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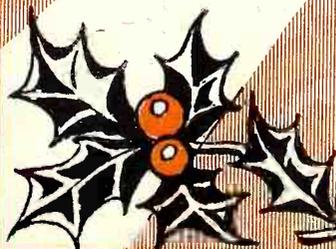
# RADIO WORLD

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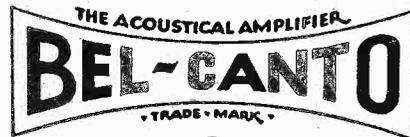
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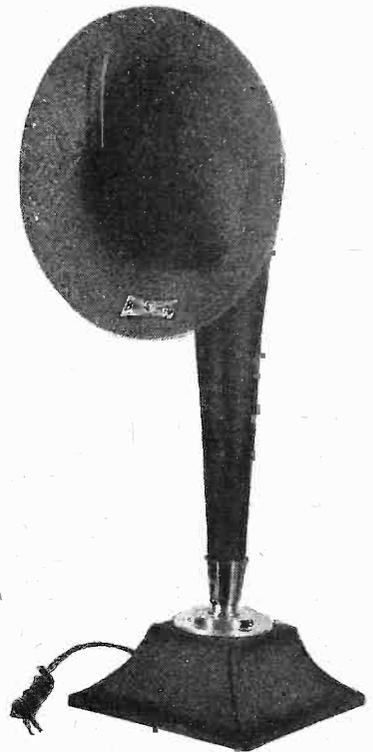


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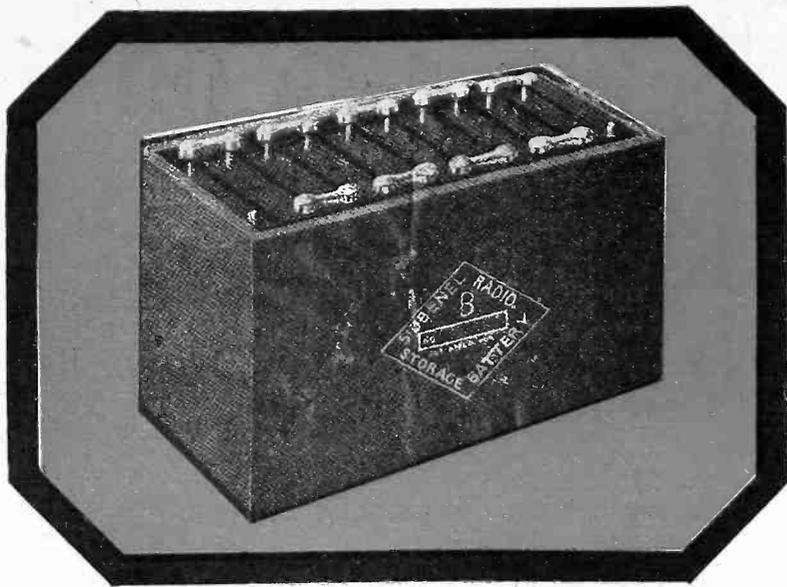
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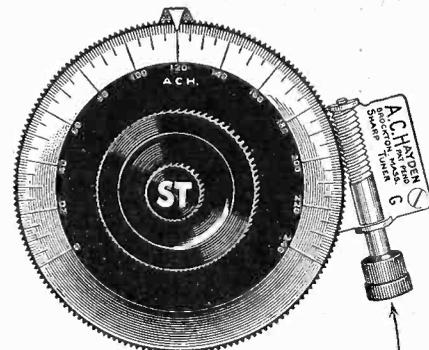
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# RADIO WORLD

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

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

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December 1, 1923

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## Make This a Real Radio Christmas!

**T**HE Christmas season of 1923 should be, and probably will be, the most prosperous the radio industry has known. All indications point that way and there are no untoward signs.

