

October, 1925

RADIO IN THE HOME



by HENRY M. NEELY



Roxy~He'll Be On *the* Air Again

Music Master
 Resonant Wood
 Insures Natural
 Tone Quality



Model V1, 14" Wood Bell \$30
 Model V1, 21" Wood Bell \$35



Radio, too, is no Longer an Experiment

TYPE 60

Five Tubes. Two stages of radio frequency, detector and two stages audio frequency. Selective, good volume and distance. Brown mahogany art finish cabinet.

Price \$60

Ten Models—\$50 to \$460
 Guaranteed
 Unconditionally

TYPE 215

Six Tubes. Special Music Master Circuit. Built-in Music Master Reproducer. Very selective, long range, splendid tone quality. Table equipped with battery compartment finished in same style as cabinet.

Table only . . . \$40

Set without . . . \$175

Table

Set and Table complete . . . \$215



DO YOU remember how pioneer owners of automobiles had to buy larger magnetos, different carburetors, more accurate timers and what not else, to get some degree of motoring satisfaction? Today—how smoothly motor cars purr their way over the roads!

Pioneer owners of radio receiving sets experimented with different tubes, more powerful batteries, condensers and all sorts of "loud speakers," trying to balance the power of the set with the quality of the amplifier.

Now Music Master Receivers provide efficiency of radio reception equal to the quality of Music Master reproduction.

We make no claim to having developed new and sensational radio "hook-ups." Standardization is the accepted principle and Music Master Receivers embody the demonstrated principles of radio research and electrical science.

An authorized Music Master dealer will demonstrate—in your home if you wish—Music Master's power of distance, clarity and volume, ease of operation—and above all, its faithful reproduction and superb musical tone quality. See Music Master—hear—compare—before you buy any radio set.

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TYPE 100

Five Tubes. New Music Master circuit, involving special adaptation to radio frequency. Very selective, good volume and distance. Solid mahogany cabinet in brown mahogany art satin finish.

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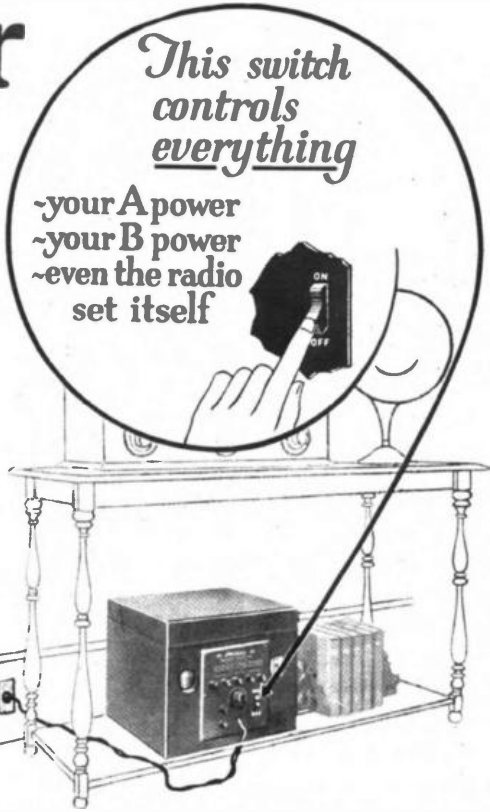
Music Master

RADIO PRODUCTS

Both A and B

radio power

from your house current



Philco "A" and "B" Socket Powers are plugged right into a lamp or wall socket. They transform your alternating current into smooth, hum-free, *direct* current necessary for your radio.

One switch controls everything—"A" power, "B" power, even the radio set itself. Snap it "ON" and you get a strong, uniform flow of both "A" and "B" power. Snap it "OFF" and your power is shut off—your radio is silent—and current begins gently feeding back into Socket Power "A" from your light wires.

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Equally important—there are no tubes to burn out—no high voltage transformers—no moving parts—no hum—no distortion—no falling off in reception. As dependable as your electric current and turned on exactly like an electric light.

Once you connect Philco Socket Power to your radio you never need change a single wire. You forget all about getting wires mixed and burning out tubes. You forget that radio is mysterious and technical. You just enjoy it.

Sold and demonstrated by Philco Diamond Grid Battery Dealers and leading radio and music stores everywhere.

Philadelphia Storage Battery Company
 Philadelphia

For dry cell (3 volt) tubes

Buy Philco Socket Power Type "AB" as pictured above. Both "A" and "B" power built into one handsome brown mahogany-finished case—controlled by one switch. No hum—no distortion. Costs only one cent per day to operate. Supplies as high as 130 volts of "B" current. Ideal for both older and newer models of *Italdia Super-Heterodyne*.

Simplicity itself to use. Connect to your radio once for all. Plug into a light, wall or base socket. The one Socket Power switch then controls everything—"B" power as well as "A." You even leave the radio switch "ON" at all times. No dry cells to replace—no thought about recharging. Easy as turning on an electric light.

For 50-60 cycle 105-125 volt alternating current	\$45.00
For 25-50 cycle 105-125 volt alternating current	\$48.50

For storage battery (6 volt) tubes

Buy Philco Socket Powers Type "A" and "B" in individual cases. Either "A" or "B" may be used alone, but for the greatest possible convenience use both together. Plug Socket Power "B" into the built-in receptacle on Socket Power "A." Plug "A" into a light, wall or base socket. Turn the "B" switch and the radio switch "ON" and leave them on permanently. The switch on the "A" then controls everything. To use the radio, snap this "A" switch "ON." When through using the radio snap it "OFF." A touch of your finger does everything. Nothing to think about but the one "A" switch.

Socket Power "A" for 50-60 cycle 105-125 volt alternating current	\$45.50
Socket Power "B" for 50-60 cycle 105-125 volt alternating current	\$47.50
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RADIO A AND B SOCKET POWERS

Philco also builds rechargeable batteries, unique because they may be permanently connected to your radio and safely charged in your living room without changing any wires. Easier (and far cheaper) than the periodical recharging and rewiring of dry cells.

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In rubber cases, subdued mahogany color. \$14.85 and up.

Philco Radio Batteries are built *Dynamic*—DRY but CHARGED. Their life doesn't start until the dealer pours in the electrolyte. You can't get a stale *Dynamic* Philco.

EDITORIALLY SPEAKING

[[Shall Tin-Pan Alley Ruin Radio?]]

IN SPITE of all of the publicity which the question has had, it seems impossible to stir up any public feeling about the so-called copyright problem. This problem has now become so acute that the heading of this editorial is not in the least exaggerated.

Tin-Pan Alley is actually and actively threatening to ruin radio.

When I speak of Tin-Pan Alley, I refer to the whole outfit of song publishers and song pluggers represented by the Society of Composers, Authors and Publishers. These people, masquerading under the rags and tatters of a theoretically starving and downtrodden genius, are putting thousands and thousands of dollars into their already well-lined pockets, and are pushing their demands for more to such a limit that it is now actually a serious question with many broadcasters just how much longer they will be able to furnish entertainment for you and me.

There is not a broadcaster in the business today who does not most cheerfully admit that the man who writes a song and the man who publishes it and all of the men who have to do with making it popular are fully entitled to a just reward for their talents and their efforts. Every broadcaster is willing to pay his share to see that this reward is adequate. But it should be remembered that the word *adequate* should also be held to include the word *reasonable*.

A number of publishers of popular music are members of this society. A number of other publishers are not members of it and have no sympathy with its methods. Even a fair proportion of those who are members do not approve of the society's attitude toward radio, but, as their business interests are tied up with other activities of the society, they are forced to agree against their will to this radio warfare in order not to lose the benefits which come through their membership in the society by means of its other activities.

BRIEFLY stated, the men who are in charge of the activities of the society have stated openly that they propose to collect *one million dollars* from radio broadcasting stations during this coming

By *Henry M. Neely*

season. If they do, you and I might just as well make up our minds that it is going to interfere seriously with the kind of radio programs we want, because this million dollars will be collected not from all of the broadcasting stations which are operating, but from the few larger and better ones, because they are the only ones who are sufficiently well financed to be easy prey for the snipers of the society.

The society demands from every broadcaster a fee for a license which will entitle him *theoretically* to broadcast the music whose copyright is owned by the members of the society. With this attitude there is not a broadcaster in the United States who has any quarrel. Every broadcaster is perfectly willing to pay a fee for a license. In fact, most of the broadcasters have already paid such a fee.

This accomplished, the society is going a step farther. It is including in all contracts a clause stipulating that, from time to time, it can notify the broadcaster of certain selections which are to be withdrawn from the contract. From time to time it has so notified some of the broadcasters, and these notifications are becoming more and more frequent. One of the publishers has gone so far as to notify all broadcasters that nothing published by his house shall be broadcast under any conditions. Here is a man who has thrown off all hypocrisy and who is coming out definitely as proposing to kill radio outright. If the other members of the society take his attitude—and there is evidence that many of them are considering it—it means that you and I might just as well throw our receiving sets in the ash heap.

Are we going to allow Tin-Pan Alley to force us to do this?

* * *

IN ORDER to make this whole situation clear, let us assume that you and I are running a first-class broadcasting station, and that we are trying to give the public the very best entertainment that is possible.

A representative of the society comes to us and says:

"Here; you have been broadcasting cer-

tain selections which are copyrighted by members of our society. Whether you are making any actual cash out of your broadcasting or not, you are doing it for profit of some kind or other, and therefore you are violating the copyright law. If you want to broadcast our music, you must pay us a fee so that the man who wrote the music will get his just reward for his labor."

"Very well," we say, "that is only fair. How much do you want for a license to broadcast your music?"

Right here the gentleman from the society begins to show the idea which is underlying the whole problem.

"Well," he says, "you people are a pretty big concern and you have plenty of money. We are going to charge you more than we would charge a smaller station that hasn't that much money."

"But," we exclaimed, "that is not fair. You are giving the small broadcasting stations exactly the same service that you are offering to give us, so why should we not both pay the same amount?"

Then the gentleman from the society will smile shrewdly and tell us very frankly that:

"That is not the idea. We are going to collect a million dollars from you broadcasters this year, and we are going to collect the biggest part of it from those of you who are able to pay the most. We don't care anything about the fact that the services are exactly the same; we are going to put on all that the traffic will bear."

Please remember that I am not now putting into the mouth of the gentleman from the society any language which he does not actually use himself. He has said exactly this thing to a number of the large broadcasters and has furthermore sat back calmly and asked them what they propose to do about it. So you and I find ourselves in rather a bad fix.

"All right," we say, "what will it cost us?"

"We will give you a license for \$1000 a year," he says. "The other fellow across the street is getting a license for \$250 a year, but that is none of your business."

(Continued on Page 32)

RADIO IN THE HOME

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The Bridge To Amplification Without Distortion

Daven engineers were pioneers. They blazed the way for others to follow. They designed and built the first Resistance Coupled Amplifier offered the public. They found resistance coupling in an experimental stage. They perfected it.

Daven Resistance Units, Amplifier Kits and Super-Amplifiers are accepted by the foremost authorities in Radio as standard. The Daven Super-Amplifier, for use in any known set or circuit, is priced at \$15.00.



RESISTOR MANUAL
Manufacturers of high grade sets are turning to Resistance Coupled Amplification. The authority is *The Resistor Manual*. At your dealer's, 25c; or by mail, 30c.

A NEW TUBE BY DAVEN

To meet the exacting requirements of Resistance Coupled Amplification the Daven Radio Corporation has created a new product—the DAVEN HIGH MU VACUUM TUBE, Type MU20. It is designed for one specific purpose only—to increase the amplification of the Daven Resistance Coupled Amplifier so as to exceed that of ordinary audio frequency coupling. *The Daven High Mu* is a 6 volt, 1/4 ampere tube with an amplification constant of 20. The price is \$4.00. *Daven Power Tube Type MU6* is recommended for last or output stage. Price \$5.00.

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Resistor Specialists

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158-160 Summit Street
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Please send me the following on Resistance Coupled Amplification:—

Check one

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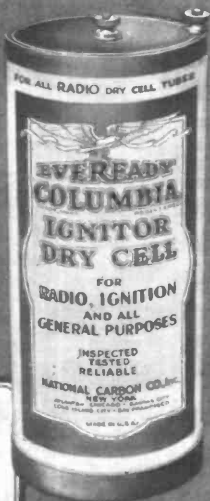
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EVEREADY Radio Batteries

- they last longer



No. 770
 4.5 volt
 Large
 Rechargeable
 Price \$4.75

What Do We Want *from* Radio?

By **R. S. McBride**

Washington Correspondent of Radio in the Home

WHAT DO YOU DEMAND WHEN YOU BUY A SET?

IN THE article on this page, Mr. McBride discusses the demands which he makes upon the broadcasting stations for his programs. It is equally interesting to know what the demands of the public are for a radio set before they buy.

The Stewart-Warner Company recently circulated 763 dealers to find out what particular attributes, other than price, they found necessary in order to meet the demands of prospective purchasers. The votes follow:

	Number of Dealers
Good Tone Quality	177
Selectivity	144
Ease of Tuning	113
Great Volume	92
Sensitivity	61
Dealer's Franchise Sales Plan	37
Beautiful Appearance	35
Entirely Self-contained	23
Use Dry Cells. No Wet Battery	23
High Quality of Materials Used	17
Fully Equipped	15
For Indoor Aerial Use	10
Non-radiating	10
Easy Logging	6
Total	763



WE, the broadcast listeners of the United States, have certain legitimate wants with respect to radio. Whether or not these wants are satisfied depends upon many factors. But first of all it depends upon an understanding and appreciation of what the wants are. Without that understanding no one can well arrange to satisfy our needs.

In the past issues of *Radio in the Home* I have discussed some of the national problems affecting radio particularly from the standpoint of the broadcast listener. In this article it seems well worth while to summarize the situation, particularly to bring out as accurately as one individual can what the broadcast listeners of the country really need, or want. Many will not agree with all parts of my list. Many will want additions made. But for a starter I think we can safely set down the following ten requirements as being perhaps the most important and the most general of the desires of the many million broadcast listeners.

But before I recite our wants it should be made clear that I do not consider the broadcast listener in the same class with the "ham amateur" or "fan." We are not the folks who sit up six nights a week until 3 A. M. We are not the folks who build a new set or try out some new hook-up every week.

We are the folks who have bought a good radio set, who want to use it for the pleasure of ourselves and friends,

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No. 5

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Radio in the home as we would all like to have it. The photograph shows the music room and library in the New York home of Mrs. Oliver Harriman and is reproduced here by Mrs. Harriman's permission. The set is a Sleeper Monotrol



The Splitdorf Mikado is a wonderful example of Japanese artistry. Each receiver is finished in black lacquer enamel and individually decorated by hand in gold and silver and varied colors by artists from the Flowery Kingdom. This is the one on the left.

but who have no intention at all of trying to understand what all the queer wires and contraptions inside the box are for. We are the millions who turn the knobs and who, thanks to American inventors' ingenuity, get fine results. But of why or how we are so lucky we have little idea.

Now for our wants.

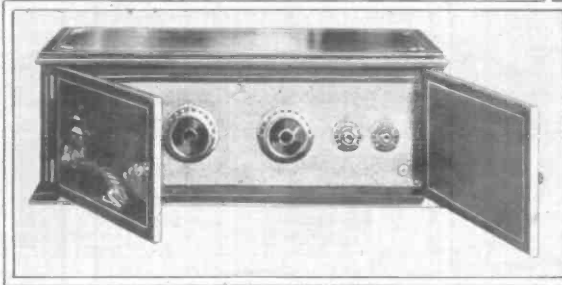
1. We Want to Hear Good Programs.

By good programs I mean high-class music, whether it be grand opera, light opera, classical parlor selections or jazz. Whatever it is, we want the best, played or sung by the best artists who can be heard. Naturally this means large expenditure by some one for our entertainment. That some one is not a philan-

The Splitdorf Rhapsody is a deluxe radio creation. A five-tube receiver is installed in a desk console of carved and exquisitely finished American walnut. It has a built-in loud-speaker and ample space for charger and all batteries.



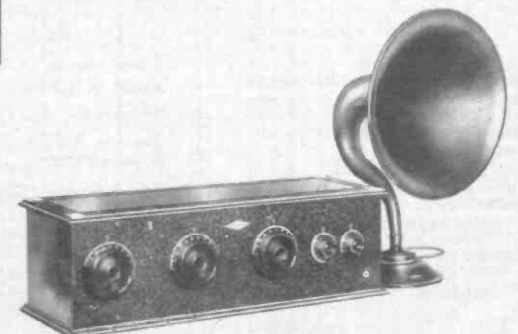
The Splitdorf Geisha, to the left, is a five-tube, inherently neutralized receiver. It is included in a beautiful two-door hand-decorated cabinet of Japanese design.



thropist. He is giving us our pleasure in the hope that we will think well of him, his service or his product, and patronize his business in due time. And that is a perfectly fair arrangement, for we always like to patronize our friends, and certainly our favorite radio broadcasters very soon come to be real friends to all of us.

In order to get these good programs we expect that some one will have to exercise ingenuity and diligence to bring together suitable artists in well-planned recitals or "continuity" programs. We have come to expect this almost as a right. In fact, it is the return which the broadcaster gives

The Splitdorf Polonaise, a more modest design, employing the Splitdorf patented circuit. Fundamentally there is only one type of receiver in the entire Splitdorf line.



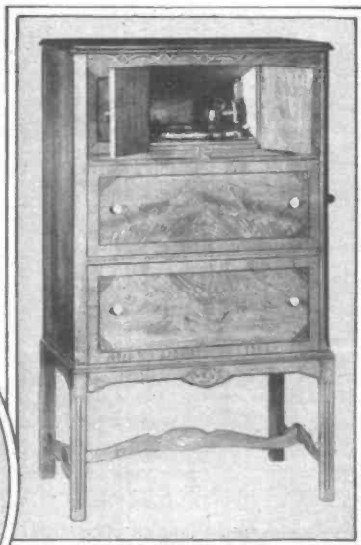
us for the privilege of exclusive use of an ether highway during certain hours and on certain wave lengths. We have come, too, to expect that there will be no need of censorship to insure good taste and the elimination of the objectionable. The almost complete freedom from objectionable material on the air is good evidence that the broadcasters fear the displeasure of the listener quite as much as they crave his appreciation and approval.

2. We Wish a Choice of Programs Available at All Times.

Perhaps this is putting our desire a bit too strong, for certainly on Sunday morning those of us who do not attend church in person are probably willing to agree that a good church service on the air is all we can reasonably demand from the broadcaster. But during the week-day evenings our moods vary. Sometime we wish to



Atwater Kent Radio and Pooley craftsmanship. To the left, a charming combination of Pooley phonograph and Atwater Kent Radio receiver, in a cabinet of Chinese Chippendale design. To the right, the phonograph is exposed when the silk-covered grille is pushed back to allow putting on the records. In the circle directly below is the Pooley Console cabinet with built-in Pooley Floating Horn and Atwater Kent Reproducing Unit. Below the circle is the Atwater Kent Model 20 Compact, in a duotone cabinet of Italian style



dance; at other times we wish to rest; at other times we crave information or instruction on the air. Hence all of us would like to have on every evening the choice of jazz, or opera, or old-home songs, or lectures. This, of course, means that there must be available to each of us within almost certain reach of our antenna adequate signals from several good broadcasting stations. If we live in New York or Chicago, where from seven to ten wave lengths are constantly in use each evening, we are assured of some choice. However, there are times when it seems to be a question of which jazz orchestra we will choose, as on a recent night when I happened to tune in about 1:00 A. M., and could get in quick succession five Chicago stations, but all five giving jazz. *That is not what we really mean by choice.* We mean an opportunity to select between material of different sorts.

And in order to have this choice we are not willing that the stations in our immediate locality be given all the wave lengths that can be used. This would monopolize the ether in such a way that it would be impossible for the listener to get out from his own city through the local barrage of radio racket. We want our local stations to be well provided for by Uncle Sam, but we qualify this desire by another one, for—



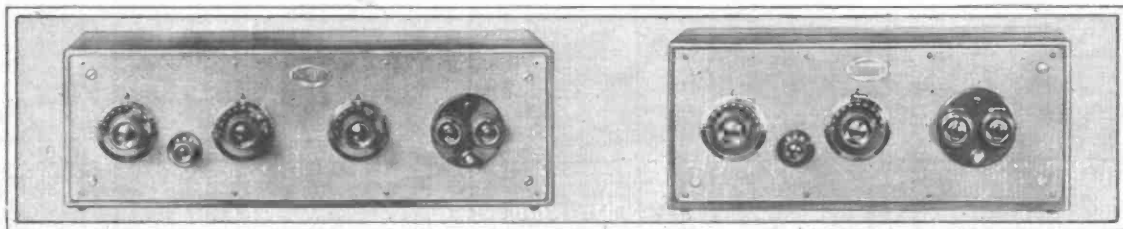
The photographs below show two members of a famous family. At the left is the Atwater Kent Model 20, and at the right is shown the Model 19. These sets are simple to operate and highly efficient

3. We Want to Get the DX Thrill.

It is indeed a hardened radio soul which cannot get some measure of excitement from tuning in on a station two or three thousand miles away. Perhaps in time this thrill will pass, much as the excitement of going at the tremendous rate of fifteen miles an hour in an automobile has passed. That stupendous rate in the early horseless carriage was a marvel to all who saw and a thrill to all who rode. If the two-thousand-mile radio thrill does pass it will be succeeded by some new variety and we shall still want to be able to have a reasonable opportunity for distance "fishing." Usually it will be the small boy of the family who thus angles in the ether, but I have no doubt that mother and father, and big sister, too, will indulge at times, and this privilege must not be denied in fixing the radio organization of the country.

4. We Want Our Programs on the Loud-Speaker.

The day of the headset is not passed, but the pleasure of sitting for an hour or more at a stretch with earphones clamped on the head certainly is not great. We expect to use this accessory when tuning in under somewhat difficult conditions. But once we have obtained the program we want to hear, we expect to plug in the loud-speaker and have it available to all





The new Kellogg 7-tube receiver, shown at the left, with single-station selector, represents one of the latest developments in radio engineering



The new Kellogg 7-tube receiver, completely concealed in a beautiful cabinet of unique design, is shown at the right

The standard model of the Kellogg 7-tube receiver is shown at the bottom of the page. No tuning is required beyond the turn of a single-station selector. The second control is to regulate the volume

the family or group of friends who may be present. Certainly, when we wish to dance the loud-speaker is essential. Even the most enthusiastic pigmy-set builder would hardly recommend having each dancer carry one strapped on his back with a pair of headphones clamped over his (or her) ears. And no continuity program can be justly appreciated unless the signal strength, without distortion, is ample for loud-speaker use.

We have come to an appreciation that this loud-speaker demand reaches back into the broadcasting station, and through that back to the Department of Commerce in Washington. This demand creates a need for higher power at all stations so that the signal strength in the antenna is adequate without that tremendous amplification of many tubes which almost inevitably produces some distortion. Thus we strongly commend Uncle Sam's radio inspection service for its encouragement of higher-power stations.

