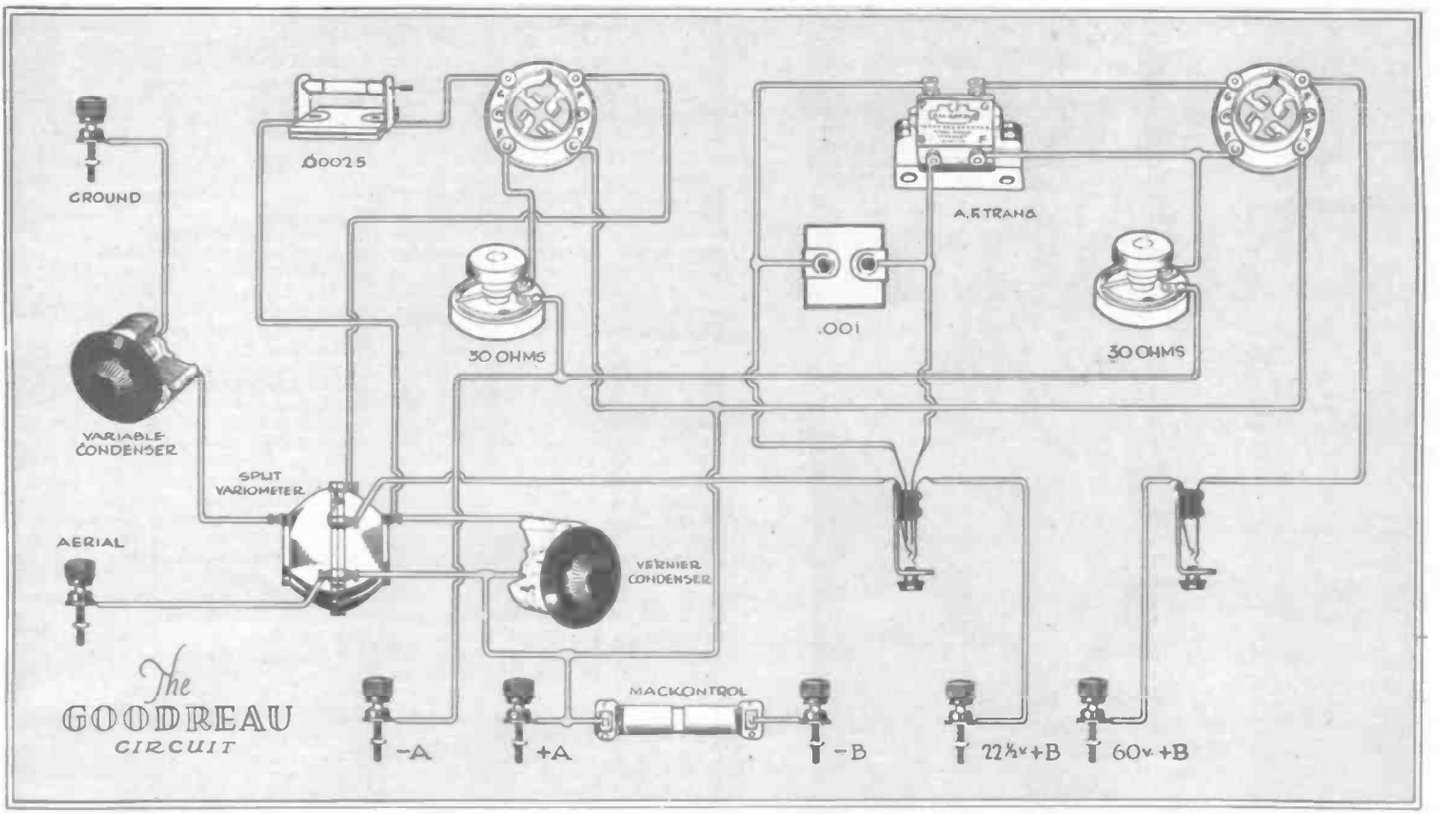
Only one of these condensers needs to be vernier, but both may be vernier if you wish to use them.

The mounting brackets are simply small brass angles and are used to fasten the panel to the base.

I have used a Radion panel here. Any other good panel may be used, however. The size used by me was as stated in list of parts. However, a longer panel could be used here, say one about 7 inches by 22 inches. This would allow you more space for the instruments and also give you a chance to put all your



*Looking straight down on the baseboard, we see how Mr. Goodreau mounts all of his parts*




controls in line. Now that we have all our parts, we are ready to build the set. This is not a hard job; it is really simple. Build it slowly and carefully, mount each part right, and when it is completed you will have a set that will please you, both in looks and in operation.