National Radio Week, closing with tonight's broadcasting programs, has been the most potent publicity factor the business has ever used. At this writing it seems scarcely possible that there can be a man, woman or child in the United States who has not heard something about radio during the past week. The very nature of radio makes it an ideal and penetrating publicity influence with an appeal to the broadest possible circle. And the industry has co-operated splendidly to make the public more familiar with the radio. The seed sowed during the past seven days will bring an abundant harvest if one may judge by present signs.

Now, right now, with the public still enthused over the wonders and advantages of radio, is the time for the wise merchant to step in and garner the business which this exceptional publicity has created. He should go after it hard, not only by using plenty of advertising space, but by sending out extra salesmen and, above all, by seeing to it that the service in the retail stores is what it ought to be to take care of the buyer who is not the least bit informed about the technique of radio. The average purchaser of complete radio sets at the moment is the layman—the "greenhorn," the "cheechako." He should be at all

times treated with consideration in spite of his technical ignorance which often is amusing to the young, but well-informed radio salesman. He may not know radio, but he's a buyer.

It is probable that from now until the first week in January the retail trade will be overwhelmed with visitors

call, they will come back when they are ready to buy. Courtesy, patience and toleration will transmute many a shopper into a buyer. So be prepared for about five weeks of hard work in educating visitors to your store to the genuine value of radio as a whole and the especial merits of your particular product. It will be well worth while to do this job right.

The money received for Christmas presents will not find its way in any large amounts to the radio retailer until after the holidays. The actual spending will begin with the new year. One of the largest manufacturers in the radio industry has found this to be true after tabulating the results of several seasons' experience. But all during January buyers will keep the retailers busy taking Christmas money.

Therefore, between now and Christmas it behooves the radio industry to follow up the wide and valuable publicity secured through National Radio Week, and to do everything possible to make people understand that there is no Christmas present quite so valuable and attractive as a radio receiving set or the parts from which to build one. Let's all get together and make this a real radio Christmas.

The usual means of publicity should be used and, if possible, be increased and intensified. Store displays must be arranged intelligently and attractively. Window dressings should be changed frequently. Lots of electric light will attract the eye of the passer-by so that he will stop



(C. International Newsreel).

This delightfully appealing picture of Baby Peggy, the winsome juvenile star of the silver screen, is typical of what will happen in many American homes on Christmas morning—if daddy does his duty and buys the family a receiving set.

who will not be immediate purchasers. They will be shopping. But they will be in the stores. And that is all any publicity can do—get people into stores. After they are in, it is the business of the individual salesman so to treat these people that even if they do not make a purchase at the first

# Notes on Receiver Design and Construction of Apparatus

By Beverly Dudley, Member, A. R. R. L.

IT has been stated that a coil and condenser in parallel are much superior to a variometer for tuning. Laboratory tests have shown that the resistance of the best variometer is 13 ohms. The resistance of a good coil and condenser is about 7 ohms. It is a good plan to use No. 18 to No. 24 wire for the coils. In laying out the parts of a set, arrange the apparatus as much like the wiring diagram as convenient. This facilitates easy wiring.

The coils used in receivers are very important. The turns should be spaced to lower the distribution capacity between adjacent wires. This is accomplished in honeycomb, spiderweb and bank-wound coils. The honeycombs seem hard to handle at short waves, but the spiderweb coils are almost an ideal inductance. They are small, compact, efficient, self-supporting, durable and can be easily made and mounted. Don't paint your coils with shellac or varnish. If it is necessary to hold the adjacent wires in place, use collodion. This keeps the wires in place, dries quickly and does not appreciably affect the efficiency of the coil. Be careful in handling collodion, as it is very inflammable. Single layer coils are most common and easily made, though they are not the most efficient.