This means that even "super-power" may be needed. We are not at all afraid of that bugaboo. We are quite content to let the decision rest with the Department of Commerce, where we know the experts will make the decision on the basis of such power permits for the stations as will give us, the broadcast listeners, the best possible service.

5. We Want No Radio Interference.

Some of us wish "the latest fashion hints," and others would like to hear the baseball scores. But neither group cares to hear both at once. The World Series description with McNamee at the microphone would not be worth much if his brilliant descriptions were intermingled with frills and tucks of even the finest fashion editor whom America affords. In other words, each broadcasting station must operate without interference with others. Planning of the ether channels and policing the air to this end is no easy task. We assume that this job belongs to Uncle Sam, and we expect him to carry out the job just as we expect the traffic force to keep things moving with dispatch, yet with safety, even at the busiest hour in the year.

Unfortunately we did not soon enough appreciate that this requirement for our pleasure and profit imposed upon us also

a responsibility. We must not expect too many radio stations. In no other line is the crude phrase more true, "Enough is a plenty." We now have about 100 Class B stations. If would-be broadcasters had their way there would be 200 or more. And 200 would be worth about one-tenth as much to all of us as the present number, and fifty would be worth at least ten times as much as our present 100.

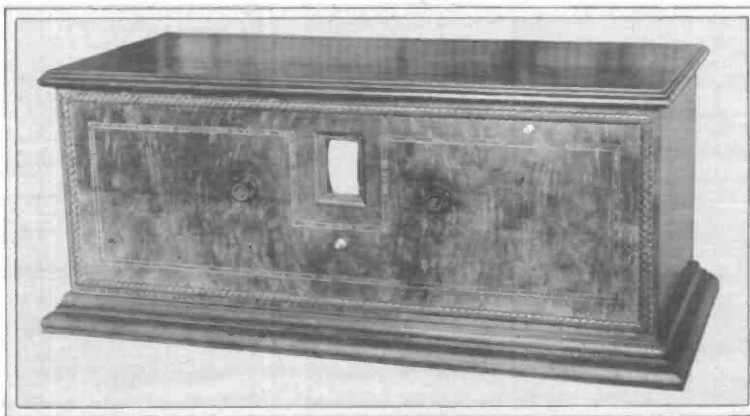
It is not easy to say how Uncle Sam is going to work out the problem of eliminating the less desirable and encouraging the best. All we can say is that we want the best to stay. We want the others to move on out of the Class B group. We do not care much where they do go, but if they interfere with maintenance of the best, they must go somewhere.

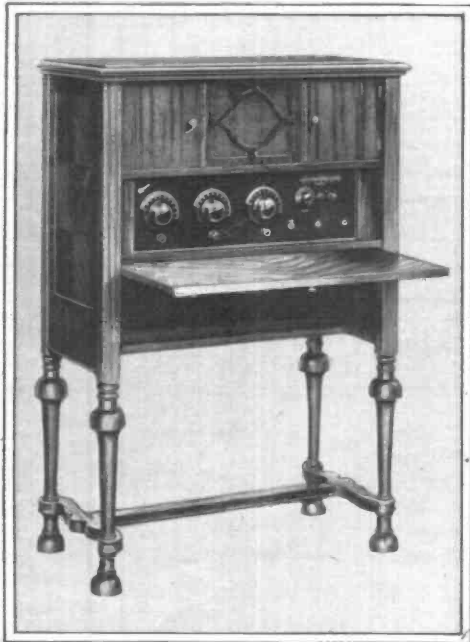
And among the other radio disturbances which we would like to eliminate are those beat notes which sometimes enter to the ruination of a splendid program.

This problem was discussed at length in a recent article. It is enough here to repeat that every moral force which we can exert is back of the inspectors who have the problem of cutting out these heterodyning whistles.

And we cannot talk of radio interference without mentioning another of our wants—

6. We Want to Get Rid of Static.





The Phanstiehl receiver pictured to the left is mounted in a richly finished cabinet, with built-in loud-speaker. Space is provided for all batteries



The Barrett-Lloyd Co. "Hi-Power" receiver pictured to the right is installed in an attractively designed cabinet. The loud-speaker is built in a separate compartment at the bottom, which is concealed when the door is closed

This interloper of the air, who is particularly vicious in his maraudings during the summer, will be more or less a minor factor by the time this issue of *Radio in the Home* is before the readers. But the memory of the summer trials and losses suffered through his activities will still be fresh in mind.

In our demand that the influence of static be overcome we are placing one of the most difficult problems of all radio before our scientific men. No one knows just what static is or from whence it comes. There are many false varieties of disturbance caused by loose connections or faulty hook-up that are blamed on static, but, even cutting out all of these through better attention to our sets, there remains still a multitude of occasions on which the crackling, sputtering noises distress us, or, perhaps, get so bad as completely to spoil the program.

The only promising answer to the problem yet devised is higher power in broadcasting. If we can raise the strength of signals wanted high enough above the so-called

"static level," then the commotion which static makes may become negligible. We can ignore it. Hence it behooves us all not to be unreasonable in voicing our desires against high-power stations. The big hullabaloo created a year or so ago when super-power was first proposed had no real foundation. Many of the small broadcasters who anticipated an overshadowing by mighty giants of the air gave thousands of us the wrong impression as to what was

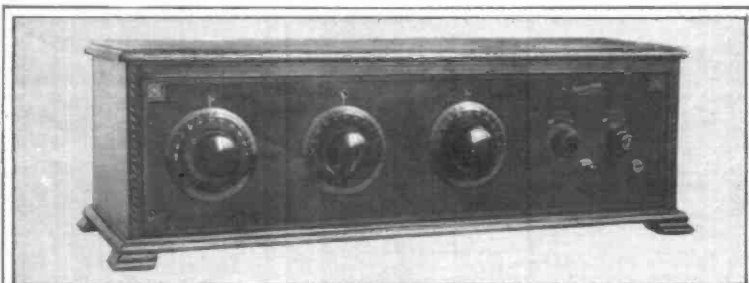
planned. The real fact is there was simply in the minds of the leaders of the industry a plan to try out stations of higher power in the hope that thereby they could give us freedom from static trouble and greater choice of programs.

So long as higher power is the only answer to the static bugaboo, we must accept this remedy, for certainly some overshadowing of the lesser stations is far better than persistent crackling interference.

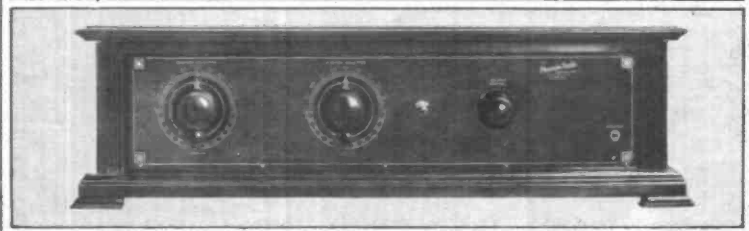
7. We Want Sets of High Selectivity.

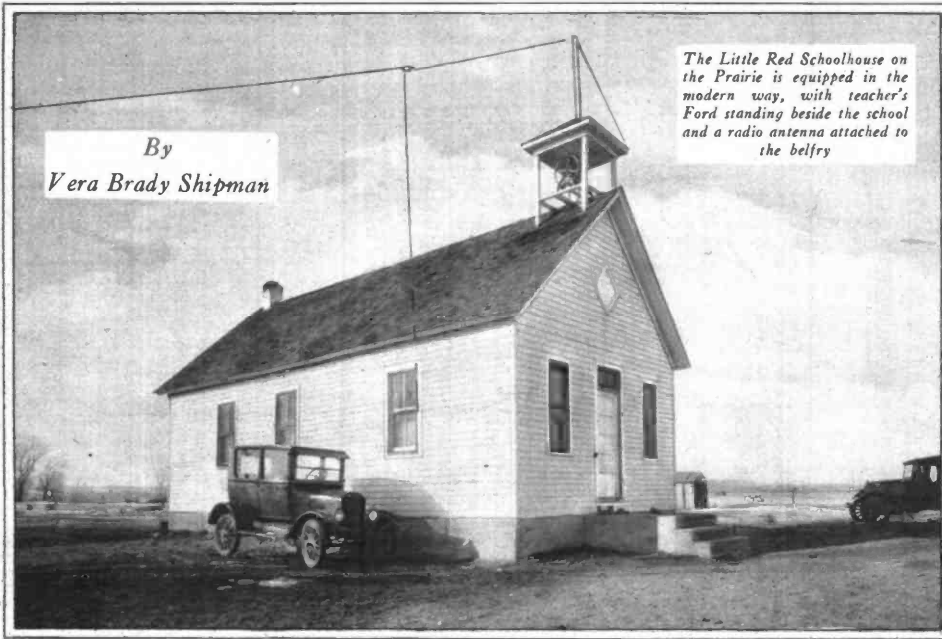
If, within range of our pocketbook, this desire for high selectivity in sets can be granted, we have still less reason to fear the bugaboo of super-power. If station PDQ, or any other one, is prone to spread over 20 or 30 dial divisions, that is not the fault of this broadcaster. It is the fault of our own set—or vary possibly, the way we operate the set. There are many reasonably priced dependable sets on the market which will cut down within a range of two or three dial divisions this blanketing effect.

(Continued on Page 22)



The new Premier receiver, pre-logged at the factory and furnished with a chart showing the dial settings of the different stations. The Premier 6-B, shown above, is a five-tube tuned radio-frequency receiver. The Premier 7-B, shown below, is a five-tube reflex receiver with crystal detector. This set operates either on a loop or antenna





By
Vera Brady Shipman

The Little Red Schoolhouse on the Prairie is equipped in the modern way, with teacher's Ford standing beside the school and a radio antenna attached to the belfry

The Little Red Schoolhouse Adds Radio



Mrs. David Elliott Martin, chairman of the Bay District Committee for the California State Department of Education, who has created a new way to teach the geography of the rivers of the earth by radio

DING, DONG! It's 9 o'clock. The lines of school children are marching into thousands of schools all over America. There is no "diller, dollar, ten o'clock scholar" in the schoolhouses which are equipped with radio sets, for the children hurry in to nine o'clock broadcast of morning exercise, or a penmanship drill or geography class, or perhaps in the afternoon they listen to another school giving a program from the nearest broadcasting station.

Out on the Kansas prairie the country school children are tuning in each morning to KSAC, at Manhattan, when Mike Ahearn, athletic director for the Kansas State Agricultural College, gives five minutes of "setting-up" exercises before a short classroom program.

"I call it muscular control and health exercise," said Ahearn, "because it's a joke for me to say to those children that I am giving them *exercise*, when they've been up for hours and have walked a mile or more to school. So I call it calisthenics or muscular drill."

"Sit erect, stand up, straighten arms at sides, dropping, to sides at second count, forward on three, down on four. All ready—one, two, three, four."

And this continues with as many exercises as can be done in the time allotted.

In Kansas, the 9000 country schools are being radioized. A state-wide campaign has been launched for equipping these schools with receiving sets so they may listen to educational and other programs from KSAC.

"When these schools are all equipped (a good per cent is already accomplished)," said Sam Pickard, director of radio exten-



"Uncle Ben" Darrow, head of the boys' and girls' club work of the Sears-Roebuck agricultural foundation, who originated the Little Red Schoolhouse of WLS

Photo by Drake Studio

Absolute freedom from all self-made noises makes Jewett performance a revelation. Due to the Jewett Clarifier (Patent applied for) there is no B-Battery current in the telephone circuit.



PROCEEDING, step by step, along the path of deliberate and consistent progress, the Jewett Radio & Phonograph Company now offers a Receiver reflecting, in its every detail, that originality and close approach to perfection which you have so thoroughly enjoyed in the Jewett Superspeaker.

Deliveries are being made to pre-arranged schedule. Distribution is through wholesalers and retailers who are under direct contract, with full territorial protection.

JEWETT RADIO & PHONOGRAPH COMPANY
 5682 Telegraph Road - - - - - Pontiac, Michigan





A typical Kansas district school taking its morning exercises by radio from KSAC

sion for KSAC, "they provide meeting places for farmers who wish to attend state-wide radio meetings of various farm organizations which emanate regularly from KSAC."

The school morning program includes morning songs, a short inspirational talk and calisthenics. Radio in the country schools is available at night for boys' and girls' clubs as well as farmers' meetings and on Sundays, is often used to listen in to a church service broadcast—for church is often held in schoolhouses on the prairies.

The superintendent of Cleveland, O., city schools, R. G. Jones, recently predicted, in an interview, that in a few years the school children of America would be receiving 10 per cent of their lessons by radio. Already many stations are making studied efforts in this direction, and several have made notable strides in schoolroom broadcasts. Three American stations are outstanding pioneers in this—KGO broadcasting to the Oakland, Calif., public schools; KSAC at Manhattan, Kan., broad-

casting morning exercises and talks to the Kansas country school children; and WGS, Chicago, whose Little Red Schoolhouse, broadcast by "Uncle Ben" Darrow, of the boys' and girls' clubwork of the Sears-Roebuck agricultural foundation, is a weekly broadcast into approximately 150 Cook County district schools.

From Oakland, Calif., the earliest direct school broadcasts have been made and their surveys contain interesting information. Twenty thousand California school teachers scattered over the valleys and mountains of the State are now aided by radio broadcasting. Their problem has been to get the children to school on time. Monday mornings, since November, 1924, a series of weekly programs furnished by the California State Board of Education, broadcast through KGO, was interesting enough to show a marked improvement in punctuality. Schools throughout that State report great enthusiasm for the new venture, according to Miss Grace C. Stanley, commissioner of elementary schools, who



Pupils in the Melrose Heights School, Oakland, Calif., receiving a physical education lesson by radio



CLARITY

THE OBEDIENT SLAVE TO YOUR DESIRES

FROM the mellow depth to the highest pitch of harmony the improved APEX Receiving Sets bring in, with startling clarity and naturalness, all of the delicate gradations of the entire range of sound—whether the highest soprano or the deepest of bassos profundo.

The charm of naturalness, combined with greater distance getting ability, positive selectivity and full volume, plus the enchanting elegance of design and finish, present radio receiving sets that are most satisfactory in every element of operation and a real delight to all whose choice of home furnishings is guided by true appreciation of artistic and refined beauty.

Only a dependable merchant is given the APEX dealer franchise. Your APEX dealer will gladly make personal demonstration of APEX Quality Radio Apparatus.

APEX ELECTRIC MFG. CO.
 1410 W. 59th St. Dept. 1012
 Chicago

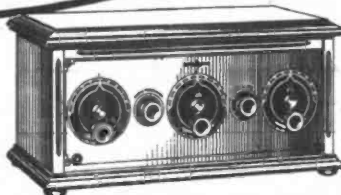
Also makers of the famous APEX Vernier Dials and APEX Rheostats, which are sold by every good dealer in Radio.



Upon request, we will gladly mail you descriptive folder.

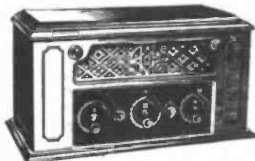


Apex Baby Grand Console
 Price \$225



Apex Super Five
 Price \$95
 without accessories

Apex Console Entertainer
 Price \$27.50



Apex De Luxe
 Price \$135



Apex Entertainer
 Price \$22.50



Apex Utility Radio Table
 Price \$75

Prices West of Rockies slightly higher. Canadian prices approximately 40% higher.



Attending the "Little Red Schoolhouse" over WLS, Chicago. Pupils of the Lincoln School, at 95th street and Kenzie avenue, Chicago, listening in

has charge of this work. The first experiments to determine the feasibility of classroom instruction by radio were conducted by Dr. Virgil Dickson, deputy superintendent of Oakland schools.

"We wondered," said Dr. Dickson, "if the teacher would be willing to stand before the microphone for the first time in his life, risking his reputation by teaching invisible classes in fifteen specified schools (no way of knowing how many more were listening in), realizing that invisible critics were actually stationed in every school and thousands of people at home and at work were listening in, or could if they wished. Eight teachers were asked to prepare lessons. All agreed."

KGO offered its services to broadcast eight lessons. The experiment was planned to find out what kind of lessons would interest classes in many parts of the city, and if a teacher or supervisor could give a demonstration lesson of value without the influence gained by actual presence in the classroom. A committee



arranged the following program, each part to be supplemented by appropriate music.

Miss Blanche Bowers talked to the high eighth and ninth grade graduates on "What the high schools have to offer."

Miss Alice Brumbaugh, with pupils taking part, discussed the development of English art and folk songs for the eighth, ninth and tenth grades.

Miss Armeda Kaiser handled a subject in geography—"Petroleum as one of the great California resources."

Miss Beatrice Burnett gave a lesson on Shakespearean literature preparatory to the Shakespearean festival for the junior and senior high schools.

Mr. Howard Welty presented for seventh and eighth grades a history lesson on Indian folklore.

Mr. E. E. Washburn taught an arithmetic lesson to the ninth grade classes.

Miss Myrtle Palmer gave a lesson in penmanship for seventh and eighth grades. Miss Palmer used rhythm of music to teach rhythm of writing, making loops and letters by count, followed by an inspiring march to add impulse in the invisible class.

The arithmetic and penmanship lessons were among the best of the series, pupils following instructions of the radio teacher and turning in their papers at the close of the recitation period, to be graded.

Miss Palmer, instructing supervisor of penmanship in the Oakland schools, stepped before the microphone, for example, at a given time, with watch in her hand, waiting the KGO signal to begin. Four pupils, with pens, paper and ink, sat at a table before her and near the microphone, From written instructions, which she had



Circle—Mike Ahearn, director of athletics of KSAC at Manhattan, Kan., who broadcasts 9 o'clock setting-up exercises to the country school children of Kansas



Above—Pupils in the Melrose Heights School, Oakland, Calif., receiving a penmanship lesson by radio as it is being broadcast from KGO

Left—Miss Myrtle Palmer, penmanship instructor, and her studio class before the microphone in the KGO studio during a recent test broadcast into the Oakland Public Schools



Crosley
2 Tube 51 S. D.
Mahogany cabinet holds all batteries.....\$52.00



Crosley Pop
A genuine impedance
receiving set.....\$17.75



Crosley Super-Trirdyn Special \$60.00
Crosley Musicone \$17.50



Crosley De Luxe
Combination
Musical De Luxe. \$87.00
Super-Trirdyn
Special..... \$2.00
Console Table..... \$5.00
Complete..... \$112.00



Crosley
3 Tube 52 S. D.
Highly selective; un-
usual range; mechani-
cal tuning cabinet.
\$29.50

Better Results From 3 Tubes Than From 5

Sounds improbable, doesn't it? But it is a scientific truth, first demonstrated in the Crosley laboratories and then confirmed by the performance of thousands of Trirdyns the country over.

These astonishing results are simple to explain. Instead of passing the incoming signal once through each of 5 tubes Crosley design passes it through two of the three tubes several times, each time building up its strength and adding to its volume.

Even the technically uninitiated can see the advantages: simplicity instead of complexity; fewer dials to adjust; sharper accuracy in selecting stations; greater clarity; greater volume.

Yet that is not all. Simplicity of design and fewer parts make manufacturing costs lower and bring about a lower cost to you. This, combined with the economies of

gigantic production, makes possible a price of \$60.00 on the Super-Trirdyn Special, the most efficient and beautiful of all Crosley receiving sets. For Crosley is the world's largest builder of radio sets—owning and operating parts factories, cabinet wood-working establishments and assembly plants.

Listen to a Crosley Super-Trirdyn under the most exacting conditions. Make an unbiased comparison with the most costly receiver you have ever heard. Forget the radical difference in price.

Then will you understand why the Crosley Super-Trirdyn represents a genuine achievement in radio performance and value which all America was quick to recognize and reward with increasing sales.

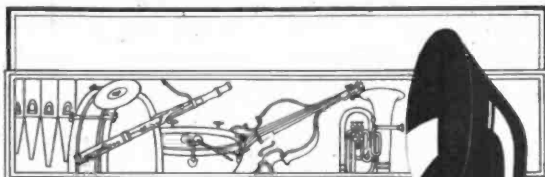
Write for an illustrated catalogue of the complete Crosley line or see them at your Crosley dealer's.

Crosley manufactures receiving sets which are licensed under Armstrong U. S. patent No. 1,113,149, and priced from \$9.75 to \$60.00 without accessories.

Add 10% to all prices west of Rocky Mountains. Crosley owns and operates WLW, first remote control super-power broadcasting station.

CROSLLEY · RADIO

BETTER · COSTS LESS
THE CROSLLEY RADIO CORPORATION, CINCINNATI, OHIO



The New Large Diaphragm



The Super Unit
With the New
Low-Pitch
Diaphragm

Brings in the Deep Bass Notes

The new Super Unit is a diaphragm of broad pitch range, especially designed by Bristol engineers. It reproduces the high and low notes with equal truthfulness, and, therefore, evens up the entire musical scale of either voice or instrumental music. Often the harmonies of a wonderful ensemble have been destroyed by the persistent loss of high or low notes, and the annoyance attributed to a faulty receiver when in fact the trouble lay wholly with the loud speaker. The Bristol Audiophone Loud Speaker with its new Super Unit of broad pitch range, and its exceptional voice of scientific development tells the whole tonal truth and nothing but the truth.

BRISTOL MADE IN U.S.A. AUDIOPHONE LOUD SPEAKER

There are four Bristol Loud Speaker models, both horn and cabinet type, priced at \$15.00 to \$30.00.

If your dealer does not carry the Bristol line, send for our illustrated folder 3025-Q. We will also send free a most instructive booklet, "How to Select Your Loud Speaker."

THE BRISTOL COMPANY
WATERBURY, CONN.



Model S
Audiophone, \$28
Rubber, horn
14 1/2 inches in
diameter. Black
mat finish with
silvered base
decoration.
Models S and
C (the Cabinet
Model) are
equipped with
the new Super
Unit.

carefully prepared in advance, Miss Palmer read to her control class before her and to some 600 other pupils scattered over the city of Oakland in ten different schools. When the papers from the control class and the various schools were sent in for grading, they all looked very much alike.

The lesson began like this—
"You will understand when I say 'move' I refer to the paper. Now let us take our position

your wrist to test your position —'push-pull'—six times, then tap with two little fingers six times."

And so on through the entire writing period, and while a phonograph played the rhythms desired loops and ovals were made in unison. One mother at home sent in her paper to be graded. Parents were grateful that there was a way to keep in step with their children in school.



Jay B. Nash, director of physical culture, and a studio class before the microphone at KGO, broadcasting a test lesson into fifteen Oakland Public Schools

drill by signals. When I say one, sit erect, feet on floor and directly under the seat, arms hanging loosely at sides; 'two' arms should be held in a limp, relaxed condition over the desk ready to drop into position; 'three' arms should be dropped.