Many start out slowly, but when the set is almost done, they rush to complete it, hoping to have it ready for the next concert. They are careless in wiring, and when the set is complete it refuses to work. The work has to be done all over again, and nothing has been gained by rushing. "Haste makes waste"; this is true in radio as in everything else. Take your time, make sure everything is right. Let us begin our set. Are you ready? Let's go.

First, let us drill our panel and mount the parts. You will see where they are mounted by looking at the pictures of the set. Study these pictures a little while before you mount the parts.

First, we will drill the holes for the binding posts. There are seven of these, two on the left-hand side of the panel and five on the right-hand side The one in the upper left-hand corner is the antenna post. This is set in one inch from the edge of the panel and one inch from the top of the panel. Drill this first, then drill the one in the lower left-hand corner. This is the ground post and is set in one inch from the edge and one inch from the bottom of the panel.

Next drill the holes for the battery binding posts on the right-hand side of the panel. The top one is set in one inch from the edge and one inch from the top of the panel. Next drill the one in the lower right-hand corner. This is set in one inch from the edge and one inch from the bottom of the panel. The other three posts are set in one inch and spaced as equally as possible.

Next drill the holes for the variable condenser, the one without the vernier. This is to be mounted on the left-hand side of the panel. You will no doubt find in the box your condenser came in a paper template for drilling these holes. After you have drilled these holes, try the condenser on the panel to make sure they are right. Also make sure that the center hole is large enough for the condenser shaft to turn freely.

The variometer is next. If you use a Kellogg you will find a template with it and no trouble will be found in mounting it.

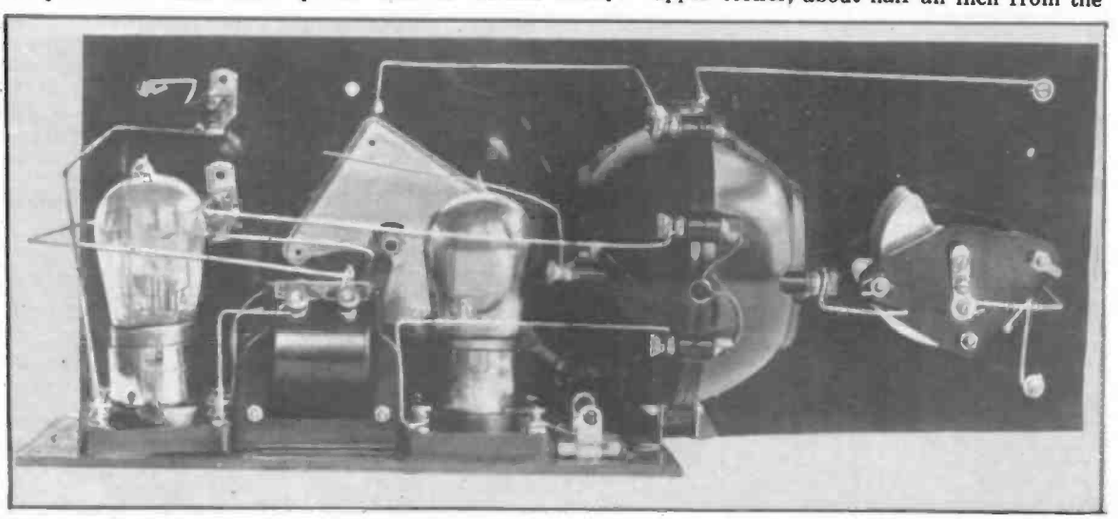
Next mount the vernier variable condenser. This is mounted on the right-hand side of the panel. Mount this very carefully and make sure that both vernier and main plates can be turned freely. The jacks come next. The first one to be mounted will be the open circuit one. This will be mounted on the right-hand side of the panel, on a line with the top binding post and about an inch or more away from it.

The closed or double circuit jack should be mounted on a line with the second binding post from the top and directly under the other jack.

The rheostats are next to be mounted. If you will look at the pictures you will see where they are mounted. Be sure and space them so that they will not touch the variable condenser, and also make sure that they will not prevent you from mounting the panel to the base.

This completes the panel mounting; we are now ready to mount the other parts on the base.

On this base we are going to mount the grid condenser and leak, the audio transformer and the tube sockets. First, we will mount the grid condenser and leak. This will be on the left-hand side, in the upper corner, about half an inch from the



*A view directly from the rear shows the mounting of the apparatus on the panel*

edge and the same distance from the back of the base. Fasten this condenser to the base with two small machine screws. To do this you will have to drill two holes in the base. The grid leak fits in the clips on each side of the condenser.

The detector tube socket is next. Mount this half an inch from the back edge of base and as near the grid condenser as possible.

Next mount the audio transformer close to the detector tube socket and placed so that the post marked P on this transformer will be near the post marked P on the detector tube socket. If you do this you will find the posts marked G and F on the transformer will be close to the posts marked G and F on the second tube socket. This means that the leads from the transformer secondary will be very short, and the shorter you can get them the better the set will operate.