In making the coils use as little supporting material as necessary. You don't need, for example, a rotor for a variocoupler an inch thick. In any case a light water-proofed tube of cardboard is preferable to a heavy composition tube. In wiring the set be patient. A receiver

cannot be connected up in five minutes if good radio principles are to be adhered to. Solder all joints, and make a good job of it; it is the perfection of details that makes a good receiver. Don't attempt to build more than two stages of audio-amplification unless you are perfectly familiar with the theory and amplification of such circuits, as howls and squeals result from poorly designed amplifiers. Use a good transformer.

A simple method of controlling regeneration applicable to either single or two-circuit tuners is to connect a 200 or 400 ohm potentiometer between the antenna and receiver. Varying the resistance tends to control regeneration. This scheme was tried out at station 9BR with some success and is worthy of a trial. It seems to give greater range to a receiver, especially if a hard tube is used for detection, since it brings the tube up to the oscillating point without "spilling."

The range of a well designed single tube receiver cannot be stated, although during the winter nearly all the powerful U. S. stations should be heard if a good antenna is used. Using a single wire three feet off the ground and fifty feet long, WSB, Atlanta, Ga., was recently heard, on a detector tube, while amateurs as far away as Denver, Minneapolis, Central Ohio and Kentucky came in with enough volume to be heard several inches away from the phones on the detector tube alone. The set was, however, well designed, and those results could not have been accomplished with a haphazardly designed receiver.

## Amateur Call Letter Plan to be Tried December 15

HARTFORD, CONN.—Looking forward to the time when radio amateurs of all nations will communicate with one another as easily as do amateurs in the several states of our own country, the American Radio Relay League through its Assistant Secretary Charles A. Service has prepared an international amateur call letter plan, that is to be launched for trial at midnight, December 15.

By this is meant a system of intermediates to be inserted between the call of the station addressed and the station sending, definitely locating the stations according to their respective countries. The plan has been so simplified that, in most instances, the initials of the various countries are used for this intermediate sign. For example, if French 8AB was calling Canadian 3BP he would send "3BP 3BP 3BP cf 8AB 8AB 8AB k" and the answer would come back with the intermediate letters reversed, "8AB 8AB 8AB fc 3BP 3BP 3BP k."

An arrangement of this kind has been long in vogue among amateurs on either side of the Canadian border, but then it was not thought that international communication would become common in so short a time. Since the plan involves all countries that have radio amateurs, it was not accepted by officers of the League until eleven different nations, representing hundreds of foreign amateurs, had been scoured and a huge pile of correspondence carefully tabulated. It was agreed that a feasible working plan ought to cover these points:

Should not increase the length of the calling now used between amateurs of various countries. Should make identification, both of call and nationality, reasonably sure. Should not employ arbitrary signals. Must be capable of use by amateurs of all nations. Must identify amateurs of the same country working each other, when heard by amateurs of another country. Should take care of present and future requirements for several years, or until such time as the next International Radio Telegraphic Convention meets and assigns a better scheme on the basis of the present commercial assignment of calls.

Whenever possible the initials of the various countries have been selected as the intermediate, but when conflicts have occurred, arbitrary initials have been selected, phonetically suggestive of the country, which makes it that much easier. They are: A—Australia, B—British Isles, C—Canada, I—Italy, M—Mexico, N—Netherlands, O—South Africa (the exception), P—Portugal, Q—Cuba (phonetic), R—Argentine (phonetic), S—Spain, U—United States, Z—New Zealand.

This arrangement leaves twelve letters which may be assigned when amateurs become active in other countries. Amateurs are advised, when calling another amateur in their own country, to insert between the two station calls the initial of that country, so that listeners-in of other nations may identify the operator sending.

# Adaptations of Several Good Selective Circuits

By Walt. S. Thompson, Jr., E. E.

**I**N a previous article the writer described a tuning unit in connection with a receiver using radio-frequency amplification. It is the purpose of this article to describe a few circuits to which this tuner is particularly well adapted.