A striking point is the lack special direction, that he forgot to be restless.

Since these experimental lessons, regular Monday classes have been broadcast, featuring California history and geography. Professors of the vari-



And down at Stickney, Ill., in the public school, the children listened outdoors to Coolidge's inauguration speech on a Operadio loaned for the occasion

ous universities and colleges of the State, eminent educators and story-tellers contribute. No lesson is longer than twenty minutes, using the story-telling method, illustrating each country with stories of historical and geographical features of the place, to entertain as well as instruct. Before and after each lesson story, music lends charm to the story-telling appeal.

Arthur S. Garbett, a composer and musical authority of San

into position and the movement on the muscles begun.
"Now you may follow as I give the signals: 'one'—'two'—'three'—start the push and pull with the empty hand.
"Slip a piece of paper under of discipline problem in a radio class. Every mischievous boy or girl who listened in to the radio was so intent on the voice from the loud-speaker, expecting it might call his name for a

ous universities and colleges of the State, eminent educators and story-tellers contribute. No lesson is longer than twenty minutes, using the story-telling method, illustrating each country with stories of historical and geographical features of the place, to entertain as well as instruct. Before and after each lesson story, music lends charm to the story-telling appeal. Arthur S. Garbett, a composer and musical authority of San

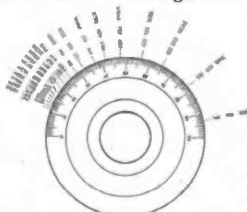
ANNOUNCING

the  *new*

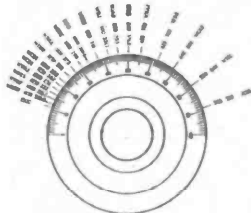
RATHBUN STRAIGHT LINE FREQUENCY CONVERTER

THE modern radio receiver has abundant tone, volume and power—now it may have *perfect, simplified control.*

The Rathbun Straight Line Frequency Converter is adapted for use on your receiver—every receiver—without change of equipment—except the condenser dials. Each station is given a distinct reading at a uniform distance from the next. Real logging becomes a fact. The stations are distributed with flawless precision over 360°—one complete revolution of the Dial. There is no limitation or crowding as on controls using only half a dial. Radio control is simplified.



Stations indicated in kilocycles and wave lengths showing crowding with an ordinary capacity condenser.



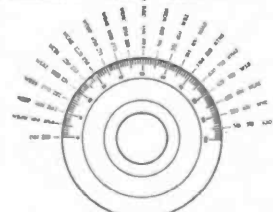
Stations partially separated and tuning slightly improved with a Straight Line Wave Length Condenser

The Rathbun Straight Line Frequency Converter provides straight line frequency tuning with ordinary capacity condensers. It is interchangeable with any dial—on any receiver. It is sold with the guarantee of reliability and satisfaction attached to all Rathbun Radio Apparatus.

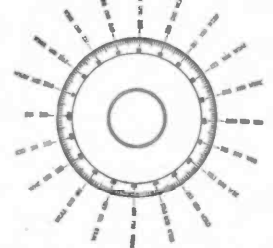
See and Try It—at Your Dealer's

If your dealer cannot supply you, send Money Order (\$3.50 each) and your order will be shipped promptly by Parcel Post prepaid.

Rathbun Manufacturing Co., Inc.
Jamestown New York



Practically even separation over half the dial with a Straight Line Frequency Condenser



Complete and equal separation of stations over the entire dial with the Rathbun Straight Line Frequency Converter

Francisco, furnishes a musical episode for the story, such as rivers of the world. Some instruments, characteristic of the country through which the river flows, are first heard in each episode. In the instance of the story lesson of the Volga River, cathedral bells were used in the opening of the musical scene. Then followed the song of the Volga boatman. After the story more Russian music ended with distant bells, completing the picture in the child listener's mind.

Under the supervision of Mrs. David Elliott Martin, chairman of Bay Section Committee on School Broadcasting for the State Department of Education, an interesting new geography lesson was introduced on the radio in these river stories. Fascinating stories of the Mississippi, Hudson, Rio Grande, Yukon, Rhine, Danube, Seine, Nile, Tigris and other rivers

were told by the character "The Old Man of the Rivers." He told his stories to a boy and girl before the KGO microphone, painting word-pictures of scenes along the river banks as the little party drifted on. The boy and girl asked him questions as the story progressed, which he in turn answered in his own interesting way.

These early tests were received at eight Oakland schools. The members of the committee were distributed among these schools to observe the lesson effect and suggest improvement. Each principal was asked to report the results of the school-room reception.

One mother wrote in, "I am not a pupil, but a mother of three pupils. I have often been interested in my children's lessons, and have tried to help them in arithmetic, writing and reading, but am told 'Mother, we

don't do it that way now.' I am tied down so that I cannot go to school and radio brings the school to me."

From the beginning, KGO experiments were conducted with not more than ten classes in as many schools listening in, so that observation might be made of how the listening was done and results tabulated. There are about five hundred pupils in an average KGO school test lesson. The problem of the country school teacher is lessened as they, too, are instructed and benefited by the broadcast.

And now in the Middle West, every Friday afternoon at 2, at WLS, Chicago, "Uncle Ben" Darrow comes on with something like this:

"Hello, boys and girls. This is the Little Red Schoolhouse radio program of WLS, the Sears-Roebuck station, broad-

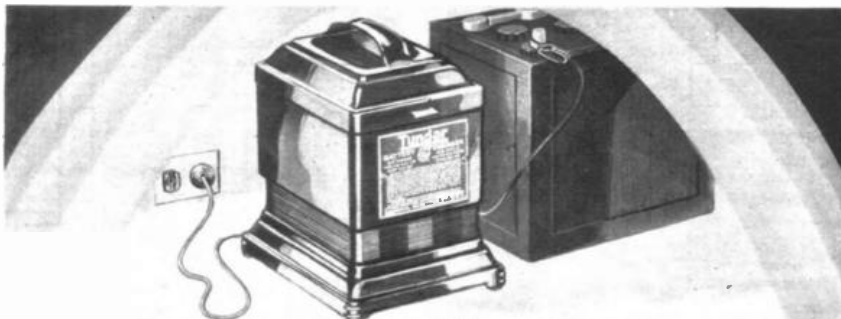
casting from its Hotel Sherman studio, Chicago."

A poster sent to all Cook County schools by Edwin J. Tobin, superintendent of Cook County, announcing each weekly WLS school broadcast, with programs and an appeal to see that pupils listen in at school or at some nearby home, urges teachers as well to have their pupils write compositions after listening in on the radio school program, mailing these to his office.

The enrollment in Cook County alone is at least 10,000, and there are many more down



Elmer J. Tobin, superintendent Cook County schools, who heads a radio committee to provide through WLS educational weekly programs for the Little Red Schoolhouse



Partners for Power

If you want distance and clear tone from your radio set, your storage battery must have its partner—the Tungar Battery Charger.

Two clips and a plug to connect to the house current. That's all there is to it. Or you can make permanent connection and just throw a switch.

The Tungar charges while you sleep—it makes no disturbing noise—keeps your batteries at top notch. For power there is nothing like a good storage battery—with a Tungar to keep it good.



The Tungar is a G-E product developed in the great Research Laboratories of General Electric.

The new Tungar charges 4, 6 volt "A" batteries; 10 to 20 volt "B" batteries, in series and sets of batteries, too. No extra attachments needed.

Two ampere size (East of the Rockies) . \$18.00
60 cycles—110 volts

Tungar

REG. U.S. PAT. OFF.

BATTERY CHARGER

Tungar—a registered trademark—is found only on the genuine. Look for it on the name plate.

Merchandise Division, General Electric Company, Bridgeport, Conn.

State and in adjacent portions of Indiana, Michigan and Wisconsin. Sessions are held every Friday. From 10:20 to 11 is for high school students, and from 2 to 2:30 is the Little Red Schoolhouse for children of the lower grades and from 2:30 to 3 is the grammar school session. There are more than 150 schools in Cook County listening in regularly. Schools in thirty-four other Illinois counties are enrolled. Wisconsin schools rank next in number, followed by Indiana and Michigan.

While the Little Red Schoolhouse caters particularly to the country school—the one-room institution, of which there are 10,600 in Illinois alone, its program is generally acceptable to the city grade school.

The grammar school program is equally acceptable to the country school. On each high school program is a popular speaker. Musical numbers are given by school musical organizations or soloists. Musical appreciation as well as art will be conducted beginning this fall, and a travogue each week—all these capably conducted by some eminent authority.

GENERAL ELECTRIC

Supremacy



The Magnatron DC-201-A, DC-199 and DC-199 (large base) now list for only \$3.50 each.

MAGNATRONS have achieved supremacy in the vacuum tube field, but the constant vigilance which has brought these tubes to the fore has not for one moment been lessened. Every part, from contacts to filament, is tested, constantly tested.

CONNWEY ELECTRIC LABORATORIES
Magnatron Building Hoboken, N. J.



MAGNATRONS

The Best Plug at a Better Price!



The Pacent Autoplug
Now 60c

THIS plug is entirely shock-proof, for the entire length of the cord tips is encased by the plug shell and no metal parts are exposed. The shell is made of genuine Bakelite. No screws are used in its assembly, and there is nothing to work loose or cause trouble.

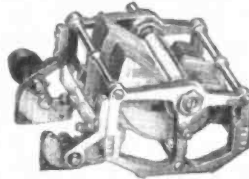
Pacent parts are used by 40 leading manufacturers in the construction of their sets. It will profit you to get in touch with us.

See your dealer, and write us for the new Pacent Catalog of complete line of Pacent Essentials.

PACENT ELECTRIC COMPANY, INC.
91 Seventh Avenue, New York City

Washington Chicago **Pacent** Buffalo Detroit
Minneapolis Birmingham RADIO ESSENTIALS Jacksonville Pittsburgh
Boston Philadelphia Canadian Licensees:
San Francisco St. Louis White Radio Ltd.,
Hamilton, Ont.

DONT IMPROVISE - PACENTIZE



All the efficiency of the well-known B-T "Lifetime" Condenser now available in tandem. (Used in the new B-T "Counterphase").

And Now the B-T Counterphase

Even better than the "Nameless," the "Counterphase Six" gives the added sharpness and efficiency you've been waiting for. Three stages of "radio-frequency," full efficiency over the entire broadcast range, only two tuning controls—a short indoor aerial sufficient for distant reception. Anything less than such improvements would not justify B-T in offering a new circuit and new apparatus to build it.

Kits containing essential parts for building the "Counterphase" five or six tube set—two or three stages of "R. F."—on sale wherever dealers handle the best.

Non-Inductive Resistances

New circuits require non-inductive high resistances. B-T Resistances give stepless resistance from zero to maximum. Resistance element is not subjected to wear, therefore not affected by continued service.



Noiseless—Smooth in operation—Constant. Made in 7 types, from 400 to 500,000 ohms maximum resistance. Send for descriptive literature. 10c will bring a copy of "Better Tuning," 8th Edition.

BREMER-TULLY MFG. CO.

532 S. Canal St.

Chicago, Ill.

Better reception this season than last!

WOULD you like better radio reception this fall and winter than last? Better distance? Better volume? Better tone? You will enjoy better results in every way, this season, if you keep your tubes at full efficiency with the Jefferson Home Tube Rejuvenator.

All tubes deteriorate rapidly with use. The Jefferson Tube Rejuvenator "brings them back" in 10 minutes! Use it once a month—keep your tubes like new. Completely restores paralyzed or exhausted tubes. Doubles and trebles tube life, quickly paying for itself through this great saving.

Takes large or small tubes—types 201-A, 301-A, UV-199, C-299, 5-VA. Attach to any alternating current electric light socket in your home. The Jefferson Home Rejuvenator for tubes is as essential for satisfactory radio reception as a charger for storage batteries. Get one now; start the season with your tubes in perfect condition. Sold by leading dealers in radio supplies, and fully guaranteed.

\$7.50
610 in Canada

JEFFERSON ELECTRIC
MANUFACTURING CO.
501 So. Green St., Chicago, Ill.

Makers of Jefferson Radios, Bell Receivers and
Type Transformers, Jefferson Spark Coils for
Automobiles, Stationary and Marine Engines;
Jefferson Oil Burner, Jefferson Coils and
Transformers.



JEFFERSON

TUBE REJUVENATOR

Keeps radio tubes like new



for
HOME
Use



JEFFERSON
Radio Transformers

Your radio, no matter how costly, can be no better than its transformers. Our experience as the world's largest manufacturers of small transformers is everywhere recognized by leading radio engineers who carefully specify "Jefferson." If you want amplification without distortion—clear, pure, sweet, natural tones from your radio—make sure it is equipped with Jefferson Transformers. Sold by the better radio dealers, used by leading set manufacturers.

What Do We Want From Radio?

(Continued From Page 11)

If we will see to it, with expert advice if necessary, that we have such sets in our homes, then much of our radio trouble is a thing of the past.

Fortunately, these sets of high selectivity are usually ones which have a good distance range. In fact, if they did not have this distance range, the high selectivity would not be of much value. With such a set, any Class B station of 1000 watts or more, that is within 300 to 500 miles, can be counted upon regularly. Perhaps, when air conditions are a bit bad the loud-speaker results will not be all that we would ask, but our choice of programs and our accessibility to all good things of the air are tremendously increased in this fashion.

There is as much difference between these fine sets and the best that could be bought only three or four years ago as exists between the splendid player-grand pianos electrically operated and the toy piano on which the 4-year-old gleefully pounds and thinks that she is playing a piece. Radio has grown up within so short a space of time that we listeners have had a tremendous job mentally in keeping pace. That fine set which we bought three or four years ago is now really out of date. This is not our fault in selection nor the fault of the industry. It is the simple and natural result of rapid improvement in the art.

The question in our minds often is, "Will another three or four years make a similar change?" Personally I doubt it. I think we can safely today invest any reasonable sum of money in a set of a large and reputable maker with the assurance that it is good for many years to come. The instruments and art have matured as rapidly as the industry. It is not to be expected that there will be anything like as many changes in the next twenty years as have been made in the past two.

This question of sets brings us logically to our next want.

8. We Want Sets Easy to Operate.

In this respect I think likely that we are a bit unreasonable. Our ideal is a set having three knobs and no other wheels, handles, switches or pulls to manipulate. The first knob would simply turn on the set; the second knob would choose the station that we want; and the third would adjust the loudness or the tones to suit the program coming in and our particular mood of the minute.

Such simple control of the set is probably a bit too much to ask today. Some sets claim it, but not many have attained this

ideal, and perhaps none with perfect success. I think it will be well for most of us to postpone pressing this demand for it is a very little thing on our part to turn an extra dial or two in order to offset those internal complications which may or may not (usually will not) succeed in eliminating this minor complication.

But, however, this feature of radio instruments may be solved there is no question as to the importance, especially with the ladies, of our ninth demand—

9. We Want a Good-Looking Set.

It is no longer at all necessary to have a bunch of loose or dangly wires and weird collection of mismatched batteries, or a crudely assembled group of accessories in order to have as complete and fine a radio set as can be made. The very best instrument now comes dressed in cabinets, which are ornamental in any room. The living room, the study, the parlor or the reception hall will be just a bit "better furnished" with such a set. This is as it should be. There is no reason why the radio set should be any less ornamental than the phonograph, the piano, or the bookcase. Each is a means to an end—recreation, entertainment, information—but each can also be artistic and in keeping with the color scheme and decoration of the room.

10. And We Want to Hear Every Event of National Importance.

No longer can the President of the United States be inaugurated with an audience of less than ten million. No longer can election returns be delayed more than three or four minutes after assembled by the news agency before we must have them in our home. No longer is grand opera confined to the stage or the studio. And this opera must be sung for each of us by the artists of international, or at least of national fame.

This means that we demand a linkage of broadcasting stations into great net-works for simultaneous transmission of events of national importance. We, American citizens, demand this right. Fortunately, it is entirely a practical thing to provide us with our wish. Two great and constantly growing groups of stations are furnishing this type of service. They are making it possible for each of us with a little imagination to participate in events almost as effectively as if present in person.

This want, more than all others, is making for the nationalization and solidification of radio. These linked systems regularly give the more important national events to every one who wishes to listen in, from Maine to Texas, from Florida to the Dakotas.

ROXY-He'll Be On the Air Again

By Henry M. Neely

SOME time ago, somebody started the rumor that Roxy would never be heard by radio again. I don't know where the rumor originated; I imagine it was simply a misinterpretation of the farewell which Roxy said to his audience the last time he broadcast with his "gang" from the Capitol Theatre in New York. That was not, however, a good-by; it was merely an au revoir.

So many readers wrote in to ask whether the rumor was true that I ran in to see Roxy at his office in New York the other day and asked him point-blank.

"Give up radio!" exclaimed Roxy. "God love you, I couldn't live without it."

He reached into a big drawer in his desk and drew out several architect's water-color drawings of details of the magnificent new theatre for which ground has already been broken at Broadway, 7th avenue and 45th street in New York City.

"Do you see this?" he asked. "This theatre is going to be an institution such as you and I will not live to see equaled. I say that, not because it is mine, but because it isn't. It is the public's. It belongs really to the radio audience. I have been three years on the air and this is my reward. Without the radio listeners, this would never have been possible.

"I'm going to keep faith with my radio listeners if it is the last thing I do. I'm going to provide radio programs such as never have been attempted by any one. I am going to take personal charge. It will be my hobby and my playground."

It was only a few days after my talk with him that Roxy sailed for a brief eight weeks' vacation in Europe. He should be home about the time that this is printed and he expects to be on the air again the middle of November.

Naturally, the huge new theatre will not be ready by this time. It is going to be so immense and so elaborate that it will take much longer than that to complete the edifice. During Roxy's absence in Europe, his partner, Mr. Atkinson, has been busy building a studio for him "somewhere on Broadway," and from this studio for the next year Roxy and his "gang" will entertain the radio public.

It will not be the same gang that Roxy had at the Capitol Theatre. These artists have been carrying on since Roxy's retirement from that house, but, though plans are not yet definite, there seems little doubt that some of them who best fell into the spirit of the Roxy program will be taken over into the new gang.

"I suppose," said Roxy, "that we will have to continue to call it the 'gang.' Somehow that name 'Roxy's gang' has become so closely associated with me that it would be impossible for me to put any other aggregation of artists on the air without the public instinctively feeling that they were still Roxy's gang."

Roxy speaks of his gang much as a father would speak of a large family of children. Some of them have been loyal to him; other have been artists. Any one



who has dealt with artists will understand this distinction.

To the man or woman who has simply met these artists by means of radio, it will be almost impossible to convey a sense of the very vital necessity of Roxy's own personality in conjunction with the artist's talent in order to bring out the best that is in the performer. I have sat in the studio and watched some of these singers or players before the microphone. Most of them, when Roxy took them into his gang, were merely talented amateurs. Many of

them had the worst kind of stage fright when they went up to the microphone for the first few times. I have seen one, starting to sing, grow tense and strained through sheer terror. I have seen Roxy quietly walk up, take the two writhing hands in his, separate the fingers and gently stroke them until, reassured and imbued with his own confidence and certainty, the fright was gone and the singer's voice floated out through the microphone across thousands of miles of country and into the homes and hearts of the great public beyond. Yet the

ROXY AND HIS "GANG"



Roxy and his gang have made their last "appearance" together. When Roxy starts his new broadcasting in November, it will be with a new "gang" which will probably include some of the artists formerly with him at the Capitol Theatre. This photograph was made in Worcester, Mass., March 23, 1924, and is published here for the first time as a fitting souvenir of a radio feature that was the favorite of hundreds of thousands of listeners-in. It is well worth framing because the same "gang" will never be together again. In the photograph are, from left to right:

A Souvenir for the Radio Fan



First row (sitting)—T. J. Dowd ("Tommy Dowd"), Frank Moulan, William Robyn ("Wee Willie").

Second row (sitting)—Douglas Stanbury ("Doug"), Mlle. Maria Gambarelli ("Gamby"), Miss Espree, Margaret McKee ("Mickey"), Julia Glass, S. L. Rothafel ("Roxy"), Gladys Rice, Marjory Harcum, Louise Sherer, "Betsy" Ayres.

Third row (standing)—Peter Harrower ("Peter the Great"), Snedden Weir, Joe Wetzel, Alva Bombarger ("Bomby"), Yascha Bunchuk ("The Sheik"), Dr. William Axt ("Dr. Billy"), Dr. Eugen Ormandy ("The Blue Blond"), Jim Coombs ("Daddy Jim"), Roger de Bruyn, Newell Chase, Max Herzberg.

In the two back rows are members of the Capitol studio orchestra, organized by Roxy especially for broadcasting.

All the thrill of building your own —and an exact duplicate of the famous Harkness Laboratory Model

THE remarkable results obtained with the Harkness Counterflex Circuit are due to a novel principle which enables tremendous amplification to be secured and eliminates the squeals of self-oscillation.

Counterflex Receivers also employ a new type of radio frequency transformer which is so efficient that the 3-tube counterflex actually has a greater receiving range, more volume and more selectivity than most 5-tube sets. It is now possible to build an exact duplicate of the set Mr. Harkness has built for himself and use parts made under his direct supervision.

The important thing is to get Genuine Harkness parts made by the Kenneth Harkness Radio Corporation. A complete kit of these parts is now available at radio stores, and each set bears the signature of Kenneth Harkness Radio Corporation on the cover of the container.

Read some opinions of people who have built a Harkness Counterflex:

"I have been experimenting with all kinds of Radio sets up to six and seven tubes. I secured a Harkness 3-tube Counterflex, wired it up myself, and was amazed at the result."

H. J. KRICK, Altoona, Pa.

"We like our Harkness Counterflex very much. Have listened to programs all over the United States."

DAYNE COCKREFT, Roseland, Neb.

"Have owned and operated seven sets and the Harkness Counterflex has them all tied to a knot. So far I have logged seventy-four stations including one in California."

L. W. LILLARD, Seaside, Pa.

"Have logged a total of forty-two stations including two in Mexico City, four in Canada, three in New York and three in California. To say I am pleased with the Counterflex is expressing it very mildly."

EUGENE F. BROWN, Des Moines, Iowa.

"I am exceptionally well pleased with the three-tube Counterflex. It has done all that I anticipated it would. Great to coast reception on loud speaker with an exceptionally clear tone."

E. D. LYNDEN, Flores, Neb.

After experimenting with the Counterflex for more than a year, Mr. Harkness has now written a booklet giving a thorough explanation of its fundamental principles and a complete description of different models of Counterflex receivers. We will send you a FREE COPY of this booklet on request. Just mail the coupon below, enclosing 10c to cover postage and cost of mailing.



With this complete kit of genuine Harkness parts you can assemble the 3-tube Counterflex in just a few moments—with only a screwdriver. A card of special step-by-step diagrams shows how to wire the set. It is not necessary to understand or follow the usual type of circuit diagram. Complete 3-tube Kit, \$36.00 In Canada \$44.00

GENUINE
HARKNESS
RADIO PRODUCTS

KENNETH HARKNESS RADIO CORP.