Now mount the second tube socket, making sure that the posts marked G and F are near the transformer posts having the same markings.

The next and final mounting job is the small brackets which are used to fasten the panel to the base. Two of these are enough for this small base, one on each side of the panel in front. Make sure, by placing the panel and base together, that these brackets will not interfere with the rheostats on one side nor the binding posts on the other.

Fasten the brackets to the base with small machine screws and nuts. Then drill two holes in the panel for the other two mounting screws. All the drilling is done now; mount all the parts in the proper position on the panel, and we are ready to wire the set.

This wiring is where most novices fall down. It is so easy just to rush through the wiring, so as to get the set working as soon as possible. But if good results are expected we must take pains with the wiring. A good wiring job takes time, but the result, both in the neat appearance of the set and in its operation, proves it to be worth while. What kind of wire to use? Well, that is largely a matter of individual choice. There are many different kinds of wire that can be used here. Soft copper wire, in sizes from No. 18 to No. 14, may be used if desired. However, it would be wise to cover this wire with rubber tubing, otherwise a short circuit may result, because this soft wire will bend and may touch other wires. This should be used only when a quick job must be done.

Bus bar wire is used a great deal in wiring sets. It makes a neat appearance and may be covered with tubing or not, just as you prefer. When used bare it will remain upright without sagging, as it is hard wire. If you use bare wire it tends to make you more careful about spacing. Let us wire as many of the parts on the base as we can, as this will save hard work, which sometimes results when we try to wire parts on the base when it is fastened to the panel.

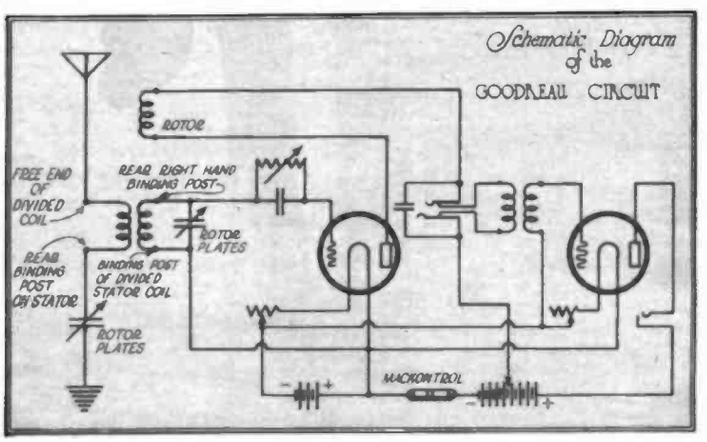
From one side of the grid condenser connect a wire to the post marked G on the first tube socket.

Now from the post marked G on the audio transformer we will connect a wire to the post marked G on the second tube socket.

From the post marked F on the audio transformer we will connect a wire to the post marked F on the second tube socket.

From the other post marked F on this second tube socket connect a wire to one post marked F on the first tube socket. Now for wiring the panel.

In wiring the instruments on a panel, it is wise to start with the hardest job, which in this case seems to be the rheostats. Now if we look at our wiring diagram we will see that these rheostats are connected in the negative filament leads. We will connect a wire from the negative A battery binding post, which on this set is the bottom one on right-hand side of panel, to the center post of one rheostat. From this center post on the rheostat a wire goes to the center post of the other rheostat. It ends right there.




The next thing is to prepare the split variometer for this circuit. I am showing a Kellogg. Look it over, you will find that one binding post on this has two cotton-covered wires connected to it. Disconnect them. Look at the wiring diagram and you will see that we have three separate coils—primary, secondary and tickler. The rotor of the variometer serves as the tickler coil, so we do not have to touch that.

Now on the stator of this variometer we have two separate windings, but they have been connected to the binding post mentioned, and so they are in "series," making one coil instead of two. We will have to separate them.

Now that we have them separated, we must make sure that we will know which is the primary and which is the secondary. To do this, get your phones and a dry cell. Connect the negative terminal of the battery to the binding post on left-hand side of variometer in the rear. Now connect the positive terminal of this battery to one of your phone tips and touch the other phone tip to the wires you have disconnected from the binding post. One of these will cause a sharp click in the phones when touched. Connect the one from which no click was heard back on the binding post and leave the other free.

Let us continue our wiring. Con-

nect a wire from the binding post in the upper left-hand corner to the end of the coil we have left free. It would be advisable to solder this connection, making sure of a good contact.

Now from the other end of this coil, which is the rear binding post on left-hand side, we will connect a wire to the stationary plates of the variable condenser on left-hand side of panel. Now from the rotor plates of this condenser we will connect a wire to the ground binding post, which is the one in the lower left-hand corner. This completes the wiring of the primary circuit.