The key-note of the tuning unit is the selectivity which it gives to any circuit. This is due to the very loose coupling between the primary and the secondary circuits and as this coupling is also variable, the degree

to do without a loud speaker, there is but one thing to be desired; that is, the ability to separate local stations, which the average crystal set does not have. Fig. 1 is offered as a solution to the above difficulty, this circuit acquiring its selectivity, not only because of its loosely coupled primary, but also because the secondary is tuned to resonance with the incoming wave by using a large inductance and a small capacitance. The inductance is the variometer and the capacitance, repre-

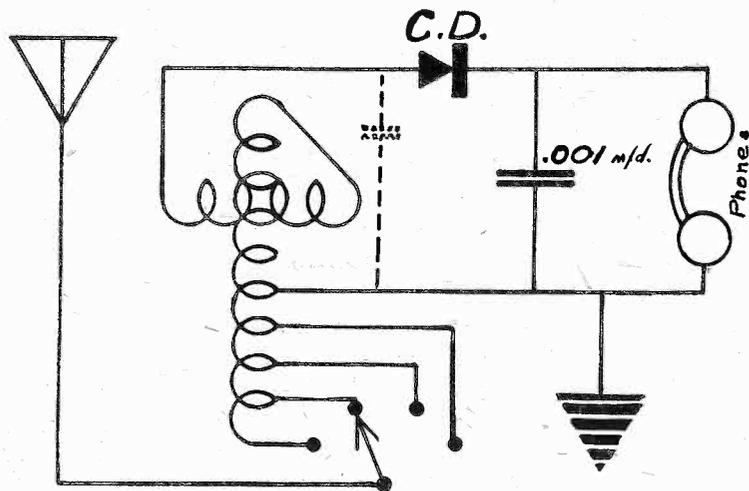


Fig. 1. A selective crystal circuit, embodying the special tuner mentioned.

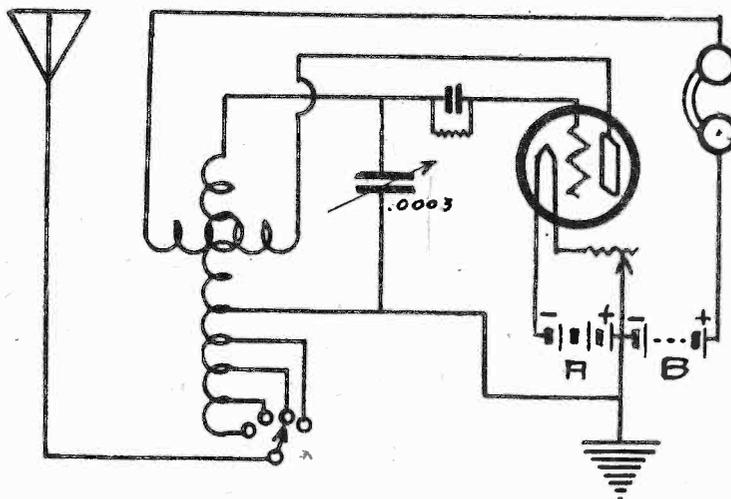


Fig. 2. The same tuner used in connection with a single tube.

of selectivity can be changed. When hunting for a particular station or when trying to pick up a new one, it is often more convenient to use the maximum coupling, because a fan using a too highly selective receiver might pass the desired station without locating it. After the station has been picked up there is often some other station broadcasting with a wave length closely approximating that of the first, so it is

represented by dotted lines in Fig. 1, is the distributed capacitance in the windings of the variometer. If this distributed capacitance is not large enough to enable the user to reach the higher broadcasting wave lengths, the two wires between which the dotted condenser is connected should be twisted together for about an inch or so, taking care to insulate the two wires from each other. This can be accomplished by slipping a piece of