Dept. B2, 727-728 Irvinghuyson Ave., Newark, N. J.
Please send me free copy of your booklet explaining the new Harkness Counterflex Circuit. I enclose 10c (coin or stamps) to cover cost of mailing.

Name

Address

public did not know that it was Roxy who made this song possible. I think the whole effect of these programs was best summed up by a friend of mine—a musical critic—with whom I was once discussing them and whom I asked for a frank opinion of them.

"Well," he said, "if that fellow Roxy would only keep out of it, I should say that they are average first-class studio programs. I should further say that there is nothing about them to raise them above the level of a number of other programs broadcast from other good stations.

"But Roxy won't keep out. I'm glad he doesn't. The moment he comes on, the whole thing attains a personality which is irresistible. There is a friendliness and a homyness about it all that absolutely disarms a critical viewpoint and makes you feel that you are simply spending an evening with a crowd of very talented friends and that the whole thing has been most chummy and enjoyable. It isn't the artists who do this; it's Roxy."

I told this to Roxy when I had my last talk with him.

"I'm glad to hear that," he said. "I have really worked hard at this thing and put my whole heart and soul into it and it is mighty gratifying to know that my part of it is not overlooked by the listeners.

"That matter of personality, it seems to me, is the most important thing in the world in dealing with the public. I am going to keep it in mind in my new theatre. In fact, I think it would not be a bad scheme to speak of it as *the theatre with a personality*."

"That's it—the theatre with a personality. That is exactly what it is going to be. I have often said in discussing it, that we should not call it a theatre at all but rather an institution. I cannot tell you all of the very many activities which it is going to represent, but the theatre will be only a part of it. Look here."

He spread out before me a large water-color drawing of the rotunda—a magnificent conception which is quite in keeping with the magnitude of a theatre which is going to cost close to eight million dollars.

The rotunda will be 89 feet wide, 114 feet deep and 70 feet high. It will be the most magnificent and elaborate approach to any public building in existence today. The entire Capitol Theatre is not as high as the inside of this rotunda. As a matter of fact, the rotunda itself would be big enough to constitute a good-sized theatre.

Here, when the building is completed, will be the entrance to the studios which will be perhaps the most elaborate radio institution yet planned.

There will be, of course, a great symphony orchestra of 110 players. There also will be a new "pick-up" device which will insure better broadcasting of this organization than has ever been done with an orchestra before. It is now being perfected and will be reserved for this Roxy orchestra.

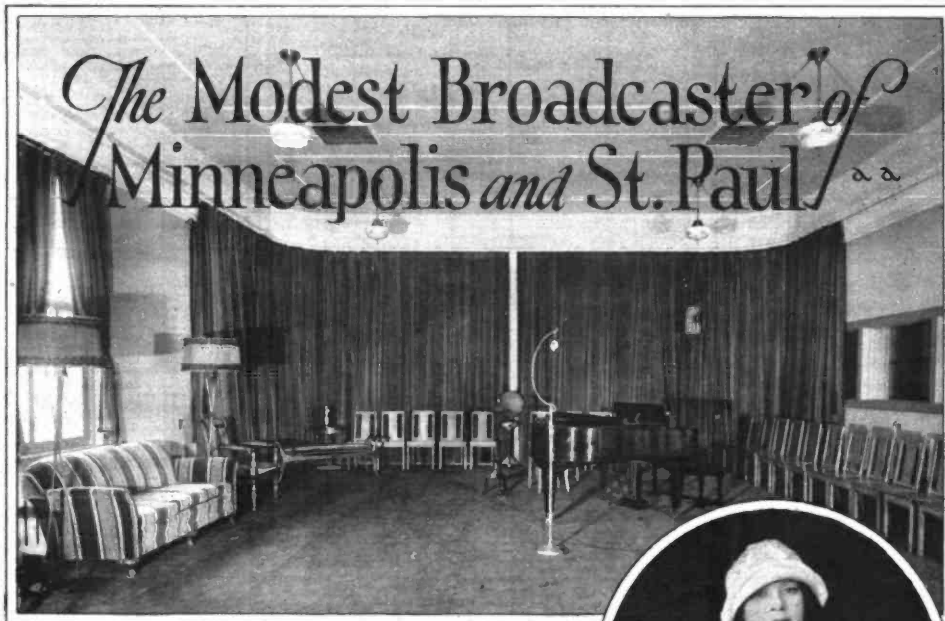
There will also be an unusually complete syncopating orchestra, a chorus of one hundred voices, a huge set of cathedral chimes, a great organ with two consoles in the theatre, a separate organ available for broadcasting at any time and a third pipe organ in the studio especially for radio broadcasting. The whole plant will be equipped to put across almost anything in the world that can be broadcast by radio. There also will be another great advantage in the prestige which this new theatre will have because that will make it a drawing card for artists who have been hitherto unavailable for radio work.

"They say the age of miracles is dead," exclaimed Roxy when he told me of all this. "God love you, it isn't at all. This is the miracle."

And then he told me of some of the personal experiences which had come to him through the immense mail he has received on account of his broadcasting. Stories sad and gay, stories illuminating and deadening, stories inspiring and heart-breaking—all have come to him through his mail, and it is remarkable to know that a man so busy as he is has devoted as much time as he has managed to devote to individual cases which seemed to be unusually deserving of his personal attention.



Here bands, orchestras and other large groups do their broadcasting. The ceiling is suspended and deadened, the floors built upon cork and covered with a heavily padded carpet. The heavy drapes shown may be moved upon a track, thus making the room acoustically adjustable



By
Earle R.
Buell

STATION WCCO is said to be the only thing upon which the two cities of Minneapolis and St. Paul have ever agreed. The bitter rivalry of these twin cities has become a tradition in American life. Not long ago I heard a man speaking from Station WCCO and was surprised to hear him say that he would not advocate a widespread reading of the Bible, but I understood better when he explained that the Bible was full of things about St. Paul but not one word about Minneapolis.

When the station first started, there was even a rivalry as to which city should be named first in the announcements. This difficulty was cleverly solved by having a card on one side of which was printed "Minneapolis-St. Paul" and on the other side "St. Paul-Minneapolis." This card is always placed on the stand under the microphone and, as the announcer finishes his announcement, he turns it over so that when he makes his next announcement the order of the cities will be reversed.

Under such circumstances, it is all the more remarkable that Station WCCO is functioning not only so efficiently but apparently so harmoniously.

H. M. N.



Gertrude O'Neil Gauley, "the best Irish Swede in the land of the Scandinavians"

THE Gold Medal radio station—Minneapolis-St. Paul, WCCO—never mentions the name of the company that owns it.

Neither does it name the commodity its company manufactures.

That is why it is gradually digging deeper and deeper into the good graces of the Northwest.

You might listen for hundreds of nights or days without learning that WCCO stands for Washburn-Crosby Company.

You might listen a lot longer without hearing that Gold Medal is the trade name for a kind of flour and a brand of foods.

Isn't this the answer to the question of broadcast advertising?

There is much argument over commercial broadcasting, but if a station confines its programs to entertainment and legitimate instruction, can there be any objection to its use of a simple trade-mark in the station call?

The Twin Cities of Minnesota enter their station for the championship in avoiding commercialism.

These cities at the head of navigation on the Mississippi River believed that they had solved the broadcasting problem when ten companies, divided between the

two, united in support of WLAG, "the Twin City station in the Land of Ten Thousand Lakes," but the vicissitudes of one of the companies—that which actually owned and handled the station—brought it into difficulties.

It was this historic institution, once known as "The Call of the North," which was succeeded by WCCO.

When the two cities were left without presentation in the nightly ethereal chorus, radio fans and radio dealers determined to "do something about it."

The Northwest Radio Trade Association was most vitally interested and took the matter seriously. The man who is now president of this organization, Don C. Wallace, and the man who has been its secretary since the beginning, H. H. Cory, began figuring the thing out one night and laid out a plan which they considered ideal for broadcasting in connection with two centers of population like Minneapolis and St. Paul.

WLAG had encountered the usual difficulties of stations not properly located because of persons who were unable to "tune it out." If the station was "on the air," it made some of the long-distance



Mrs. Eleanore Poehler, musical director of the Gold Medal Station
Photo by Gene Garrett, Mpls.



Miss Mildred Simons, assistant to the musical director of the Gold Medal Station
Photo by Gene Garrett, Mpls.



Eleanore Freemantel, accompanist. Her name is heard oftenest from WCCO

fans angry. If it was "off the air," several thousand crystal set owners wanted to know what was the matter.

Something had to be done with the ideal station to enable it to please both factions, and nightly, as it takes the ether now, this problem seems to have been solved.

For Mr. Wallace and Mr. Cory planned a powerful station (one of the brand-new 5000-watt outfits then being proposed) and suggested that it be located about twenty miles from both Twin Cities, with remote control studios in each.

The scheme met theoretical approval on every hand.

But when the tentative budget was laid before a luncheon meeting of the Radio Trade Association in the old West Hotel in Minneapolis, an eloquent gasp escaped the crowd as it nearly choked on its final spoonful of ice cream.

A 500-watter had fizzled. What was to be done about a 5000-watter?

Pooh and a couple of bahs!

And then Wallace and Cory went further with their plan. They suggested that the money be raised by popular subscription in the Twin Cities and that it be in fact as well as in name a Twin City station.

Still there was much tapping of the forehead and shrugging of shoulders.

Then somebody sicked Harry Wilbern onto the job.

Harry Wilbern raised most of the Minneapolis contributions to the Red Cross and sold most of the Liberty Bonds during the war. He calmly and rather curtly informed them that he had raised a lot more money in the Twin Cities than they had even thought about yet and that he would see what could be done.

In the meantime, the commercial associations of the Twin Cities were called into conference on the matter. The Civic and Commerce Association of Minneapolis thought it would be very nice if somebody were to do something about it. And so did the St. Paul Association.

Still the time was not exactly propitious and there were lots of ifs, ands and buts.

The plan was discussed and the newspapers printed news about it and wrote editorials about it.

Then it was whispered that one of the big companies in Minneapolis was interested and the little group of serious radio thinkers held its collective breath for nearly two days.

Suddenly, out of a clear sky and some interesting conversation on the part of Mr. Wilbern, the Washburn-Crosby Company and A. E. Zonne, president of the Civic and Commerce Association, came a pronouncement.

Washburn-Crosby Company would buy the station, locate it as suggested, fit up studios in both cities and pay half the running expenses as well, if Minneapolis and St. Paul would pledge the remaining \$50,000 a year for three years and if it might be called the Gold Medal station of Minneapolis and St. Paul.

Without even the formal organization of a money-raising campaign, Minneapolis ambled out and brought in its share of the \$50,000 a year and St. Paul did the same thing.

The old equipment of WLAG was taken over.

Mr. Wilbern was made manager.

And he with one representative from



Harry Wilbern, manager, Gold Medal Station
Photo by Gene Garrett, Mpls.



E. S. Harrison, assistant manager, Gold Medal Station
Photo by Gene Garrett, Mpls.



Henry Adams Bellows, new director of WCCO programs



Englebert Roentgen, solo cellist, Minneapolis Symphony Orchestra



Carlo Fischer. His announcing of numbers played by himself is unique
Photo by Sweet, Mpls.



Rollo Wells. Business took him from the vaudeville stage. Radio gives him back to the national audience

the St. Paul association and one from the Civic and Commerce Association of Minneapolis became the executive board.

Today the 5,000 watter proposed by Mr. Wallace and Mr. Cory is a reality.

A new Minneapolis studio and general offices are located on the top of the new Nicollet hotel with a colored boy in a handsome green uniform at the door. And in the grand concourse of the new St. Paul union station it was arranged that similar studios should be established immediately.

All over the back of the letterhead used by this station are names of persons and companies that have contributed to the maintenance fund and WCCO is one of the big national hookup of stations which heads up in WEA, New York, and helped take the summer course out of radio.

The voice best known from this station was first recognized by the fans in the old slogan "The Call of the North." It is a voice of both pleasing and distinctive quality belonging to Paul Johnson, bred of a long line of Viking ancestors.

Although from his service at the Minneapolis and Twin City stations, Johnson is one of the best known announcers in the United States, the broadcasting business is a sideline with him and his main concern is plowing through a stiff medical course at the University of Minnesota.

He is so tall he has to lean over wherever they put the microphone, and his principal other distinguishing characteristic is a forehead that marks him at once as a student. Probably no other university boy in the United States is so familiarly known to America.

A new voice is making itself known from the station nowadays, the pleasant tones of a slightly Bostonese accent, which cannot be disguised. This, if you do not know, is Henry Adams Bellows, the new director of the Gold Medal programs.

Mr. Bellows took the job early in April, leaving his active directorship of the largest trade magazine in the milling business, the Northwestern Miller. During the lifetime of the Bellman, once a nationally known Minneapolis publication, Mr. Bellows was its most active editor. He has long been known as one of the music critics of Minneapolis, but what actually won him the place after all was his qualifications and his high standing in the milling industry was the quality of certain program notes he has been writing for the Minneapolis Symphony orchestra. He has a knack for helping the music lover to a keener appreciation of the musical numbers played by this organization, Minneapolis' best known musical body, and it is said there is hope that he may be able to do the same thing for radio music.

Every now and then the Gold Medal station broadcasts without previous announcement a concert of this great orchestra. In spite of the inability of present equipment to transmit or receive accurately the full quality of a symphony concert, this is always a big event in the Northwest. Did the recording contracts of this orchestra permit its coming concerts to be announced, it is probable that several million persons would be tuned in to hear it.

But a frequent and favorite feature of the WCCO schedule is the Verbrugghen quartette of symphony players which is led by Henri Verbrugghen himself, the director of the great orchestra. A flute



George Lamb, impersonator of the Old Soak
Photo by Reynolds Studio, Mpls.



Karl Schenrer, of the University of Minneapolis.
Photo by Golling Hesse Studio.



Don G. Wallace, of Minneapolis. He helped start WCCO

Perfect Simplicity!

NO-DIAL

5-Tube Receiver



*A touch of the
finger
brings
'em in!*

Licensed under Bushmore Patents and
Patents Pending, Hooper Patent
No. 1014009.

Think of a receiver without dials; so simple that any child can operate it; so sturdy that he cannot break it! That's NO-DIAL, the newest thing in radio!

Features You Have Waited For!

Utmost Simplicity without sacrifice of other desirable features has been attained by NO-DIAL engineers thru the most careful correlation of all parts. Adjustments which the listener himself in ordinary sets must make are in NO-DIAL completed at the factory.

Better tuning is made possible because the condensers are permanently kept in step. The cover of NO-DIAL is rotated, bringing in station after station loud and clear, far and near. That is all the listener need do—even filament control is automatic.

Better logging is made possible through the physical shape of NO-DIAL Receivers. The entire edge of the cover is a Station Register. Stations always come in at the same places where you locate and mark them.

Sensitivity of NO-DIAL is equal to that of higher-priced receivers. In many tests it has received stations from coast to coast with loud-speaker volume and fine tonal quality. Tube for tube, it recognizes no superior. NO-DIAL does not re-radiate.

Cabinets of NO-DIAL Receivers are of spun aluminum, finished in mahogany brown crystalline, matching the most beautiful loud speakers and harmonizing with distinctive furniture in any home.

Circuit of the five-tube NO-DIAL is the latest and newest radio hook-up, a most remarkably efficient combination of tuned radio frequency and resistance coupling.

OUR GUARANTEE

We guarantee NO-DIAL Receivers against defects in workmanship or material, and will promptly replace any receiver which in our judgment is defective, or refund the purchase price.

THE OHIO STAMPING & ENGINEERING COMPANY
DAYTON, OHIO, U. S. A.

Use This Coupon for Detailed Information

The Ohio Stamping & Engineering Company,
Dayton, Ohio. Dept. E H-10.

I am a (distributor) (dealer) (agent)
..... (user) Without any obligation on my part,
send me full details of NO-DIAL Receivers.

Name

Street and No.

City and State

quartette of the symphony players is also heard from time to time, not to mention other artists from it who appear as soloists.

The person whose name is mentioned oftener than WCCO's microphones is Eleanor Freemantel. That is because she is the official accompanist of the new station. She was equally well known to hearers of the old.

They say she never takes off her hat in the studio and is seldom known to rehearse any number. Called on suddenly at odd moments of the day or night, she slips quietly into the studio and reads at sight compositions of Grieg and Verdi, Haydn and Mozart, Strauss and Irving Berlin as nonchalantly as one might strum a ukulele.

Carlo Fisher, once principal cellist and business manager of the symphony orchestra, who now gives more of his attention to training new musicians, although he is still a standby of the cello section, occupies an unusual place in the affections of WCCO listeners.

In solo work as well as with his favorite MacPhail trio (William MacPhail and Harrison Wall Johnson) he has a method all his own, for he entertains almost as much by his delicious anecdotes of the composers and their compositions as by his playing.

It has long been the custom to give him the microphone and let him do his own announcing whenever he appears in the studio, and so far he has handled every broadcast of the symphony orchestra.

The other day a request program was put on, one in which the numbers as well as the artists were named by the station audience, and first on the list of requested artists was the Gold Medal radio quartet.

The organization was born about the time of the opening of WCCO. It consists of Ted Kline and Kenneth Johnson, tenors; Neils Swenson, bass, and Clarence Scheibe, lead.

More and more as they sing together their voices blend, their co-ordination is perfected, and they gain stronger and stronger hold upon the appreciation of their listeners.

The capacity of a voice to create an entire atmosphere is the constant marvel of radio, and the principal exponent of this at WCCO—with the possible exception of Gertrude O'Neil Ganley—is George Lamb.

It is getting so there is nothing in the way of notable amateur theatricals in the Twin Cities in which Lamb does not do a striking comedy characterization besides possibly directing the whole show.

But his greatest successes have been in the impersonation



WHY ARGUE ABOUT IT ?

If

you are not satisfied
with your present receiver

Send 30 Cents
(Stamps Will Do)

for the July, August
and September, 1925,
issues of

RADIO IN THE HOME

containing full directions
for building
Flewelling's

SUPER-HET CONVERTER

Hooked up to your
present receiver, it
gives the volume and
selectivity of a Super-
Heterodyne.

The supply of these
issues on hand is limited,
so send at once
to the

CIRCULATION
DEPARTMENT

Radio in the Home

Public Ledger Building
Philadelphia

of Don Marquis' "Old Soak" in the "Battle of the Keyhole" and "The Searching Foot," from WCCO.

As for Mrs. Ganley, she is called "the best Irish Swede in the land of Scandinavians," and none of her radio programs is complete without her portrayal of "Tillie at the Photographer's."

In the list of the Gold Medal humorists there is a singer of comic songs named Rollo Wells, who graduated from the big-time vaudeville stage into business in Minneapolis, and who is always called upon in the featured programs of the station.

Wells exemplifies one of the answers to the question, "Where does radio get its multitude of stars?" If he were not one of the champion insurance salesmen in the Northwest, he would probably still be trouping in vaudeville or musical comedy. He is one of many whom successful business has stolen from the entertainment world, and radio has given him back to it by enabling him to be heard throughout the United States without leaving his job.

There are two other Minneapolis Symphony players in the Gold Medal audience. One is Engelbert Roentgen, the Dutch cellist, who was heard in his home town in Holland on one of his programs. He is solo cellist of the symphony. The other is Henry J. Williams, the symphony harpist, who reveals from time to time the excellent broadcasting quality of this kind of all instruments as well as his own great proficiency.

From the University of Minnesota, situated in Minneapolis, WCCO draws many soloists and orchestra players, but the radio fans rejoice most when it is able to book Karl Scheurer, of the music faculty. His name is a

"The Gold Medal Radio Quartette." They are, from left to right: "Choppie" Kline, first tenor; Kenneth Johnson, second tenor; Nels Swenson, bass, and Cal Schiebe, baritone



tough one for Paul Johnson to announce, but his handling of the violin makes up for that and the name can always be spelled.

Since the prosperity of the Northwest is dependent upon its crops a great deal of attention is paid at the Gold Medal station during the daytime to the market reports. These are read by Miss Wildred Simons, who, in addition to these duties, is much sought after to preside over the station's reception room, because, it is said, she knows by sight and telephone voice more of the artists who have appeared there than any other person.

Eleanor Poehler, who has been musical director of the Twin City institution since the beginning of its career on the air in the days of WLAG, is recognized by every regular listener to its programs both for her announcing and for her soprano voice, with which she is accustomed to grant requests for special numbers, particularly the old songs which she learned from her grandfather, one of Minnesota's pioneers.

The voice of the assistant manager of the station is never heard at the microphone. He is Major E. S. Harrison, formerly of the United States Army. The reason he put succinctly:

"That's not my end of the business."

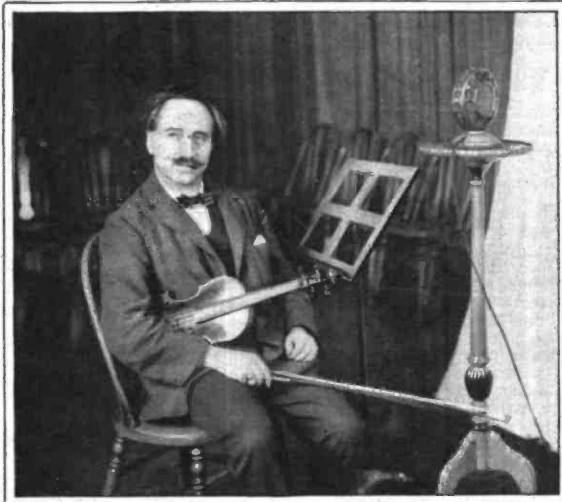
It is not quite clear yet what Mr. Bellows is going to do with WCCO, but so far it has been a station that took itself seriously and tried to serve its community as well as entertain and build up its large audience.

One thing is quite likely—that it will bear watching (or harkening) for the next year or so.

Circle, left: Henry J. Williams, harpist, Minneapolis Symphony Orchestra and WCCO

Circle, right: Paul Johnson, announcer of the Gold Medal Station. "The best-known medical student in America"

Left: Henri Verbruggen, director of Minneapolis Symphony Orchestra, who has been converted to radio



The latest developments in low-loss parts

Built of this special insulation made to order for radio

NOW you can get a complete line of low-loss parts made of Radion, the special insulation which our engineers created for radio purposes exclusively.

These parts embody the very latest developments in radio. They are as efficient as the well-known Radion Panels and have the same high-resistant characteristics.

Radion Panels, made in black and Mahogany, come cut in 18 standard sizes for whatever set you wish to build. And in addition, you can have Radion Sockets, Radion Loud-Speaker Horns, Radion Tubing, Radion Binding Post Strips, Insulators, etc.

New Sockets for Both New and Old Tubes

OF PARTICULAR interest are the new Radion Sockets. Nos. 4 and 5 are for the new-style UX tubes exclusively. Nos. 2 and 3 are designed to take both new and old style tubes.