The secondary circuit is next. From the binding post on the variometer, from which we have taken one wire, we will connect a wire to the rotor plates of the vernier variable condenser, and from there this same wire will go to the positive filament terminal. From the binding post on the variometer, the one in the rear on the right-hand side, we will connect a wire to the stationary plates of the vernier variable condenser and from there it should be connected to one side of the grid condenser and leak. To do this we must mount the base and panel together with the brackets.

The next circuit to be wired is the plate or tickler circuit. We will wire the plate circuit of the detector tube first. Connect a wire from the 22½-volt B battery post, which is next to the top on the right-hand side of the panel, to the lower connector of the telephone jack. From the upper connector of this same jack, a wire will run to one binding post on the rotor of the variometer. From the other rotor binding post of the variometer a wire will run to the post marked P on the detector tube socket.

Now from the post marked B on the audio transformer, a wire will run to the lower of the two remaining connectors of the jack in the plate circuit of the first tube. From the other connector of this jack a wire will run to the post on audio transformer marked P. This completes the wiring of the plate circuit of the first tube. The by-pass condenser should now be connected across the primary of the transformer.

Next we will wire the rest of the filament circuit. From the left-hand post of the rheostat on the right (looking from rear of set) we will connect a wire to post marked F minus on the first tube socket.

From the post on the other rheostat, the one on the left-hand side, we will connect a wire to post marked F minus on second tube socket.

Now from the positive A battery post, which is the one next to the bottom on the right-hand side of panel, we will connect a wire to the post marked F on the second tube socket. From the positive A battery post we will connect a wire to the B minus binding post, which is the post above the A post.

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*Note—In this place I recommend the insertion of the new device known as the "Mackontrol" as an insurance against burning out the tubes in case of accidental shorting of the B battery through them. The wiring then becomes—from the positive A battery post to one side of the Mackontrol and from the other side of the Mackontrol to the B minus post.—H. M. N.*

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Now we will wire the plate circuit of the second tube. From the upper binding post on the right-hand side of panel we will connect a wire to the upper connector of the open circuit jack. From the lower connector of this jack we will connect a wire to the post on the second tube socket marked P. Now our wiring is done. It wasn't such a hard job, was it?

What next? Well, let's decide what kind of tube we wish to use in this set. Our rheostats have resistance enough so that we may use any type of tube without changing.

I have used UV201A in this set. The large tubes give best results. For the most sensitive detector use UV200. This tube requires fine adjustment of filament and plate voltage. I have used UV201A because it is not critical. It is also very sensitive, though not as good as detector as UV200.

For operation on dry cell tubes use WD12. I have found this tube to be very good as a detector and amplifier. However, do not expect the same results with these tubes as you would get with the large tubes.

The 199 or 299 tubes may also be used successfully.

After the type of tubes to be used has been selected, connect the batteries, antenna and ground to the set. For types UV200 and UV201A tubes you will need a six-volt storage battery. For WD11 or WD12 you will need one dry cell for each tube. These dry cells should be connected so that they will last longer and yet give the same voltage as one cell. To do this connect the center post of one cell to the center post of the other cell, and connect one outside post to the other outside post. If you connect these otherwise you will destroy the tubes.

To operate this receiver after everything is connected up, insert telephone plug in detector jack, that is the jack in the plate circuit of the first tube. Turn on rheostat almost all the way. Set both condenser dials at zero, then turn variometer dial until a sharp "click" is heard in phones.

Leave variometer dial alone when you hear this click and rotate the primary condenser dial—that is the one without vernier—until whistle is heard; when whistle is heard set dial where whistle is loudest, then turn vernier condenser dial until you hear a louder whistle. Then turn variometer dial slowly until whistle clears up and music comes in. Decrease or increase filament current, which will make music much louder and clearer.

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*NOTE—But for heaven's saks don't keep this whistling going on any longer than necessary. That's probably re-radiating and spoiling the concerts for your neighbors.*

*H. M. N.*

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Now insert telephone plug in the other jack and turn on rheostat of second tube, when the music should be heard much louder.

This receiver is very simple to tune and you will soon learn how to get the most out of it.

It is impossible to tell how far this receiver will reach in every location, but you will find it a good distance-getter, comparing favorably with other standard two-tube sets.

If you are using a short antenna and find that you cannot reach certain wave lengths with this set, it would be advisable to change the connections in the primary circuit, that is, instead of connecting the condenser and coil in "series" as I have done, connect them in parallel, that is, connect the rotor plates of the variable condenser to the ground and also to one end of the primary winding, connect the stator plates to the other end of the coil and to the antenna.

I would like to hear from all who try this receiver and shall be glad to help you as far as I can with any trouble you may have with this set. Address all letters in care of the editor of *Radio in the Home*.