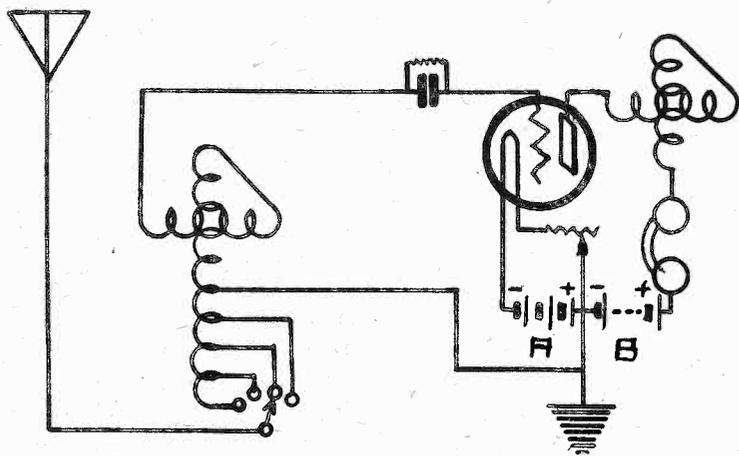


Fig. 3. Obtaining regeneration by means of a plate variometer. Slightly more selective than the preceding two, but more difficult to tune.

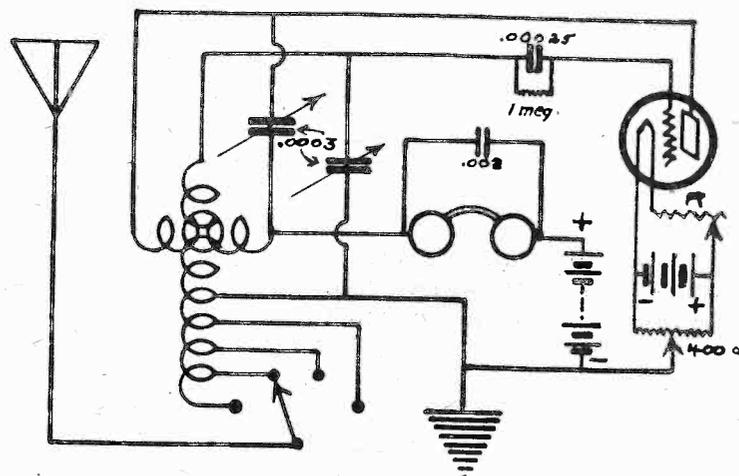


Fig. 4. Variation of the Haynes circuit shown in Fig. 2. Extremely selective. Good volume and control of volume is possible.

highly desirable to loosen the coupling; hence we see that the ability of the user to change the degree of coupling is another important feature of the tuner.

Any one living in or near a large city is usually close to one or more broadcasting stations and is fortunate enough to require only a crystal set to hear these stations very comfortably using a head set. The reception using only a crystal is so fine that if one is satisfied

spaghetti over one of the wires before twisting them together.

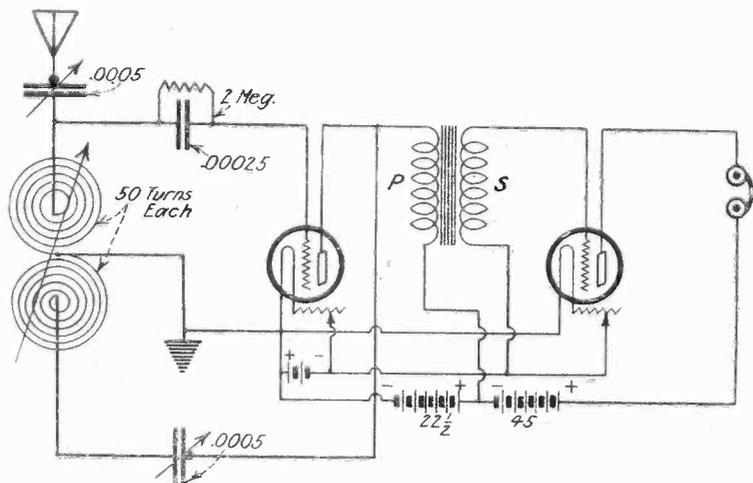
Figs. 2 and 3 are examples of how to combine the advantages of the single circuit set and the three-circuit set, as well as eliminating most of their disadvantages. From the single circuit set we get the  
(Concluded on next page)