All Radion Sockets are highly efficient, due to the principle of their construction and the low-loss characteristics of Radion. Ask your dealer to show them to you.

Send for Booklet

OUR booklet, "Building Your Own Set," gives clear, complete directions for building the most popular circuits. Mailed for 10 cents (stamps). Send the coupon today.

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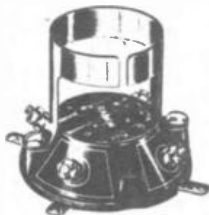
Chicago Office: Conway Building
Pacific Coast Agent
Goodyear Rubber Co.
San Francisco, —Portland

AMERICAN HARD RUBBER COMPANY
Dept. N 10, 11 Mercer St., New York City
Please send me your booklet, "Building Your Own Set," for which I enclose 10 cents in stamps.

Name
Address



Ask for Radion Panels by name; look for the stamp on the panel and the name on the envelope.



This is the Radion No. 2 Socket, designed for both old and new tubes. Equipped with binding posts. Other Radion Sockets come equipped with binding posts.

RADION

The Supreme Insulation

How to Build the SUPER-FIVE



Write today for the **QUADRA-FORMER BOOK**. It will bring you a new radio experience. Profusely illustrated with photographs, drawings. It takes you step-by-step through the making of the **SUPER-FIVE**, an exceptional 5-Tube Receiver developed by engineers of the Gearhart-Schlueter Radio Corporation.

Enclose 25c and You'll Have It by Return Mail

GEARHART - SCHLUETER RADIO CORPORATION
714 Voorman St. Fresno, Calif.

The new 5-Tube Set with all the power and grip of the "Super" — so write Henry M. Nisly, Editor of Radio in the Home, Philadelphia.

Editorially Speaking

(Continued From Page 4)

You must pay us \$1000 a year."

"All right," we say. "We will sign the contract giving us the right to broadcast all of the music whose copyright you control."

Here he smiles again.

"Oh, no," he says, "you cannot broadcast all of our music. We reserve the right to notify you from time to time that certain selections are not included in the contract. Furthermore, you are not to broadcast any music published by certain members of the society under any conditions."

"What!" we exclaim, "how are we to keep track of all of the numbers which we are not allowed to broadcast even though we pay you a fee?"

"That's your business," he says.

"All right," we agree reluctantly, "for how long a period will this license last? As we understand it, we can renew it at the end of the year for the same figure."

"Not at all," he says, "we are not talking about next year. We are only getting you to sign the contract for this year. That will be a legal admission on your part that we have the right to make our demands on you, and next year we will talk about the matter all over again. Next year's license will undoubtedly cost you considerably more."

Of course, this confronts us with a very serious problem. It means that we have not the slightest idea how much money we will have to provide in our business next year to continue our broadcasting, and when we attempt to get approximate figures from the gentleman, he still smilingly declines to make any guess about it. He tells us very frankly that he will charge us just as much more as he thinks we can pay next year.

NOW, suppose that we want to broadcast an orchestra from the best moving-picture theatre in our town. The proprietor of that theatre has already paid to the society a license fee which is fixed by law at so much per seat in the house. You would naturally suppose that, as that license fee had already been agreed upon and paid, the performance by that orchestra of the society's compositions would be unrestricted from then on. That is not the case, however. The moment we put a microphone in that theatre, the society demands that we make an entirely new deal. As a broadcasting station, we must take out another license, at any price which they choose to make us pay. If we do not, we must go to the trouble of getting the program of that orchestra in advance, finding out as best we may which numbers are copy-

right by members of the society and which are not, and then we must stand by the switch and pull the orchestra off the air the moment they start to play anything which is copyright by the society.

Let us carry this illustration further. Suppose the National Carbon Company, for one of the Eveready Hours, desires to broadcast this orchestra in the theatre. According to the present demands of the society, the theatre must pay a license fee, the National Carbon Company must pay a license fee, the station which picks the music up originally must pay a license fee, and then every one of the ten or fifteen stations of the chain doing the broadcasting must each one pay an additional license fee.

Other clients on this link of broadcasting stations may want to broadcast other orchestras on that same evening. It is not beyond the realm of possibility that there may be five or six firms using that link that night and giving us the very best possible entertainment that we can get by radio. If each one of these firms should put out a musical program—and almost all of them do—each one would have to arrange to have all of these license fees paid separately for each of the broadcasts, and yet it is quite within the realm of possibility that each program might include one or more of the same numbers. Figure out on that basis how many times the society will be paid for that one composition and on that one night.

And also remember that the society reserves the right at a moment's notice to refuse to permit us to broadcast any certain one of these selections. In other words, this clause simply means that they can tighten the screws up as much as they want to. The moment they want to collect more money from us, they simply proceed to send us a weekly list of compositions which are withdrawn from our license agreement, and the first thing we know, our license means absolutely nothing to us because all of the compositions may have been withdrawn after our fee has been paid.

This is an actual condition, and no broadcaster has the power or the right to do anything about it. If he attempts to object, as one or two of them have done, he is promptly met with the answer, "Well, if you don't like it, cancel the license and stop broadcasting our selections." Rowell Croaley, Jr., tried to fight them and now they demand a \$3000 fee from him, while they give the same license to another Cincinnati station for \$250.

Now you may say that the solution of the problem is not to broadcast anything which is

(Continued on Page 40)

The Design of a Short Wave Receiver

THERE seems to be all sorts of short-wave broadcasting planned for this coming winter in all parts of the world and this, taken with the tremendous amount of interest in the short-wave work of the MacMillan expedition near the North Pole, makes the short-wave field by far the most interesting for the man whose hobby is radio. The almost uncanny manner in which short waves cover tremendous distances, the really simple receivers that yet have proved to be the best of all for the work, and the midget antenna that can be used, have caused an interest in short-wave reception that reminds one of the early days of broadcasting. Every one seems to be clearing the decks, so to speak, to hear MacMillan, England, and so forth, not to forget KDKA, which on 63 meters or thereabouts is putting wonderful signals into practically every country in the world.

In response to the many requests for the design of a suitable short-wave receiver, we are going to describe one that is rather unique in more ways than one as will be seen. First of all it is best to call to your mind that the most important thing about a receiver nowadays is the design of it, how it is put together. They may all use the same hookup, but the manner in which the hookup is put together determines just how good the receiver is. Remember that; it is important. If built exactly as I shall describe, this receiver will do things that perhaps will surprise you. We are using it at our farm in Michigan and the receiver alone without any external loop or antenna will work a loud-speaker by short-wave signals from KDKA or WGY and amateur or commercial code signals from all over the United States and Canada are also copied in this manner. This will serve as a guide to the sensitivity of the receiver, but of course louder and more reliable signals are obtainable by using 10 to 30 feet of wire around the picture moulding in the room. For the reception of regular broadcasting and the longer waves an antenna of the common 100-foot variety is the best. It is important to remind you here that the best short-wave reception is accomplished with the short midget antenna of 10 to 30 feet in length, and that vernier dial controls and careful choice of grid leaks are very necessary for successful operation.

Because the most sensitive type of hookup known must be used because reception of continuous wave code means an oscillating tube as a detector and reception of phone broadcasting is accomplished with a non-oscillating regenerative tube, our hookup must be of the plain regenerative type.

The best regenerative hookup for all general purposes is the Weagant circuit, which we will use as shown in Fig. 3. All tuning is done by means of the condenser C1 and the regeneration and oscillation, volume, etc., are controlled by the conden-

By E. T. Flewelling

Associate Editor, "Radio in the Home"



The panel of the short-wave receiver as Mr. Flewelling built it makes a neat and simple design

ser C3. To insure all absence of body capacity effects, etc., the rotor and stator plates of both condensers must be connected as shown. 201-A tubes are used in the receiver, with 45 volts on the plate of the detector tube and 60 to 100 volts on the amplifier. Our receiver as shown in Fig. 1, 2 and 3 does not use a phone jack on the first stage of the amplifier because

we use the receiver mostly for phone work or without any antenna.

If you desire to do much reception of long distance code, however, it will be better to insert a phone jack on the first stage of the amplifier because such reception is always accomplished with the headphones, and one's ears could never stand two stages of amplification. However, my own personal choice is for one jack as shown. We are most concerned that the detector circuit be built in strict accordance with the design as given, but the amplifier circuit may be constructed as the individual builder may desire.

No detailed list of parts is given because the hookup is so simple that one can see at a glance just what is needed. In order to adhere strictly to the design of the receiver, special parts as follows must be used:

- 2—.00025 MF or .0003 MF Condensers.
- 2—Vernier Dials.
- 1—Hard rubber Strip, 3-16-inch by 1-inch by 6 inches for mounting condensers as described.
- 4—Brass jacks to screw on to condenser terminals, described under coil mounting.
- 1—Battery switch to shut off all filaments.
- 2—Amperites to control amplifier filaments.
- 1—Phone jack.
- 1—.00025 MF capacity grid condenser.

The panel dimensions are as shown in Fig. 4. Note the two small holes for the condenser shaft. These holes are for mounting the National Vernier Dial. Two long screws are substituted for the short ones furnished with the dial and are used with spacing washers to fasten the insulating strip on which the condensers are mounted. This strip and the spacing washers may be seen in Fig. 2, running between the two condensers and just above the rheostat.

After the panel is drilled the phone jack, filament control switch, detector rheostat and condenser dials are mounted. Note that only the base of the vernier dial is mounted until the condensers are fastened by means of screws through the two inside holes for the dials. I believe that the method that is used to mount the condensers with vernier dials is the most simple and easiest to handle that I have yet seen. First a hard rubber strip 3-16 of an inch thick is drilled as shown in Fig. 5, and the two condensers mounted upon it through holes "A." It will be found that the small holes "B" are spaced the same as the two inside holes for the dial mountings so that the same screws with spacing washers are used to hold both the dial mounting and the condenser mounting.

It will be noted that the condensers are of the single hole mounting type and therefore are very easily turned around to line up with each other, as will be described. After temporarily mounting the condens-

How We Built the Set at 3XP

By H. M. N.

MR. FLEWELLING'S article gives all of the information that is necessary for those who happen to have variable condensers with bakelite or hard-rubber end plates.

We thought at Station 3XP, however, that there were a great many fans who already had metal-end plate condensers who would like to build this set, and so we constructed it at our laboratory using other parts in order to give all of the data necessary for any one no matter what make of parts he had.

We chose Hammerlund variable condensers for our set because they are typical of better class metal-end plate condensers. The photographs show how we mounted them. It is a simple matter to take off one of the nuts which hold the condenser together and to insert in its place an 8-32 machine screw to hold the hard-rubber strip which serves as a mounting strip for the phone-tip jacks. Mr. Flewelling has been on a farm in Michigan for a number of months past, and since his retirement to the wilds, Carter, Yazley and several others

(Continued on Page 30)

KARAS HARMONIK

AUDIO FREQUENCY

AMPLIFYING TRANSFORMER



The Triumph of a Masterpiece!

—a Marvel of Transformers That Brought Real Musical Quality to Radio Reception

JUST one year ago the Karas Harmonik Audio Frequency Transformer took the radio world by storm.

Nothing like it had ever been known before. For the first time, scientific study had been devoted to perfecting an audio transformer for the reception of broadcast music. High, low and medium frequencies are amplified to equal degree. Bass notes pour from the speaker in full strength and rich tone quality. Vital harmonics and rich overtones, formerly lost, come out in their full beauty.

Music critics approve the results of Karas Harmonik amplification with great enthusiasm. Prominent radio engineers pronounce it a technical masterpiece. Technical editors have specified Karas Harmoniks in their circuits. The triumph of the Karas Harmonik is complete.

But for all of this, the enjoyment of the Karas Harmonik amplification has been too greatly confined to one class of radio enthusiasts. Home set builders bought Karas Harmoniks by the tens of thousands.

It was the owners of factory-built sets who missed the delightful pleasure of real, true radio music in their homes. For set manufacturers were prevented by price from adopting Karas Harmoniks for their sets.

Today there are in use hundreds of thousands of sets—good sets—which could be vastly improved in musical quality by the simple operation of replacing the old transformers with Karas Harmoniks. Your set may be all you desire from the standpoint of selectivity, of range, and other tuning qualities. But if it is not equipped with Karas Harmonik Audio Frequency Transformers you are NOT getting nearly the musical quality you can just as well enjoy.

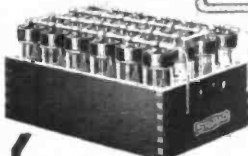
You can install Karas Harmoniks yourself. On any radio repair man can do it for you. Make up your mind to do it now—at once. Get a pair of Karas Harmoniks TODAY! In large cities most good-dealers carry Karas Harmoniks—and in many small towns. If your dealer is out of them, order direct from us. Send no money. Just pay the postman \$7.00 each upon delivery.

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For Over 30 Years Makers of PRECISION Electrical Apparatus

STORAD



RADIO BATTERIES

THE "B" BATTERY

A dependable battery that will solve your "B" circuit power problem on multi-tube sets once and for all. It holds its charge for months.

Made in two sizes: No. 4548-4500 Millamp. Hr. Cap. 48 Volts. No. 4524-4500 Millamp. Hr. Cap. 24 Volts.

STORAD "A" BATTERIES

Full capacity reliable storage batteries made of highest grade materials and having rubber case and rubber-insulated connectors.

Made in three sizes: R-3-60 amp. hr.; R-4-80 amp. hr.; R-5-100 amp. hr.

Ask your dealer about Storad products or write direct for literature.

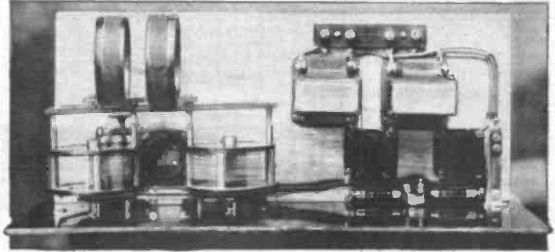
DISTRIBUTOR'S TERRITORY STILL AVAILABLE

The Cleveland Engineering Laboratories Co.
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ers, it is a simple matter to locate the detector tube socket between them and they can then be removed while the socket is mounted, connected to the rheostat and the socket filament

no fastening and unfastening of wires. This means "plug-in" type coils, and as there are no such coils of a suitable nature on the market it becomes necessary to "roll your own." For-



Looking Down on Flewelling's Short-Wave Receiver

wiring completed. Use No. 18, well-insulated wire for all wiring in the receiver. Note in Fig. 2 how it is bunched together and tied with thread in accordance with best engineering practice. This is true for

fortunately, this is very easy indeed to do.

You will have to decide upon what method you will use to plug the coils into or onto the condensers in such a manner that they are readily inter-

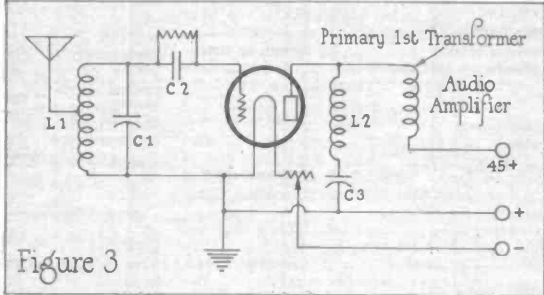


Figure 3

all battery and filament leads, but you will find that your detector circuit is built in such a manner as to have practically no wiring in it.

changed, but Fig. 2 shows the method that we used very satisfactorily and a hard rubber strip 1/2 inch wide by 7 inches long is used to mount the dif-

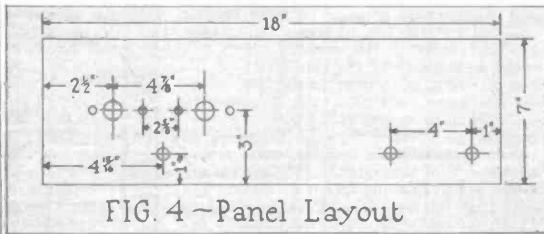


FIG. 4 - Panel Layout

Because our receiver must cover a tremendous range of wave lengths efficiently it is necessary that the coils be readily interchangeable with

ferent coils in pairs. Fig. 2 shows two separate pieces of Celeron tubing 3 inches in diameter, on which coils are wound. They are prepared for experi-

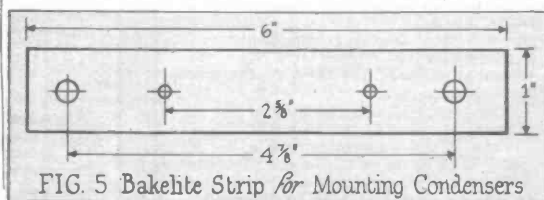
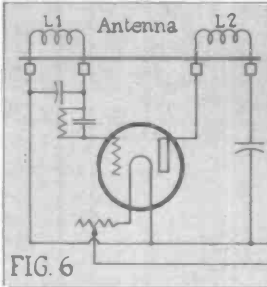


FIG. 5 Bakelite Strip for Mounting Condensers

mental purposes and can just as well or better be one single piece of tubing carrying the two windings L1 and L2 of Fig. 3, spaced 1/4-inch apart for all coils. The hard-rubber strips were drilled for 6-32 screws, which just fit into head-phone cord tips and are soldered to them. Small brass rod was then drilled to fit the cord tips snugly on one end and tapped



with a 6-32 thread for screwing onto the condenser on the other end. This method has worked out excellently, but unless Mr. Clark, who does the buying for *Radio in the Home* readers, can furnish them, I am afraid that it is a job for your own work bench. (Note—See my article herewith, H. M. N.) The brass rod is 1/4-inch stock cut in 3/4-inch lengths, drilled and tapped as explained. This method of mounting was described in the writer's September article on a Superhet Converter and is worth its weight in gold because it offers such a convenient way of handling coils, eliminating wiring and securing direct "wireless" connections.

It is well to emphasize again that development in radio receivers this year is almost entirely along the line of design and assembly. The great values gained from properly designed and assembled receivers have been well recognized. The old order of promiscuously placing parts about a receiver and con-

necting them by a multitude of wires is rapidly passing, being forced out of use by the more advanced types in which each part works with each other part. Our receiver would not be different from any other of its type were it not for the design shown. The method of plugging in the coils shown in Fig. 2 might be a little out of the ordinary, but it results in a ship-shape, workmanlike type of receiver.

Standard Celeron tubing, 3 inches in diameter, should be used to wind the coils on and only one length is necessary for all windings, that is, 3 inches in diameter by 6 inches long, and such tubing is available by the carload. Shorter lengths can of course be used if desired for the short waves, as only a few turns of wire are necessary and they are easily fastened to the hard-rubber strip by screws and nuts in a neat and strong manner. All coils are wound with No. 22 DCC wire, and with coils of up to 25 turns it is best to space each turn by the diameter of the wire used. This is easily done by winding two wires at the same time and then removing the unused wire. A few drops of any of the standard "dopes" will serve to keep the spacing.

- Coil Values**
 20-Meter Band
 L1—L2—3 turns each
 40-Meter Band
 L1—L2—5 turns each
 75-Meter Band
 L1—L2—10 turns each
 150-Meter Band
 L1—25 turns
 L2—15 turns
Broadcasting
 L1—40 turns
 L2—20 turns

The antenna connection to the coils is made by a binding post mounted directly upon the tubing and does not show in our photographs.

For broadcasting reception the coils are tapped at 15 turns from the filament side of the coil for antenna connection, as shown in Fig. 3. For all other wave lengths the antenna post is di-

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You can! Hundreds of ambitious men are already earning thousands of dollars in this wonderful new industry—you, too, can get your share. Mail coupon below for Free Book which describes fully the amazing money-making opportunities in Radio and tells how YOU can earn from \$5000 to over \$10,000 a year.

The astounding growth of Radio has created thousands of big money opportunities. Millions of dollars were spent during the past year on Radio, and thousands of young men are needed right now to meet the ever-increasing demand of work.

Men are needed to build, sell and install Radio sets—to design, test, repair—as radio engineers and executives—as operators and land stations and on ships traveling the world over—as operators at the hundreds of broadcasting stations. And these are just a few of the wonderful opportunities.

Easy to Learn Radio at Home in Spare Time

No matter if you know nothing about Radio now, you can quickly become a radio expert, by our marvelous new method of practical instruction—instruction which includes all the material for building the latest, up-to-date receiving sets.

Scores of young men who have taken our course are already earning from \$75 to \$200 a week.

Pay Increases Over \$100 a Month
 I am averaging anywhere from \$75 to \$150 a month more than I was making before enrolling with you. I would not consider \$10, 000 too much for the course.
 (Witness) A. S. Long, 120 No. Main St., Greenburg, Pa.

Doubles Salary
 I can very easily make double the amount of money now than before I enrolled with you. Your course has benefited me approximately \$17,500 over and above what I would have earned had I not taken it.
 (Witness) T. Windsor, 731 Bedford Ave., Grand Junction, Colo.

Wonderful Opportunities
 Take advantage of our practical training and the unusual conditions in Radio to step into a big paying position in this wonderful new field. Radio offers you more money than you probably ever dreamed possible—fascinating, easy work—a chance to travel and see the world if you care to, or to take any one of the many radio positions—all around you at home. A Radio offers you a glorious future!
 The National Radio Institute is America's Pioneer Radio School—est-



ablished in 1914. Our course is an absolutely complete one now being offered which qualifies for a Government first-class commercial license. It gets you the bigger paying jobs in Radio.

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Learn more about this tremendous new field and its remarkable opportunities. Learn how you can quickly become a radio expert and make big money in Radio.

We have just prepared a new 32-page booklet which gives a thorough outline of the field of Radio—and describes our amazing, practical training in detail.

This Free Book, "Rich Rewards in Radio," will be sent to you without the slightest obligation. Mail coupon for it now! For a short time we are offering a reduced rate to those who enroll at once. Act promptly and save money.

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Please send me, without the slightest obligation, your Free Book, "Rich Rewards in Radio," and full details of your special Free Employment Service. Please write plainly.

Name..... Age.....
 Address.....
 City..... State.....

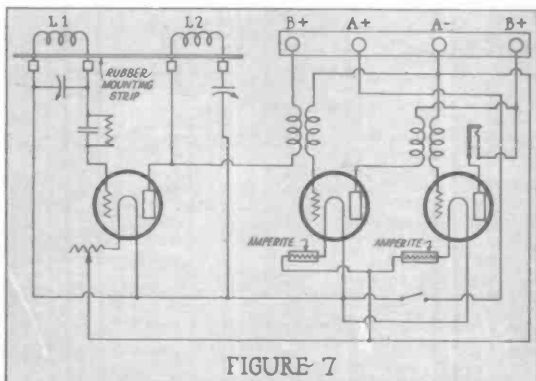


FIGURE 7

ROBERTS' "Supercoils" New Type

for Walter Van B. Roberts
"RADIO BROADCASTS' KNOCKOUT"

New "Supercoil" Antenna Tuning Circuit Improves Volume tremendously, especially on high wave lengths.