# A Receiver Combining Selectivity With Good Volume

By S. W. Hannel

**T**HERE are a great many radio fans who like to build their own receivers. They do not fancy buying "ready-mades" simply because they get more fun out of fooling with tools and wires and solder and circuits. Of course, a necessary requisite must be that the receiver works after it is constructed. Also it must work satisfactorily in order to "make a hit" with the fan.

I have in the course of my experimenting with radio probably fooled with more circuits and different apparatus than the average fan, simply because I am quite particular as to the way a set functions before I allow it to grace the hallowed space known as my radio table. Up to the present time I have had a dozen or so more



Circuit embodying a spiderweb variometer of special design. Extremely good volume and selectivity is possible if the set is correctly operated. Good circuit for distance work when properly constructed.

or less successful receivers working, but at last seem to have struck the happy medium.

The circuit itself is not original with me. It is an adaptation of one that appeared in a Canadian paper some time ago. In the original plans a tapped coil was used but, favoring spider-web coils, I adapted it to them, and finally used two as shown in the hook-up herewith.

(Concluded from preceding page)

simplicity of tuning and eliminate the lack of selectivity and the tendency to radiate C. W. waves. From the three-circuit set we get the selectivity and sensitivity and eliminate the complicated tuning.

Fig. 2 is an adaptation of the Haynes circuit with which so many fans have had remarkable success. The tuning is done with an 11 or 13 plate variable air condenser in the secondary circuit, the rotor of the variometer being used as a tickler coil to control regeneration. The values for the grid condenser, grid leak and rheostat will depend upon the tube used, this circuit being well adapted to either the dry cell or the storage battery tubes.

The circuit illustrated in Fig. 3 is still more selective, due to the fact that the plate circuit is tuned to resonance with the incoming wave by a variometer. The use of the additional variometer eliminates the necessity for using a condenser for tuning the grid circuit, as it releases the rotor of the tuner-variometer

The parts required for the construction of this receiver are few, but should be of the best manufacture. They are: two 23-plate condensers; one 2-megohm grid leak with .00025 fixed condenser; two rheostats; two sockets; one audio-frequency transformer; two 50-turn spider-webs (home-made); one 45-volt, or two 22 1/2-volt, B batteries; panel and other necessary apparatus.

The hardest part of the entire set is winding the spider-webs, and this may be done in a half-hour's time if you have the knack. Use a former with an uneven number of slats, and skip every other one. This gives a more straggle-wound coil and the tuning is sharper due to less distributed capacity. The two coils are wound in opposite directions, as shown in the diagram. This latter procedure is not just according to the best practice of our radio engineers, but in this particular receiver it makes a lot of difference which way the coils are wound, and I have found that the results are increased fully 50 per cent. by using coils with the windings opposing one another.

Wire the receiver up just as shown, taking the ground-filament tap off the two outside connections of the coils. The only precaution necessary is to make sure that the coils are mounted with the wires running in opposite directions. When laid out flat, or when coupling is nil, they should form approximately a letter S.

The tuning is simplicity itself, inasmuch as the only controls are the two condensers with an occasional adjustment of the coupling when doing distance work.

Just to show the fans that this set is capable of doing good work, the following stations were all copied within an hour the first night the receiver was constructed: WHB, WDAP, CFCK, WMAQ, WLAG, WOC, KHJ, KFBQ, KZN, WJAZ, KPO, CJCG, WDAF, KFI, KDZQ, KLZ, KFAF, or in round numbers, a total of 10,400 miles from Sanatorium, Colorado. And there was no such thing as having to stretch your ears to hear them either, as most of them came in loud enough to make you think that they were middle distance stations instead of the "big boys."

so that it can be connected in series with the stator and used for tuning. Regeneration is obtained, due to the feed back of energy from the plate to the grid circuit through the tube, when the plate circuit is tuned.