COMPLETE SET
 8 coils in three mountings..... \$9.00
 Postage paid.....

Basket weave windings. Large, duplex insulated wire. Adjustable couplings. Minimum dielectric. 1500 cycles.

Sent anywhere C. O. D.—Parcel Post orders shipped day received

PERFECTION RADIO MFG. CO.
 Dept. R-1520 Chestnut St.
 Philadelphia, U. S. A.

CARTER "DIALITE" \$1.75

Gives you light right over your dial where you need it. Eliminates shadows. Permits closer logging and easier tuning. A quarter turn snap switch combined with light permits light to be turned off if desired, when set is operating. One hole mounting. Simple to install on your present set.

Any dealer can supply

In Canada—
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 2500 W. 12th Ave.
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Amplifier and Detector Tubes Improve Performance

Give your "set" a chance. Good tubes improve reception. Consider the points of SEA GULL superiority.

1. Non-microphonic.
2. Uniformity may be used interchangeably in any stage.
3. 10% higher mutual conductance.
4. 50% longer life.

The best workmanship, newest and most efficient equipment, and the finest material insure these properties.



When buying tubes have SEA GULLS tested on the meter, as well as in a "set." Compare with any other tubes—watch the oscillation factor—the constancy of which evidence "matched" tubes.

There is also a high capacity rectifier SEA GULL tube for B battery eliminators. These are equally as good as our other tubes. They sell for \$3.00.

If your dealer cannot supply you, send his name and \$2.50 for each tube you want, plus P. P.

Dealers and jobbers write for information and discounts

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Mail Order 318

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Obsolete

Take the "GUESS" Out of Tube Control

\$1.10 Everywhere

Amperite automatically controls tube current, eliminates hand rheostats, filament meters, guessing and all tube worry. Simplifies wiring, tubing and operation. Permits the use of any type of tube or any combination of tubes. Tested and used by more than 50 set manufacturers and in every popular construction set.

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Write for FREE Hook-ups

AMPERITE

The "SELF-ADJUSTING" Rheostat

Protection

Isn't your home and radio worth the best protection you can buy?

Safety demands the

BRACH VACUUM ARRESTER

STANDARD FOR 15 YEARS

ZENITH RADIO

Types straight through the local, gets distance. Brings in more stations—clearly and with volume—in a given length of time than any other set. Direct comparisons invited. Zenith receiving sets cost more, but they do more. The exclusive choice of MacMillan for his North Polar Expedition.

Zenith Radio Corporation
332 S. Michigan Avenue, Chicago

rectly connected to the grid side of the coil. Under "operation" I shall explain more fully this connection.

If you will refer to Fig. 3, the circuit diagram of the short-wave receiver, you will note that the condenser C1 is connected in parallel or directly across the coil L1 with its fixed plates or stator connected to the grid condenser. If one of the brass jacks or plugs which we have described is screwed onto the rotor terminal of the condenser and another jack is screwed on the stator terminal directly across the condenser, and the coil with its phone tops is plugged into these jacks, you can see that you have completed quite a bit of connecting without using any wires.

Condenser C3, however, you will note in Fig. 3 is connected in series with the coil L2, and it becomes necessary with this condenser to mount one of the brass jacks by means of a screw through the bakelite end plate of the condenser. One jack is mounted upon the stator of the condensers, while the other is mounted upon a separate screw through the endplate. This is the only confusing part of our assembly. Condenser C3 now has three terminals, that is the rotor plates and the two jacks.

Having located the detector-tube socket between the two condensers as shown in Fig. 2, our next step is to mount the grid condenser C3 with its grid leak. Soldering clips are mounted on the socket terminals and condensers are turned until the jacks are in a straight line, as shown in Fig. 2, and it will be found that the soldering clips on the grid condenser can be soldered directly to the soldering clips on the tube socket and to the condenser C1.

In accordance with the 3XP method of illustrating you should have completed, and connections made, and it is very simple to complete the wiring of the detector by making the filament and plate connections to agree with Fig. 6. Now it becomes necessary to arrange for plate voltage to the detector tube, and this is done through the primary of the first stage audio-amplifier. Fig. 7 shows the completed receiver with two stages of audio exactly as laid out and shown in Fig. 2, the amperites being used to control the amplifier-tube filaments and to furnish biasing voltage for the amplifier-tube grids.

In operating a short-wave receiver one of the greatest factors that influence the receiver is the resistance of the antenna and the natural period or wave to which it and surrounding objects might be tuned. These things are very likely to make it impossible for the receiver to oscil-

late if they are directly connected into the receiver circuit. This is one reason why short-wave sets must be handled a bit differently than is usual. Ease of handling, flexibility, etc., recommend that the receiver be connected to the antenna by capacity coupling. If two pieces of insulated wire are twisted together, even though the wires do not actually come in contact, they will act as the plates of a miniature condenser. The more the two pieces of wire are twisted together, the greater the capacity of the condenser, and we can thus adjust the coupling of the antenna to the receiver. A short piece of insulated wire is connected to the antenna post on the coil L1, and an insulated wire from the antenna is wrapped around it five or six times. (Note—See our 3XP method as given in the accompanying article.—H. M. N.) If a large antenna is to be used it should always be connected to the receiver in this manner, but a short ten to thirty foot antenna may be connected directly.

The receiver will oscillate violently, evenly or not at all in accordance with the antenna or antenna coupling used and in accordance with the grid leak used. These two points, antenna and grid leak, then are the points to watch if you are to get the most out of your receiver. The shorter the wave to be received the shorter the antenna or the weaker the coupling should be for best operation, but a good medium antenna and coupling may be found to operate very well indeed over the entire range from 20 to 100 meters. Above this range it is better to enlarge the antenna and tighten the coupling or connect the antenna directly to the receiver.

This article describes a method of assembling or building nothing but a plain regenerative receiver, but the method of assembly is a guarantee that the utmost sensitivity and volume will be secured, and after all is said and done there has not been found, so far, a more sensitive type of receiver than the one we have described. If you cannot hear MacMillan or other long-distance stations it will not be because of your location, but because of your receiver, time of listening, interference, etc.

How We Build the Set at 3XP

(Continued From Page 33)

have put on the market very excellent phone-tip jacks for the very purpose outlined in Flewelling's article. We show some of these clips and jacks.

In building our set, we made the connections just as short as possible for the purpose of using the Brightson True-Blue tubes. Quality on these short waves is

at best very poor, and we felt that it was wise to use tubes which in themselves are as pure in quality as possible so as not to add further distortion to signals that are already none too good.

We have never cared to listen in on these short-wave broadcasts just because of this lack of good quality, but we realize

many cases this will not be necessary, but we thought that it would be wise because, with certain combinations of audio-frequency transformers and tubes, the choke coil is necessary to guarantee perfect control of oscillation.

This choke coil can be 100 turns of No. 28 DCC wire wound on a piece of cardboard mailing

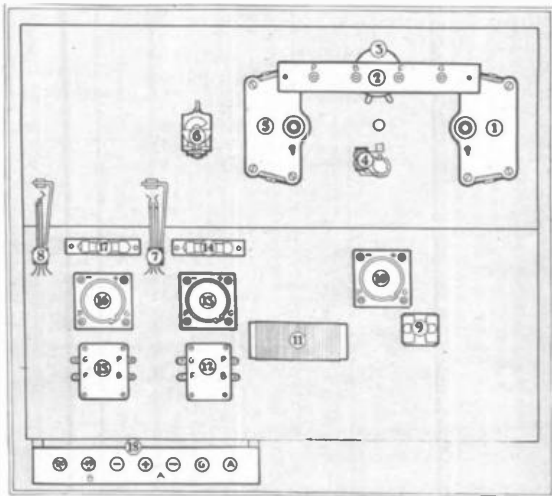


Figure 1—Panel and Baseboard Layout

that a great many fans who like to experiment will wish to put this set together, and so we are giving the data here.

We followed the Flewelling diagram and instructions except that we inserted a radio-frequency choke coil in the plate circuit of the detector tube. In

tubing or it can be a 100-turn spiderweb or honeycomb coil. The number of turns is not important. One hundred or more will answer.

This makes about as satisfactory a short-wave set as it is possible to build at the present time. It is virtually the circuit

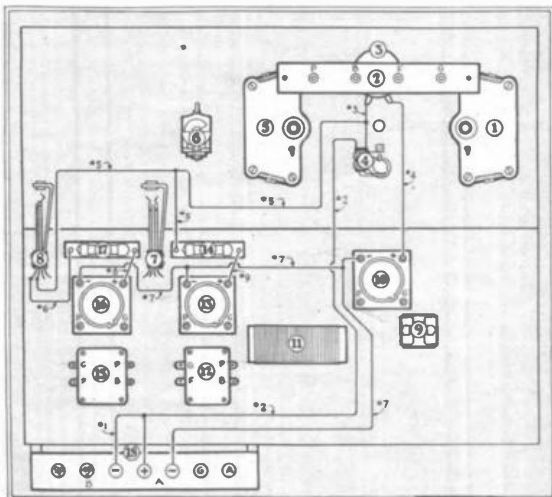


Figure 2—Filament Wires



"A" is a stray field or wave, traveling toward the coil. Due to the winding all induced currents oppose each other so current can flow. Hence no pick-up.

The wave front here moves at right angles to the coil plane. Again opposing currents are set up in opposite sides of the coil, preventing interference.

New kind of coil

Instantly brings four amazing improvements to your present set—greater distance, more volume, increased selectivity, finer tone quality. Send for remarkable new book, *Better Radio Reception*.

SCIENCE has discovered a new distance principle that is bringing astounding results. Now you can apply it to your present set through new type coils known as Eria "Balloon" Circloids.

Thousands of tests and experiments were necessary before the circloid was finally perfected. Leading radio engineers worked night and day in order to develop a coil that would correct the four vital weaknesses of present sets. At last they were successful.

When circloids are used, results you think impossible are obtained with surprising ease. Note especially the four that follow:

1. *Greater distance.* Circloids have no measurable external field to affect adjacent coils or wiring circuits. This makes possible higher amplification in each stage with increased sensitivity and greater range.

2. *More volume.* Higher r. f. amplification enables circloids to bring in distant stations scarcely audible in ordinary sets with volume enough on the loud speaker to fill an auditorium.

3. *Increased selectivity.* Circloids have absolutely no pick-up qualities of their own. Only signals flowing in the antenna circuit are built up. (See diagram above.) This explains total absence of static.

4. *Finer tone quality.* The self-enclosed field positively prevents stray feed-backs between coils. Hence no blurring or distortion. Tones are crystal clear.

Write for new book, "*Better Radio Reception*"

You will be amazed at the difference circloids will make in your present receiver. Get a set and test them out today. Go to your Eria dealer or write direct.

Also send for remarkable new book just published. It explains the Circloid principle with diagrams and drawings and tells you many things you ought to know about reception. Send 10c to cover postage and cost of mailing.

ELECTRICAL RESEARCH LABORATORIES
2523 Cottage Grove Ave., Chicago, U.S.A.
20-A Cottage Grove Ave., Chicago, U.S.A.

ELECTRICAL RESEARCH LABORATORIES.
20-A Cottage Ave., Chicago, U. S. A.

[] Send me free information on the Circloid. Eria distributor. All are equipped to give complete radio service.

Name

Address

City..... State.....

ERLA

Dealers—Exclusive franchises are available to high-class dealers in localities still open. Write or wire immediately.

Na-Ald Cushion Socket
Now! The Na-Ald 400-S Deluxe

Cross-section of new Na-Ald Cushion Socket

ALDEN MFG. CO., Dept. J16
"It's the Contact That Counts"
Springfield, Mass.

"—results are truly amazing!"

NATIONAL
Browning-Drake
Transformer

A tuned radio-frequency transformer of highest efficiency

Write for Bulletin 100 R1H
NATIONAL COMPANY, Inc.
110 Brookline St., Cambridge, Mass.

Pilot Light Switch

A combination of Pilot Light and Midgut Battery Switch. Constantly indicates whether the radio set is "on" or "off." The pilot light bulb-eyes is furnished in a choice of red, green or amber.

Pilot Light Switch, No. 210, \$1.00, Lamp Extra

Pilot Light Bracket same as the Pilot Light Switch except that bracket is set up in the same panel hole as the glass bulb-eyes instead of being mounted in the switch.

Pilot Light Bracket, No. 310, 50 cents, Lamp Extra

YAXLEY
YAXLEY MFG. CO., Dept. K
217 N. Dearborn St., Chicago, Ill

Perfect Control



CAN you handle your radio set as easily as your automobile? Slip through radio traffic without bumping into unwanted stations, throttle down on the locals, or speed up to full volume on distant stations? Control your radio receiver with a Centralab Radiohm for greatest flexibility and power. Gives smooth variation of resistance from zero to 200,000 ohms. Ideal for plate circuit control of oscillation. Now used as a standard unit by more than a score of prominent radio manufacturers.

\$2.00 at your dealer, or mailed direct. Write for literature and circuits describing this and other Centralab patented controls.

CENTRAL RADIO LABORATORIES
18 Keefe Avenue Milwaukee, Wisconsin

Centralab

known as the Reinartz circuit, which is based on the famous Weagant circuit. The right-hand condenser shown in our hook-up is the one which is intended to control regeneration. We used the Hammerlund five-plate condenser, but the exact size of this particular condenser is not important, although it should not be smaller than five

the oscillation and, in cases where the regeneration condenser is not of exactly the correct size, the use of this midget condenser as an antenna coupling will compensate very largely.

For the condenser shown on the left-hand side of the panel, it would undoubtedly have been better to use a straight-line fre-

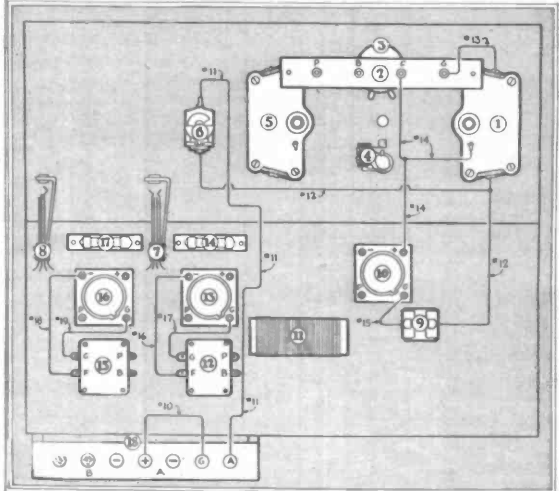


Figure 3—Grid, Grid Return, Aerial and Ground

quency or, as the Amsco Company calls it, an "allocating" condenser. Karas puts this type of condenser out under the name of "orthometric." Unfortunately, at the time of building this set, we had not received any of these condensers. If we had, we would have put one in in this left-hand position. For those who do not

plates. You can use a condenser up to thirteen plates if you wish. We also did not particularly care for Mr. Flewelling's idea of twisting two wires together to get capacity coupling to the antenna. We much prefer the use of a midget condenser such as we show in our own hook-up. This gives an added control of

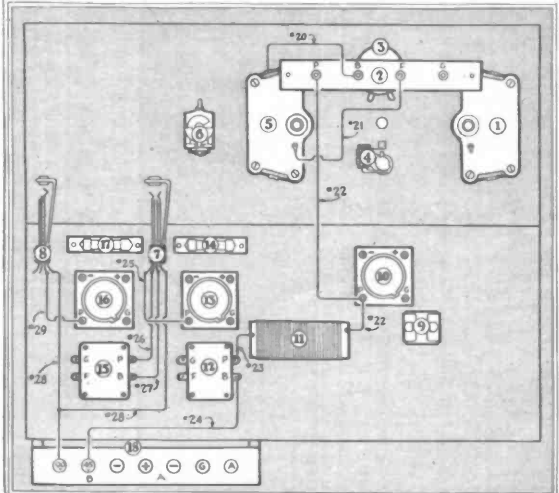


Figure 4—Plate and "B" Battery Wires

EDY
PATENTED
BINDING POSTS
Twenty-five Different Engraved Tops

They Don't Lose Their Heads!
15c AT ALL DEALERS 15c

Send for Latest
RADIO CATALOG
and GUIDE

SETS, PARTS, KITS
BIG SAVINGS

You need this big FREE book. A practical guide to success in set building. Gives advanced hook-ups. Shows all newest parts and lists all prices for below others. Send today. Hold the new set. Make more money.

BARAWIK CO.
187-130 S. Canal St., Chicago

DEALERS/MAKE MORE MONEY!

Buy all your stocks from us and make more money.
Get this big catalog
The most complete dealers' catalog ever compiled. Standard parts, kits, and sets at better prices. Write now for your copy.

W.C. BRAUN CO.
32-54 S. Clinton St., Chicago

"Long Distance"

No better tube made for getting distant stations than the SCHICKLERLING Tube noises and distortion eliminated by patented stabilizing plates.

Model S-4000
5 volt. Stand- and Base, 6 amp. Detector-Amplifier in this enclosure

2.50

Mail orders filled promptly
SCHICKLERLING PRODUCTS CORP.
401-407 Mulberry Street
Newark, N. J.

Write for list of other models

intend investing in new condensers, very much the same effect can be had by using the regular semicircular plate condenser with the Rathbun or the Radial straight-line frequency dials.

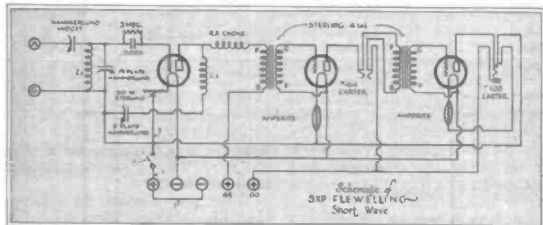
We used No. 18 DCC wire for winding the coils, but I really

No. 2—Jack strip, 7 inches by 1 inch by 3-16 containing four Yaxley Midget phone-tip jacks.

No. 3—Sterling 30-ohm rheostat.

No. 4—Yaxley pilot switch.

No. 5—Hammerlund 5-plate condenser.



believe that ordinary bell wire, wound on a piece of standard Celeron tubing three inches in diameter, makes as good a coil for these low-wave lengths as it is possible to build. This is not because bell wire has any inherent merits, but because the

No. 6—Hammerlund Jr. condenser.

No. 7—No. 104 Yaxley jack.

No. 8—No. 103 Yaxley jack.

No. 9—Dubilier grid condenser and 3 meg. Daven leak.

No. 10—No. 13—No. 16—Tube sockets.



The Panel of the Short-Wave Receiver as we built it at Station 3XP

thickness of the insulation is such that the actual wire is spaced apart the exact distance for best radio efficiency. Any possible losses in the insulation are more than compensated for by the accurate spacing. I am a great believer in coils wound with bell wire on Celeron tubing.

Parts List

No. 1—13-plate Hammerlund condenser.

No. 14—No. 17—1A Amperites and bases.

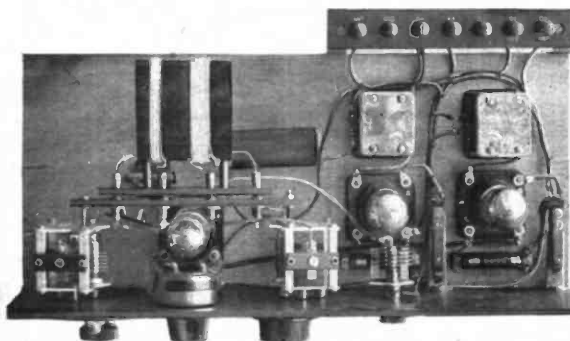
No. 12—No. 15—Sterling 4 to 1 Audio transformers.

No. 11—Choke, 100 turns, No. 28 D. S. C. on 1 1/4-inch form.

No. 18—Eby binding posts on 8 inch by 1 1/4 by 3-16 hard-rubber strip.

L1—7 turns No. 20 on 3-inch tube.

L2—13 turns No. 20 on 3-inch tube.



Looking down on the 3XP version of the Short-Wave Receiver

Amplions chosen to reproduce Papal Ceremonies throughout Saint Peters, Rome



His Holiness the Pope seated on his throne upon the occasion of the recent canonization of Sister Teresa. The microphone is on the right arm of the throne.

Of ALL loud speakers, Amplions enjoy the honor and high compliment of having been installed throughout the famous Cathedral of Saint Peters, Rome, that important ceremonies conducted by His Holiness the Pope may be clearly audible to great multitudes of people.

Supreme clarity of reproduction was the prime requisite. It is only logical that The Amplion—creation of the actual originators and oldest makers of loud speakers—should have been chosen. Amplions outsell any other loud speaker throughout the world, chiefly because of unrivaled clarity of tone. "The clearness of the reproduction of the Pope's voice was an outstanding feature," writes a witness to the first ceremonies

Hear The Amplion in comparison with any or all other reproducers. Prove to your entire satisfaction that it is the world's finest loud speaker. Amplion Loud Speakers, \$12.00 up. Phonograph units in two sizes. Write for interesting literature and dealer's address.

THE AMPLION CORPORATION OF AMERICA
Executive Offices: Suits U, 280 Madison Ave., N. Y. C.
Canadian Distributors: Burndy of Canada, Ltd., Toronto
Alfred Graham & Co., London, Eng., Patentees

AMPLION

The World's Standard Loud Speaker



A portion of the magnificent canopy over Saint Peter's Tomb, showing two of many Amplions installed for amplifying Papal services to vast assemblages of pilgrims



325 RADIO Storage "B" Battery

325 Economy and performance combined before. Recharged at a negligible cost. Approved and listed as Standard by Radio Shack Distributors, Radio Laboratories, Inc., Bell Telephone, Radio Navy Lab., Radio, Inc., and other top quality authorities. Insulated with Bakelite, non-sparking plates. Order yours today! Just state number of batteries you require. **SEND NO MONEY** until state number of batteries you require. **SEND NO MONEY** until state number of batteries you require. **SEND NO MONEY** until state number of batteries you require.

WORLD BATTERY COMPANY
1219 So. Wabash Ave., Dept. 86 Chicago, Ill.
Makers of the Famous World Radio "A" Storage Battery
First-class service, top class prices. All sizes, all types.
All recognized under United States Patent.

World STORAGE BATTERIES

This It means HILCO

Five HILCO Condensers, installed in 18 minutes, will make a 2-tube circuit equal a 5-tube reflect-and-then more.

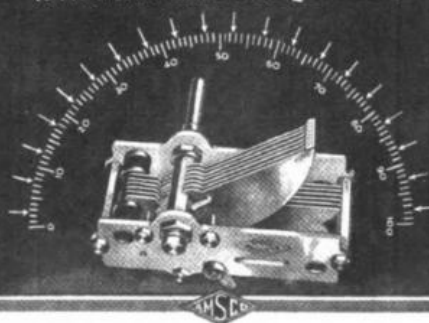
But don't expect it from any other make. It takes the dynamo-tested, watch-built HILCO tubes to clear frequency paths, stop battery leakage and make low-loss a virtue. You never knew a fixed condenser like HILCO Condensers cost no more than make-shifts.