The circuit shown in Fig. 4 has incorporated in it several totally different features. The rotor is used as a tickler coil and is shunted with an 11 or 13 plate condenser. This feature combines the tuned plate circuit and the inductive feed back of the two previous circuits and adds quite materially to the selectivity. The grid circuit is essentially the same as in Fig. 2, requiring another condenser similar to that used in the plate circuit.

The method of connecting the plate battery to the grid circuit and ground and then bringing the common lead to the movable arm of a potentiometer should be particularly noted. This feature seems to add so materially to the results which can be obtained with this circuit that the writer urges his readers to try this hook-up.

# How I Radioed the First Japanese Earthquake News to the World

By Kaichiro Yonemura

**I**MMEDIATELY after a rather strong earthquake shock at Tomioka, Japan, at noon, September 1, we found that the wires to Tokyo and Yokohama were down and telegraphic communication with both cities was completely stopped. I foresaw the difficulty of bringing about restoration of the telegraphic circuits, and it came to my mind that we must open up connection with other radio stations because radio is the only means of communication in such an emergency. Therefore we at once began calling up our fellow stations and listening in for them.

At 7 P. M. on that evening we picked up a message from the "Korea Maru," then in Yokohama Harbor, which the Choshi radio was endeavoring to transmit to

"Conflagration subsequent to severe earthquake at Yokohama at noon today whole city practically ablaze with numerous casualties all traffic stopped."

This message was received at San Francisco immediately via Honolulu and delivered to various papers there. You know that the papers throughout the United States issued extras on the morning of the first or some time during that day giving the above account of the disaster.

For some days after that I continued sending news several times each day to keep the world informed of the great event. These bulletins were copied direct by San Francisco radio, which maintained a constant watch for us.



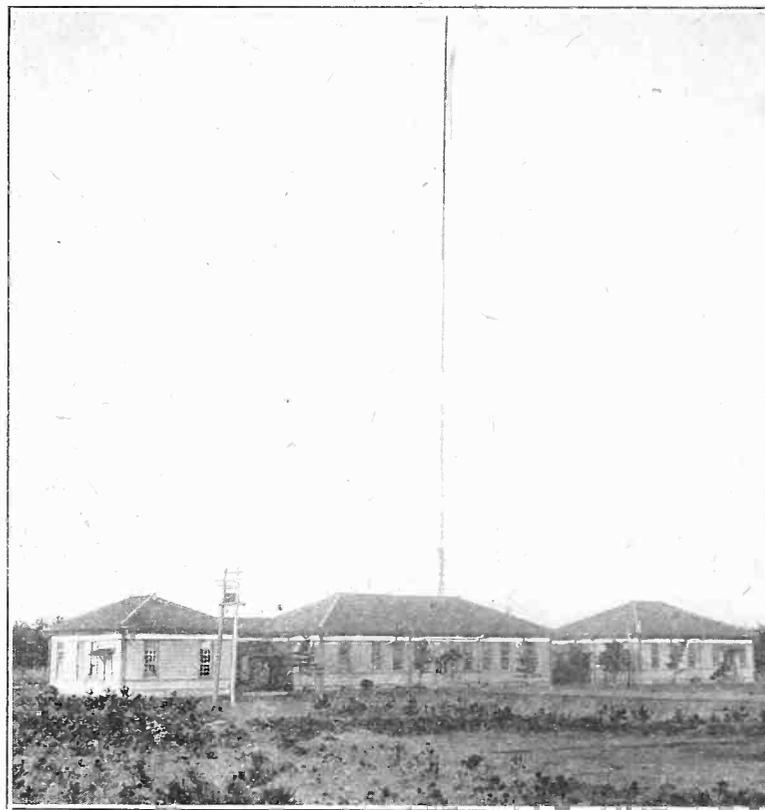
KAICHIRO  
YONEMURA,

who gave the world, by radio, the first news of the great Japanese earthquake, was born at Kanazawa, Japan, June 1, 1884. His technical education consisted of a year at the Post and Telegraph School, Tokio, in the class of telegraph manipulation. He was graduated with honors in 1902. In 1907-8 he returned to the same school for six months where he was trained as one of the first radio operators in Japan.