Hilco's dealers and jobbers will get HILCO Condensers for you from

A.E. HILL & ATLANTA

The AMSCO ALLOCATING CONDENSER

(STRAIGHT LINE FREQUENCY)



Spreads the Stations Over the Dial

The new AMSCO Allocating Condenser is the triumphant combination of electrical engineering and mechanical ingenuity. Electrically efficient in unscrambling the stations on your dials. Each dial degree from 1 to 100 will be found to represent 10 broadcasting kilocycles accurately over the entire scale—"a station for every degree". Mechanically ingenious in correcting the fault of other S. L. F. Condensers—it consumes space! Scientific low-loss construction. Rigidity with light weight.

Made in three capacities—Single or Stereo. Ask your dealer, or write for details of the entire AMSCO Line of engineered radio parts.

AMSCO PRODUCTS, INC. Dept. "A"
Broome and Lafayette Streets, N. Y. C.



New!—a handsome instrument at a low price. The AMSCO Vernier Dial gives finest to your fingers. Steps-down 13 to 1, back wards or forwards, fast or slow without momentum or back-lash.

A BOOSTER

For the Super-Het Converter

By E. T. FLEWELLING

Mr. Flewelling's Super-Het Converter described in the September issue is proving tremendously popular. He has now designed a **Booster** to make it doubly efficient. Full details in the November issue. Better place an advance order with your new-dealer.

Editorially Speaking

(Continued From Page 32)

copyright by the society. That is—theoretically—a very good plan, but practically it is impossible.

Every broadcasting station has among its favorite features remote control stations which pick up good dance orchestras, motion-picture theatre orchestras, church services, grand organs and features of that kind. It is impossible to have all of these programs made up according to a hard and fast schedule in sufficient time in advance to give us the opportunity to check up on all of the selections and find out which are copyright and which are not.

Suppose that we should cut into a fine concert orchestra playing in a hotel and broadcast it for a dinner music program. The leader plays several selections and one of them is so popular that the audience demands an encore. He plays an encore not previously arranged. We have no time to check up on any list—furthermore we probably cannot get a complete list. If it so happens that this selection is not included in our agreement, we are subject to a damage suit by the society, and the society will not be slow in collecting.

As a matter of fact, such an instance actually happened at 7:35 P. M. on the evening of Thursday, August 20th, when WJZ had to pull the switch while broadcasting the Vanderbilt Hotel String Ensemble. The announcer came on and apologized and took all of the blame, explaining that he had suddenly discovered that the number the orchestra was playing was barred from broadcasting.

He was not to blame, however. No announcer and no studio director can possibly keep track of all of the numbers which are or are not copyright by the society. However, the mere fact that a part of this number went out before the switch was pulled gave the society a chance to become extremely nasty with the Radio Corporation and I have no doubt that they took full advantage of this opportunity.

TIN-PAN ALLEY is in a very strong position in this matter. They have elected to Congress from the Tin-Pan Alley district a gentleman who used to be a song publisher in Tin-Pan Alley himself and who has frankly stated that he proposed to back up the society and is not interested in any question as to whether they are right or wrong. Anything that Tin-Pan Alley does is all right with him and he does not care a hang about the rest of the public, because so long as he does the bidding of Tin-Pan Alley he is

absolutely certain of re-election by Tin-Pan Alley for the rest of his life. He should worry about you and me and the rest of the radio fans!

Tin-Pan Alley has actually boldly dared the larger broadcasting companies to try to make a fight about this in Congress.

"If you do," they said, "we will go down to Washington and draw a pathetic picture of the starving music composer and you know that the public always favors the under dog. You people are big corporations and we represent the starving composer! What chance have you got to arouse public sentiment against us?"

Now just a word in conclusion about this "starving composer" aspect of the case. Out of every one hundred dollars collected by the society from broadcasting stations, sixty-five dollars goes to pay the high-salaried officials who are putting into execution this hold-up plan to squeeze one million dollars out of radio. Of the remaining thirty-five dollars, the very largest portion goes to the biggest firms of publishers. This is divided on a pro rata basis, the firm which publishes the largest output getting the largest share of the thirty-five dollars.

Out of the original one hundred dollars, not more than two or three dollars goes to the composer. This also is divided pro rata. No composer can get the benefit of it unless he has had published a certain number of popular songs. Now, you and I all know that a man who has published four or five popular songs is not by any means a "starving" composer. The royalties from a popular song are tremendous and you and I would probably be very well satisfied to get the returns from just one song hit. It is probably safe to say that there is not one single "starving" composer represented in all the compositions owned by the society. If there is, that composer has been brought to starvation by his facility in spending thousand of dollars of easily earned royalties and not because he has never had a fair return from his efforts.

WHAT are you and I going to do about it? Probably nothing. So far as any of us can see, there are only one or two possible methods of stopping this menace to radio.

One of these methods is to get all of the broadcasting stations together under a definite plan to stop broadcasting entirely until the society makes a reasonable arrangement. There is a swell chance of that!

Can you imagine certain of the department store broadcasting stations or the stations run

(Continued on Page 41)

Notes from the Lab at Station 3XP

STERLING RHEOSTAT—Sterling Manufacturing Company, Cleveland, O.

If you have ever had the misfortune to let a wire from the "B" battery drop over on your rheostat and blow your tubes, the chances are you will certainly be very much interested to know that this rheostat is entirely clad in a composition armor which hides all the wire. It is one of the smoothest-running rheostats we have seen. You will find it pictured in the Flewelling short-wave set which we built at Station 3XP.



The Jefferson Tube Rejuvenator

STERLING A. F. TRANSFORMER—Sterling Manufacturing Company, Cleveland, O.

While many manufacturers have been contented just to put out a quality piece of apparatus, never worrying particularly about its looks in case it went into the inside of the set, Sterling has taken a transformer that was good to start with and put it in a very beautifully de-

The Jefferson tube rejuvenator certainly puts "pep" in old tubes and brings them back to life in about ten minutes. Several tubes were rejuvenated with this handy device and in practically every case it was possible to obtain a higher filament emission reading than when the tubes were new. It can be used to reactivate tubes which have

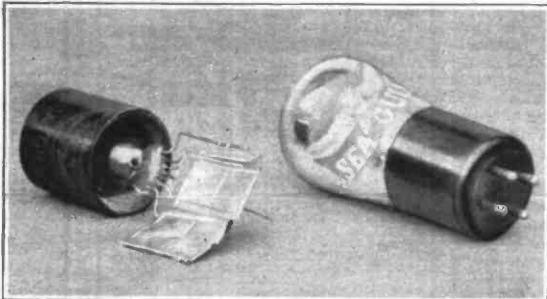
Gull tubes under test at 3XP laboratory. When you consider that Government specifications require a filament emission of only ten milliamperes at 500 hours, it will be seen that these tubes were performing splendidly when these curves were

made for reproduction, Tube G12 showing an emission of about 25 MA and Tube G11 showing about 40 MA. At the end of 1762 hours (the equivalent of about eighteen months' operation in a receiver) these tubes show a filament emission of about 26 milliamperes, and still give excellent results when placed in a receiver.



The Carter "Imp" Switch

(Continued on Next Page)



The Sea Gull Tube. The photograph to the left shows the "inner works" of the tube

signed shell. The quality of music from this transformer is good and its volume excellent. It is safe to say that the future transformers and other apparatus for inside mounting on a radio set will be articles of beauty. The manufacturers are reaching the point in perfection of their products which will allow them more time in the future for design work. This transformer is shown in the 3XP Flewelling short-wave set in this issue.

been paralyzed or whose filaments have become exhausted.

SEA GULL TUBES—Aberdeen Specialty Company, Inc., 1520 Chestnut street, Philadelphia, Pa.

The Sea Gull tubes have been tested in virtually every type of receiver at the laboratory and found to be very efficient detectors and amplifiers for both audio and radio frequency. They are also excellent oscillators. It will probably be interesting to know that the curves in Fig. 3, Page 25, of the August issue of *Radio in the Home* were filament emission curves of Sea

TUBE REJUVENATOR—Jefferson Electric Manufacturing Company, 501 South Greene street, Chicago, Ill.



The Carter "Imp" Rheostat

Get Ready NOW for the Best in the Air This Fall and Winter

Sterling RADIO SERVICE EQUIPMENT

simplifies the task of maintaining perfect reception.

THE quality of your radio reception lies in the health of your tubes and batteries. Every set owner, by devoting a few moments of his time to servicing these life-centers of the set, can get more joy out of radio with less cost for upkeep and less replacements. Equip yourself completely with Sterling service instruments to serve the tubes, and batteries—and save money in the end.

- ¶ Pocket meters to test "A" or "B" batteries accurately and without unnecessary drain on the battery.
- ¶ Tube testers to determine the efficiency of the tubes and locate wiring, socket and transformer troubles.
- ¶ Battery chargers to charge "A" and "B" batteries at a safe and certain charging rate by the most up-to-date and simplest method. No bulbs, no liquids.
- ¶ Tube reactivators to renew the filament of UV-201A, C-301A, UV-199 and C-299 types of vacuum tubes. Meter tells when tubes need treatment and their exact condition after reactivation. Keeps amplification at its best. Invaluable for matching tubes in the set.
- ¶ Each Sterling Radio Service instrument is meter-equipped. The Tube-Servicing Instruments are furnished with handy charts to show you exactly and truthfully the condition of the tube.

The Sterling Manufacturing Company
2831-53 Prospect Ave. Cleveland, Ohio
Dept. K.

Sterling Radio Service Equipment

Battery Chargers

Enclosed or open models for "A" and "B" Batteries

\$16.00 to \$55.00

Pocket and Panel Meters

Prices, \$1.00 to \$4.00

Home Tube Tester

Price, \$8.50

Tube Reactivator

Prices, \$12.50 & \$14.00



These Service Instruments are a necessary part of every set owner's equipment.



A Separate Circuit for Each 40 Meter Wavelength Band!

KELLOGG—for 28 years makers of precision telephone instruments—producers of quality parts since radio began—Kellogg has perfected a radio receiver worthy to bear the Kellogg name.

In the new **WAVE-MASTER** there are nine separate circuits—one for each 40 meter wavelength band. Each circuit gives that maximum efficiency heretofore found only in one short section of the dial of ordinary radio frequency sets. Each circuit brings within the range of the tuning dial a different group of stations.

Merely set the pointer to the wave zone in which you are interested and tune in with the one dial.

This dial actually has a tuning

range of 540 degrees—over three times the range of any other set.

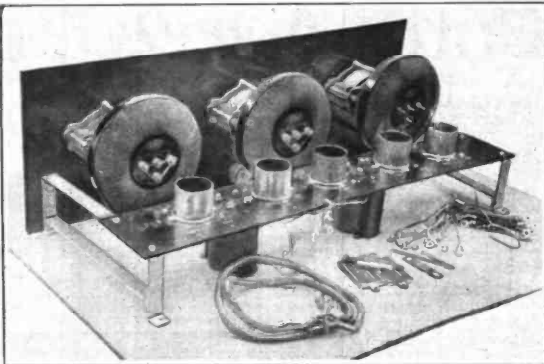
All other radio frequency sets have variable capacity which must be tuned, usually with three different dials, to balance with their inductance coils.

The **WAVE-MASTER'S** inductance is not fixed but variable and is easily and quickly tuned, with the one dial, to balance the fixed capacities.

Write for full description. Please mention your radio dealer's name.

Kellogg Switchboard & Supply Company
1069 W. Adams St., Dept. H, Chicago, Ill.

WAVE MASTER
SWITCHBOARD & SUPPLY CO.



(Continued From Page 41)

CARTER "IMP" RHEOSTAT

—Carter Radio Company, Chicago, Ill.

Carter has realized the importance of condensing those parts that can be condensed, it seems. Their "IMP" line is a series of small pieces of apparatus. The rheostat in question is but slightly larger than an American half dollar! One-hole mounting greatly facilitates its being incorporated into a set in quick time at little trouble. It is strongly made, a very neat unit, and takes up much less space than the larger makes, allowing its incorporation in a portable set or any regular set, at absolutely no risk of inferior quality.

ALL-AMERICAN TOROID COIL

—All-American Radio Corporation, Chicago, Ill.

This is an exceptionally fine model of the well-known Toroid



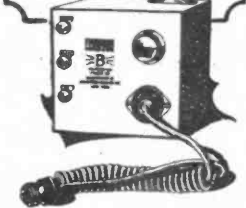
The All-American Toroid Coil

coil. While some manufacturers have rushed their models of this coil on the market to meet the early demand, a good many other manufacturers have waited in order to make their coil mechanically perfect, as well as electrically so. All-American has done just this. It comes in two models, antenna coupling coil and radio-frequency transformer. A kit containing one of the former and two of the latter coils is put out and makes a dandy set of

The Erla Balloon Circlind Kit partly assembled



YOU don't need "B" Batteries
if you use the **FRESHMAN MASTER "B" Battery Eliminator**



Connects from any electric light socket right to your radio set—that's all there is to it. With the Freshman Master "B" Eliminator your set will always be supplied with constant and uniform power. Noiseless in operation; your reception will not be marred by the snap and crackle due to chemical action in "B" batteries.

A. C. Model \$20.00
for alternating current
Freshman Rectifying Tube is required for operation of the A. C. Model. Price \$2.50
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for direct current

Costs less than one-tenth of a cent per hour to operate.
Sold by AUTHORIZED FRESHMAN DEALERS only

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Radio Recorders and Parts
FRESHMAN BUILDING
240-242 WEST 40TH ST.—NEW YORK, N.Y.
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ACME WIRE RADIO PRODUCTS

Celatite Battery Cable

For connecting A and B Batteries (or current supply) to radio set. Silk braid covering 5 flexible Celatite wires—5 feet long—a different color for each terminal. Prevents messy wiring and "blows" tubes. Adds greatly to the appearance of your set.



The New Celatite Wire

Flexible stranded wire for "point to point" and sub-panel wiring—latest method of wiring sets. 5 colors, black, yellow, green, red and brown, one for each circuit.

Enameled Antenna Stranded

The best outdoor antenna you can put up. 7 strands of enameled copper wire; maximum surface for reception. Enameling prevents corrosion and consequent weak signals. 100, 150 or 200 foot coils, boxed.



The Original Celatite Wire

Celatite is thinned copper bus bar wire with a non-flammable "spaghetti" insulation in five colors. Supplied in 30 inch lengths.



Flexible Varnished "Spaghetti"

A perfect insulation tube for all danger points in set wiring. Costs little more and is worth a lot more than the cheaper substitutes offered. Black, yellow, red, green, brown; for wires Nos. 10 to 18; 30-inch lengths.



Loop Antenna Wire

You can make a good loop with Acme wire made of 45 strands fine copper wire, green silk covered. Flexible; non-stretching; neat.



Send for folder

THE ACME WIRE CO.
Dept. R New Haven, Conn.

Also makers of fine enameled magnet wire and coil windings for Audio Transformers, Battery chargers, "B" Battery Eliminators.

You Can Make \$100 Weekly Selling Radio



Demonstrate once—results mean sure sales! Sell what everybody wants—radio at low prices. Coast to coast reception—4, 5 and 7-tube instruments. **12 Selling FREE!** Establish a business of your own. Start in spare time—evenings. Sales course in 12 lessons and 10 radio service lessons teach you everything.

\$100 Men Are Now Doing It! Success with over 3,100 men proves merit of our proposition. \$100 weekly not unusual—many Ozark men make more in spare time! **Free Book!** Write me personally—tell me about yourself. I'll see that my 64-page book, Ozark's plan No. 100, is sent you without cost. Please mention the name of your county. Mail the coupon!

OZARK INCORPORATED
1224 Radio Avenue B, Chicago, Illinois

Gentlemen: Yes No

I am greatly interested in the FREE BOOK "The Ozark Plan" whereby I can sell your radio instruments.

Name _____ City _____
Address _____
County _____ State _____

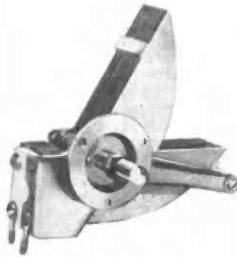
coils for a five-tube radio-frequency set.

PACENT SLF CONDENSER
—Pacent Electric Company, 91 7th street, New York City.

To meet the increasing demand for a "straight-line frequency" condenser, Pacent has put out a special piece of apparatus of that nature. Our curves of this condenser show that it helps very much in separating the low-wave stations that now crowd around your dial within the first ten or twenty degrees. Strongly built as well as being very neat and electrically efficient, it is a very good piece of apparatus.

ERLA "BALLOON CIRCLOID" KIT — Electrical Research Laboratories, Chicago, Ill.

When this kit came to 3XP, it sat around the lab until we



The Pacent Straight Line Frequency Condenser

could "spare the time" to put it together. What we were really figuring on was a day to build it. We looked at the time claimed by the maker as necessary and saw that he specified "forty-five" minutes! Well, that's how long we were! Can you imagine taking a five-tube kit set with all the parts loose and assembling it according to the maker's directions in forty-five minutes? We couldn't either until we tried it.

Furthermore, we decided that, inasmuch as it was assembled so quickly there must be something wrong with it. However, although it has been working a month, it still performs as a real competitor of any of our other five-tube sets.

All we can say is, "Just another case where Erla has greatly simplified the set-building game without taking away a bit of the set's selectivity, volume or sensitivity!"

CARTER "IMP" SWITCH—Carter Radio Company, Chicago, Ill.

If you have ever been bothered by "the kids," the servant or some one else molesting your

Guaranteed Airline RADIO Sets and Parts

MONTGOMERY WARD & CO.
Chicago, Kansas City, St. Paul, Portland, Ore., Oakland, Calif., Ft. Worth

Ward's New Radio Catalogue Is Yours Free

Yours Free—the newest, most interesting book published on Radio. A book prepared by Radio experts—a complete Radio manual.

52 fully illustrated pages showing what is new in Radio and what has been approved by the best experts.

It shows sets from one tube to five tubes, the new one dial control, parts and supplies, batteries and cabinets. It gives a list of stations, a radio log for recording stations.

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Ward's is today one of the greatest

Radio stores in the world—setting everything in Radio without the usual Radio Profits. And besides, we sell only the tested and approved equipment—selected and tested by our own experts, who are up to the minute in Radio. Thousands of customers write us of their delight and saving on Ward's Radio sets.

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For 53 years we have sold only quality merchandise under a Golden Rule Policy. You can rely absolutely upon the quality of everything shown in this Radio Catalogue.

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The Oldest Mail Order House is Today the Most Progressive
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FREE 12-Cell — 24-Volt Storage-B' Battery

Positively given free to each purchaser of a WORLD "A" Storage Battery. You must send this ad with your order. WORLD Batteries are famous for their guaranteed quality and service. Backed by years of successful manufacture and thousands of satisfied users. Backed with Solid Rubber Cells and a special rubber case and built-up plates. **World Battery**

3-Year Guarantee Send in Writing. Approved by leading authorities and Listed as Standard by Leading Authorities including Radio Clubs, Laboratories, Engineers, Electricians, and other experts. **World Battery**

World STORAGE BATTERIES
1219 So. Wabash Ave., Dept. 35 CHICAGO, ILL.

only \$3.50 COD

THE RABAT SENIOR
1700 MIL. AMP. CAPACITY

Best money saving offer ever made on any "B" battery. Rabat are used with any type radio set. They produce stronger, clearer tones. 12 cell 24 volt only \$3.50, 24 cell 48 volt \$7.00, fully charged ready to use.

Rabat Super with Charger Only \$3.00
Rabat Double Duty A & B Charger \$11.00

SEND NO MONEY but order today. After examination and approval pay expressman with C.O.D. charge. All prices Cash. These gold plated Rabat Batteries are sold on an absolute money back guarantee. Over 100,000 satisfied users.

THE RADIO RABAT CO., 1381 Oregon Cleveland, O.

PHILADELPHIA RADIO EXPOSITION
October 3rd to 10th 1925

EVERYTHING new in Radio—sets and parts for the tubes as well as the Supers. Your favorite artists in person.

The Show You Can't Afford to Miss!

Set-building contest with cash prizes. A show that the "Fan" and the "Ham" will enjoy. Don't miss it!

The ARENA

46th & Market Streets

Sponsored by the **PUBLIC LEADER** and the **Philadelphia Radio Trade**

Admission
Afternoons 25c
Evenings 35c

No More "Bunched-up" Stations!

The Signal Spiral Cam Condenser Distributes Them Evenly Over the 360 Degrees of Your Dial

Yes, sir, you get absolutely even distribution with this condenser. Other types simplify tuning. But the Signal Spiral Cam Condenser is perfect insurance against conflicting stations.

The Signal Spiral Cam Condenser uses the full 360 degrees on the dial—yet is so compactly designed that it needs no more space than the old type semi-circular unit. There is no backlash. The perfectly balanced assembly accounts for the smooth action. See one at your dealer's—then you'll understand why thousands of fans will use no other condenser. Built in three capacities for single or three-hole mounting and all one price.

We have an interesting chart showing the efficiency of this condenser. Write us for it today—also for literature on the new Signal Bracket Type Loop Aerial, the id. 4 loop for close quarters.

"Where Millions of Good Radio Fans Come From"



Signal Electric Manufacturing Co.
Dept. 11J
Menominee, Michigan

Branch Offices in All Principal Cities

Send for this RADIO BOOK FREE 1926 Catalog of RADIO BARGAINS Save 1/3 to 1/2

The World's Largest Exclusive Radio Mail Order House Will Send You This Wonderful Book FREE

64 illustrated pages containing thousands of bargains in radio sets, semi-finished sets and radio kits of all styles, sizes and approved circuits. Beautiful models of the very latest designs and types. Elaborate console models with loud speakers built right into cabinets of genuine mahogany and walnut. **ALL SETS GUARANTEED.** Coast to coast receiving range. Catalog also contains everything in radio supplies, including batteries, chargers, loud speakers, transformers, condensers, rheostats and any other parts you may want for improving your set or building a new one. Guaranteed saving to you of 1/3 to 1/2.

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"I got the catalog from you in a hurry and I am very pleased with it. Yours very truly, J. J. [Name], New Orleans, La."
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"The Catalog that I received from you is the best I have ever seen. It is full of interesting information and of all the radio sets, kits and accessories. I have already ordered a set from you. Yours truly, [Name], [Address]."

You must have our catalog no matter what set or kit you want. Our line is complete and includes all popular sets, such as Superheterodyne, Neutrodyne, Ultradyne, Reinartz, Regenerative, Radio Frequency, Browning-Drake, Reflex and all other latest circuits. Kits, sets and parts manufactured by all well known manufacturers such as: Frost, Howard, Baldwin, Brandes, Western Electric, Columbia and others.

Our semi-finished sets come with all parts mounted on panel and baseboard ready for wiring. Do not fail to send for our catalog. Remember, we are the largest exclusive radio mail order dealers in the world and carry the best of everything in radio.

OUR GUARANTEE
Every article exactly as represented. Every article is tested before shipping. Complete satisfaction or money cheerfully refunded.

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Our Catalog
Includes complete list of broadcasting stations and general information and facts about our non-competitive division. Our radio engineers will help you solve all your radio problems. Send your name and address on a card or in a letter. We will send catalog FREE.

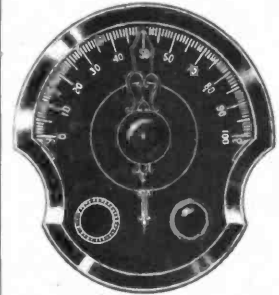
radio, leaving the tubes burning when they went away, you will be greatly pleased to know that here is a small filament switch which can be hooked up in any set, commercial or otherwise, with very little trouble and which you can lock, taking the key with you. One hole only required to mount it, diameter much less than an American quarter, sturdily built, self-indicating "ON" and "OFF" arrangement. The price is but a fraction the cost of a set of "B's," so don't blame the kids unless they break the lock (which looks as if it would be a hard job)!

MARCO VERNIER DIAL—Martin-Copeland Company, Providence, R. I.

Here is a dial that will interest the most hard-hearted DX hunter in these days of sharp tuning. The small openings in the sides are for the purpose of logging your stations. The opening at the top shows the numerical scale which is divided to one-half a degree, and which may easily be read to a fourth very accurately by use of the hair-line indicator. The dial is shown in this issue in the photographs of the Flewelling short-wave set which we built at Station 3XP.

"TUNE RITE" STRAIGHT-LINE FREQUENCY DIAL—The Radial Company, 50-52 Franklin street, New York, N. Y.

With the present tendency toward "straight-line frequency,"



The "Tune-Rite" Straight Line Frequency Dial

which can best be accomplished by means of variable condensers with their plates so shaped as to give this graduation, the man who already has a radio set built with the regular semi-circular plate condensers is up against the problem of continuing to find his low wave-length stations so closely crowded together on the lower side of the dial as to make them almost impossible to separate, or else to

ANNOUNCING The Wilson "B" Radiopower Unit



This new unit will eliminate all "B" battery troubles. Supplies plate current from light socket. Guaranteed to operate without the slightest hum. Furnishes the uniform voltage which is necessary for perfect reception. Uses the minimum of current. Nothing to adjust. No moving parts to get out of order. Will not affect your neighbor's set. Requires no attention whatever, except to switch it on and off as you want to use your receiver. It fits any set.

The Wilson "B" Radiopower-Unit is one of this season's most important developments in the field of radio. It is the ideal plate current supply, because of its dependability, convenience and economy of operation.

In handsomely finished combination walnut case. Price \$35

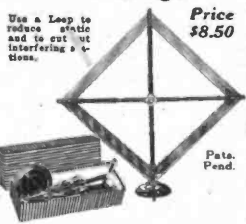
The Andrews Paddlewheel Coil

Use this superior coil for improved tone quality, greater selectivity and maximum range and volume. Has exceptionally high ratio of inductance to resistance. Losses are negligible.

This coil has been given unqualified indorsement by the testing laboratories maintained by leading radio publications and newspapers. It is exceptional in that it increases range, volume and selectivity with entire freedom from distortion. It is used in such well known receivers as the Andrews DERESNADYNE and BUCKINGHAM. It can be used in any hook-up requiring a high-grade R. F. transformer-inductance. Price \$3.00.

Ask your dealer for blue-prints of receivers and circuits using this coil, or write direct to us. Our Technical Dept. will answer inquiries.

Duo-Spiral Folding Loop



Handsomely finished in silver and mahogany to harmonize with the finest set. Neat and compact. Folds readily and can be used anywhere. Replaces unsightly and troublesome outside aerial. Has long insulated handle and silvered dial marked for calibration. Can be used on any multi-tube set. A special model for every circuit.

See these standard products at your dealer's or write for complete information.
Radio Unit Inc.
Daywood, Illinois
1314 First Ave. Maywood, Ill.
PERKINS ELECTRIC LTD.,
Montreal—Toronto—Winnipeg



NEW — —

We want to send every set owner our circular No. 776 describing our new line of 2-inch radio panel instruments.

No. 135 is made in single range voltmeters, ammeters and milliammeters. No. 140 is made double range, using our patented self-contained switch.

The voltmeters are of the high resistance type.

JEWELL ELECTRICAL INSTRUMENT CO.

1650 Walnut St.
Chicago



invest in a whole set of new condensers.

In order to meet this particular man's problem without compelling him to junk his three variable condensers and buy new ones, the Radiall Company, manufacturers of the famous Amperite, have designed a dial to fit on any of the standard semi-circular plate condensers and, by means of a very cleverly designed cam and gear arrangement, the turning of the dial gradually changes the speed with which the rotating plates are revolved, and this change is so graduated that it turns the old-fashioned condenser into a straight-line frequency unit.

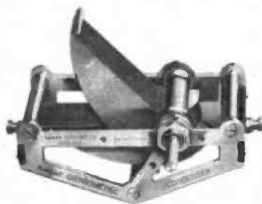
Furthermore, this dial has been so constructed that it will act as a shield to the set and will not allow hand-capacity to interfere with the tuning.

KARAS "ORTHOMETRIC" VARIABLE CONDENSER — Karas Electric Company, 19 South La Salle street, Chicago, Ill.

Karas Orthometric condenser is a contribution to the present tendency toward straight-line frequency tuning. Mechanically, it is one of the best jobs we have seen and it shows the present tendency among the best manu-

facturers to make the various items of apparatus within the radio set have as good and high-class an appearance as the set manufacturers are giving to their cabinets and loud-speakers.

This condenser is of the true low-loss type and its mechanical construction shows the very best of engineering design and prac-



The Karas Orthometric Condenser

It comes in the three popular sizes, .00025, .00037 and .0005.

KARAS "HARMONIK" TRANSFORMER—Karas Electric Company, 19 South La Salle street, Chicago, Ill.

This audio-frequency transformer made a most enviable reputation for itself during the latter days of last season. This year, it comes on the market fully prepared to take its place with the very leaders in transformer-coupled audio-frequency amplification.

Any fan who wishes to hear for himself just what the quality



The Karas Harmonik Transformer

of this transformer is need only do what we have done at Station 3XP. We built a two-stage unit with these transformers and hooked it up so that we could plug it into the detector stage of any of a number of different sets, listening to the music first on the transformers already in the set and then listening with the same set using these Karas transformers. We make this suggestion because it has been evident to us that the Karas transformer has nothing to fear from such a test.

The Unit of Absolute Dependability



MacFADDEN B-Power Generator

Price \$35 Furnishes an unfailing supply of correct B-Power to any set.

Manufactured by an organization of radio engineering and mechanical experts.

Sold under a guarantee that really guarantees

**No Acids
No Odors
No Noise**

Operates on 110 V. 60-cycle A. C. current. Turn on the juice and forget B-battery troubles for life.

Dealers can call this dependable unit with assurance for continued satisfaction.

It's a Real Job

MacFADDEN & CO., Inc.
22d and Arch Sts., Philadelphia

NEW JERSEY to CALIFORNIA on Loud Speaker
With New **Quadroformer**
6-TUBE CIRCUIT
As described in May Issue
Radio-in-the-Home
Complete Parts **\$47.25**
BASE AND PANEL INCLUDED
REGULAR PRICE \$60.50

One of the most interesting circuits ever described—one that will give results never thought possible—2500 miles on land, more than 3000 miles across the Atlantic.

A set built of our parts, according to our specifications, brought in Europe for one of our patrons, Henry M. Neely, himself, in May issue, tells how it picked up California from New Jersey with ease, on loud speaker.

A tried and proved circuit with new coil that kills self-oscillation, the drawback of every radio-frequency circuit. No radiation. Dials always log. Simple to hook up and operate. Tested and tried out by our radio engineers, and on demonstration. Parts neatly packed and ready for you anywhere.

As described by Henry M. Neely in his feature article in the May issue

The M. & H. Radio Engineering Service Will Supply Parts or the Complete Set of Any Hook-Up Ever Published in Any Issue of This Magazine at No Extra Charge

Our prices are the same on all circuits advertised in previous issues
This Service is Recommended by HENRY M. NEELY

Still Another Special COMPLETE PARTS BROWNING-DRAKE 3-Tube Set... \$34.75
Described in the April "Radio in the Home." Regular value, \$46.40.

Only One Kind of Quality here—the best. Radio Sets that give satisfaction demand quality parts. We use no other.
Our reputation built up by 25 years' faithful service, is back of each sale

M&H SPORTING GOODS
512 MARKET ST. PHILA. PA

I will buy for you!

Free 24-Hour Shipping Service for Readers of Radio in the Home

I will buy any apparatus mentioned in this magazine and send it to you at its Regular Price plus only Parcel Postage and Insurance.

ARE YOU ACQUAINTED WITH THIS SERVICE?

It is conducted in co-operation with Radio in the Home, and is for the convenience of its readers.

It is more than just a place to buy parts. Hundreds of my customers look to me to save them money and time. I sell parts for only those hookeys that I HAVE TESTED and know to be good, and every instrument I send you bears my personal guarantee of immediate replacement if defective.

QUADRAFORMER

Of all the sets I have come in contact with recently, this one stands out pre-eminent. It is easy to build, and it is a certainty that the one you build will "work," if constructed of the proper parts. I have prepared complete kits of parts for building it in two grades.

The Standard Quadraformer Kit
Contains Radion Panel, Cardwell Condensers, Mitchell-Schleuter Quadraformer, Eby Binding Posts, Amperiton, Universal Dial, and everything needed for the set exactly as shown in June Radio in the Home, at the special price of.....

\$48.50
Complete

The De Luxe Quadraformer Kit
Has Mahogany Panel, Hammond Condensers, genuine Gearhart-Schleuter Quadraformer, Jones Cable Connector, Yastley Rheostat, Amperiton, the new Marco of National Verrier Dial and everything in keeping to make a set that will grace any living room at the very special price of.....

\$65.00
Complete

Genuine Solid Mahogany Cabinets for these Sets, \$14.00

Write for descriptions of these kits before buying. Also information on Herbosch 3 Tube, Brunning-Drake 4 Tube, and a REAL Superheterodyne. All of which I have TESTED and stand SQUARELY behind. I have done the experimenting. YOU buy a CERTAINTY.

E. M. CLARKE
1523 Chestnut St. Phila., Pa.

This Seal is  Your Guarantee



"More Than Just a Name"
CALVERT LABORATORIES

SPECIALIZING in selling and repairing the Highest Quality of Radio Sets and Accessories. Sets in stock and built to order in keeping with your pocketbook and Home.

Flourishing Super-Hot Converters in stock and built to order.

Official Service Station for "Radio in the Home."
Mail orders promptly filled.

1212 Jefferson Bldg.
1025 Chestnut Street Phila., Pa.

Improving the Quadraformer Receiver

By E. J. GEARHART

THE Quadraformer transformer does remove all electro-magnetic coupling between the transformers in the various stages, but the use of the Quadraformers without attention to the other causes of coupling in a radio-frequency amplifier will not remove all tendency toward self-oscillation.

Disregarding tube-capacity, which we have proved has little to do with the cause of instability in such circuits, there are three other causes of trouble, even when Quadraformers are used:

- (1) Coupling between stages due to the impedance of the leads of the "A" or "B" batteries.
- (2) Coupling introduced by the improper connection of grid returns.
- (3) Coupling introduced by inductive loops in the wiring.

The hook-up given by Mr. Neely in the May issue, page 23, for instance, violates (1) and a set constructed according to that diagram will oscillate on a short aerial, or if the filaments of the radio frequency tubes are turned higher than a certain point.

The preferred hook-up for the Quadraformer set, with either resistance or transformer coupled audio-amplification, is shown by Fig. 1.

Note by-pass condenser C1 on this diagram.

Now let us trace the direction of flow of the radio-frequency current produced by tube No. 1 if the by-pass condenser C1 were omitted. Remember, it must flow in a closed path.

Starting at the plate the current passes through the primary of T1 and then to the B battery, through the B battery and back to the filament, where the electron stream completes the circuit to the plate.

The current from tube No. 2 flows from the plate through the primary of T2 and then through the same B battery leads and battery as the current from tube No. 1. This common im-

pedance causes coupling between the two circuits.

Condenser C1, which should be .5 mfd. or larger, placed where shown, which is not across the battery binding posts as I have seen some constructors use it, by-passes the current from tube No. 1 directly back to its filament, preventing its passage through the battery leads with the current from tube No. 2.

The plate of the detector tube also carries radio-frequency current and a by-pass of about .002 mfd., as shown, should be connected directly from the plate to the filament. It should not be placed, as is common practice, across the phones or primary of the first audio-transformer, as this would force the current to travel through the common B battery, causing coupling with tube No. 2.

The by-pass condenser C1 was omitted from the May diagram.

A set constructed according to Fig. 1 will not oscillate.

Adding Regeneration to the Quadraformer

Fig. 2 shows the result of many experiments to improve the original hook-up of the super-five.

Note that the stator of a three-plate condenser is connected to the plate of the detector tube and the rotor to what was the filament connection of the third Quadraformer. A 200 turn honeycomb or dual-lateral coil is connected between the stator of the three-plate condenser and the primary of the first audio transformer. The plate by-pass condenser of .002 mfd. is moved to the new position shown.

A new grid return connection is made from the A battery lead to the secondary of the third Quadraformer between the third and fourth of the series coils, so that three of the secondary coils are between the tap and the grid end of the secondary. See Fig. 2.

Set the three-plate condenser

New! this season

Bring control of high resistance to the panel.

DURHAM

Variables



Panel Mount, \$1.00
Standard, 75c

Both types in three sizes, No. 100, 1000 to 100,000 ohms. No. 101, 0.1 meg. to 5 megs. No. 101A, 0 to 10 meg.

ALWAYS a one-finger control and now at your finger-tips—that's the new DURHAM Variable. The familiar ease and accuracy of these standard high-resistance units in their latest form may be placed anywhere on your panel, preferably near the tube they control. Only a 1/8" hole required.



For most hook-ups you'll need two Durhams—detector and audio.

Look for the Plunger

The patented Durham combination of sliding plunger and non-wear compound to your protection and guarantee for accurate, high-resistance control.

DEALERS: Get This! Order from jobber now, specifying type, panel mount and standard.

DURHAM & CO. Inc.
1030 Market St., Philadelphia

with the rotor plates all the way out.

Tune in a station in the usual way, then slowly increase the capacity of the three-plate condenser, adjusting the dial of the third .0005 mfd. condenser slightly to compensate for the added capacity in the circuit.

You will find that the little (Continued on Page 47)

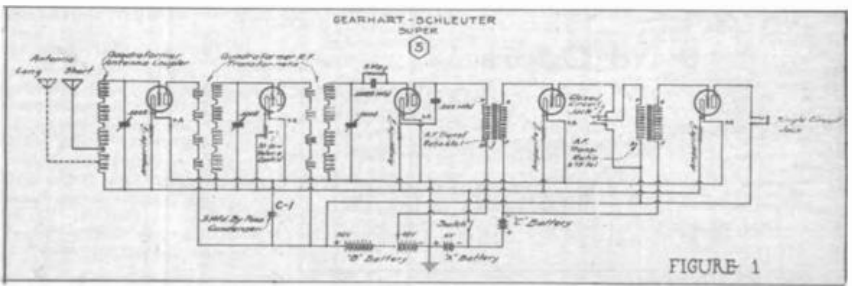


FIGURE 1

Sangamo Mica Condensers



Accuracy guaranteed within 10 per cent. of marked capacity. Resistor clips 10¢ extra.

In reflexing - - where accuracy brings results

BECAUSE of their high accuracy, Sangamo Mica Condensers give perfect results in reflex circuits, where exact capacity is necessary to success. Any receiver, whatever the circuit, is improved by the use of Sangamo Condensers.

They are accurate, and they stay accurate. All nationally recognized radio laboratories have approved Sangamo Condensers.

The accuracy of these condensers is not affected by heat or cold, moisture or acid fumes, soldering or electrical surges. They are solidly molded in smooth brown bakelite which will not chip or crack even if dropped several feet to a hard cement floor. The edges are rounded, and substantial ribs increase their mechanical strength.

All in all, Sangamo Condensers are as fine condensers as money will buy, not only on account of their sustained precision, but because their workmanship and finish is in harmony with the beautiful construction of the highest quality of radio parts on the market. Yet they are not expensive. Quite otherwise, in fact.



All standard capacities. Your dealer should have Sangamo Condensers. If not, Insist and he'll get them for you.

Sangamo Electric Company
1100-10 Springfield, Illinois
RADIO DIVISION, 50 Church Street, New York
SALES OFFICES—PRINCIPAL CITIES
For Canada—Sangamo Electric Co. of Canada, Ltd., Toronto.
For Europe—British Sangamo Co., Finsbury End, Middlesex, Eng.
For Far East—Asahi Engineering Co., Choshi, Japan.

Editorially Speaking

(Continued From Page 40)

for the personal benefit of their owners joining in any such movement? These stations are the ones which are paying the smallest fees and they would immediately take advantage of the silence of the big stations to come on the air with long tirades about the wrong that was being done to the starving composer and self-laudation because they were paying the composer a proper return for his genius and were also protecting the radio public. That would be the veriest kind of balderdash, but that kind of stuff makes a hit with about fifty per cent of our so-called intelligent public.

The other way is to stir up public sentiment to let Congress know definitely that this hold-up of radio is not to be tolerated. But there again you have almost an insurmountable difficulty. *The public simply will not get together and Tin-Pan Alley knows it.*

Do you think it could be done? Would you do it? How many of my readers would even go to the trouble to write one or two letters demanding a reasonable settlement of this question?

The copyright law provides that all music which is published under protection of copyright shall be available to mechanical musical reproducers, such as piano players and phonographs, at a certain fixed fee per record. That is all that the broadcasters ask. We want to know what is a reasonable fee and we want to have it fixed so that we know that we can pay it this year and next year and the years following. The broadcasters do not want to get out of paying a reasonable fee. They merely want to have a business proposition in front of them which will let them know where they stand and what they can do.

Until the broadcast listeners-

in appoint some one to represent them in Washington with full power to insist upon this reasonable arrangement, Tin-Pan Alley can go on squeezing the broadcasters until it will no longer be possible to put out the high grade of entertainment which is the only thing which you and I want.

I wish that the readers of this magazine would only give some indication that they are solidly behind such a movement. With such an indication in the form of letters it would be possible to put up a fight to save radio from the most serious danger which has confronted it.

But will you take the trouble? I doubt if you, who are reading this now, will even take enough personal interest in it to sit down immediately and write me a letter telling me that you want your interest in radio protected.

Will you? This magazine might undertake to do something about it if we could get adequate support from our readers.

Improving the Quadraformer Receiver

(Continued From Page 46)

three-plate condenser will double the volume, and that it is the smoothest working regeneration control you ever handled. The tuning of the set is also much sharper.

If the circuit oscillates with the rotor plates all the way out it is because it has too large a minimum capacity.

If the circuit does not oscillate with the rotor plates of the regeneration condenser all the way in the maximum capacity of the condenser it is not large enough.

It is suggested, to reduce the number of controls on the panel, that all tubes be controlled by Amperites and the three-plate condenser used as the volume control of the set instead of the RF rheostat.

NOW YOU CAN UNDERSTAND RADIO!

Know all about it—build and repair sets—explain the vacuum tube—operate a transmitter—be a radio expert!



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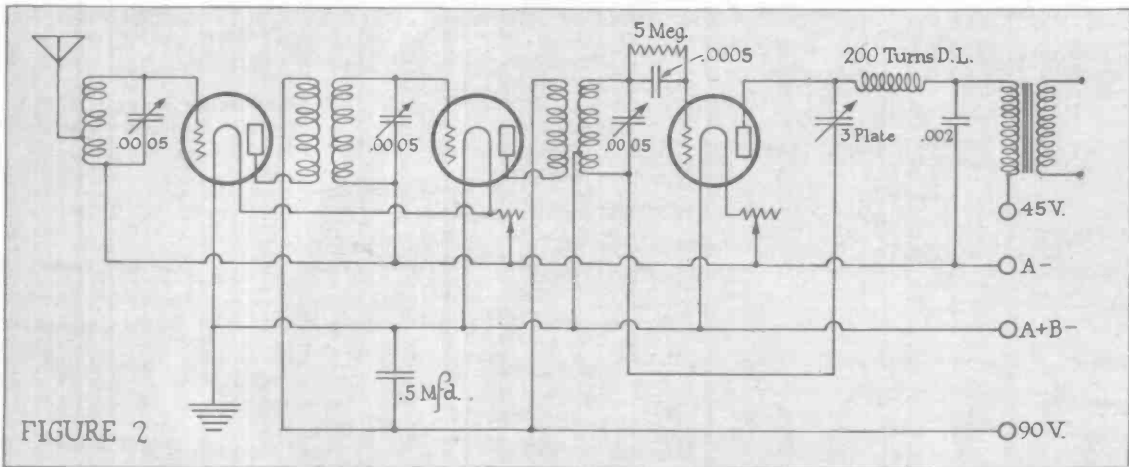


FIGURE 2



Radio
Receiver



Selectivity means more with the Valleytone



Valley B-Eliminator

The Valley B-Eliminator supplies a constant 9 voltage direct from the house lighting circuit. It costs less at the start than wet B batteries and less in the long run than dry cells, too. Much more satisfactory than either.



Valley Battery Charger

The Valley Battery Charger charges 6-volt A batteries; 24, 48, 72 or 96 volt B batteries, and 2-volt batteries. Built in a handsome black case with grained and engraved Bakelite panel and clear glass top.

Finer tuning becomes a reality—selectivity means more with the Valleytone Radio Receiver.

For instance: The Valleytone has regularly received and separated clearly and distinctly radio programs broadcasted simultaneously from stations on wave lengths from four to five meters apart.

Such selectivity is attained in the Valleytone because of the *Toroidal coils*. The Valleytone circuit brings in stations sharply, clearly, and free from distortion.

The *Potential Balance*, which is used for the first time and exclusively in this set, gives a balanced tone to the Valleytone. Reception is clear and mellow. Reproduction is faithful.

With the Valleytone you can enjoy radio as never before. You can get a station if it is on the air and transmitting strongly enough to reach you. You can choose your stations by the clock and hear them with the Valleytone.

The Valleytone is a five-tube set. It is manufactured by an old established company with the experience and the resources to assure you always the utmost in radio value.

The Valleytone is mounted in a solid walnut cabinet, finished in two tones with inlaid gold stripes. It may also be procured in beautiful console models. Special Valley tables with built-in loud speaker may be obtained for the cabinet model.

Before you buy a radio, see the Valleytone. Hear it. Let an authorized Valley dealer give you a demonstration.

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