Since then Mr. Yonemura has served five years as chief radio operator on vessels of Pacific and European lines. From 1913 to 1916 he was chief operator for the trans-Pacific radio service at the Funabashi, Japan, radio station. He was appointed superintendent of the Iwaki,

Japan, radio station on May 1, 1920, when that station opened and took over the trans-Pacific service hitherto conducted by the Funabashi station.

Mr. Yonemura was ordered last December to proceed to the United States for an inspection of the high-power radio service. He returned to Japan last April after visiting Hawaii, San Francisco and New York.



The high-power radio station at Tomioka, Japan, of which Kaichiro Yonemura is superintendent. This station controls the high-power station at Haranomachi and operates the trans-Pacific traffic with the RCA station at San Francisco via Honolulu. It was from the station shown in the illustration that Mr. Yonemura radioed the first news of the Japanese earthquake.

Shiomisaki, near Osaka. This was the first news by radio. This message and subsequently many others were one after another retransmitted by us to our head office at Sendai by a temporary wire connection.

In view of the fact that Tokyo was deprived of all means of communication with the outside world as a result of the interruption of the Bonin cable and the land lines, I saw the necessity of sending out the news to the world by our own radio. At 8:10 P. M. I informed the San Francisco radio station of the R. C. A. that there was a severe earthquake at Yokohama and vicinity and that the state of affairs was unknown. At 11 P. M. I sent the first news, which read as follows:

My work came to an end on September 7, for we saw press messages from foreign correspondents going through Iwaki.

In concluding my story, I am extremely glad that I could seize the opportunity to do my bit toward awakening the sympathy of your dear American people and toward enhancing the amicable relations of the two great nations.

## Check Up Constantly

**T**HE trouble with most receivers built from diagrams is the fact that the builder heats his soldering iron, makes all the connections, thinks he has them right, then hooks his set up. It doesn't

work. He looks around quickly, thinks quicker, and then lets out a terrible yell. If, instead of being in a hurry, he had checked his entire set he would no doubt have found the trouble before he connected it up.

# A Three-Tube Super-Regenerative Set

By Byrt C. Caldwell

FOR the person who has had some experience in building a tube set, and who desires to reach far out into the distance and bring in dozens of stations on the loud speaker, with perhaps only a loop for antenna, the three-tube super-regenerative is the most powerful set he can build which is fairly easy to construct and operate. On examination of the hook-up, the three-tube set looks fairly complicated, but if

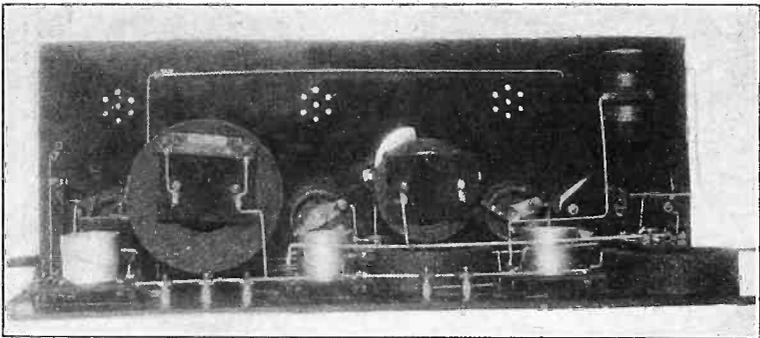


Fig. 1. Rear view of the completed receiver, giving a good idea of the placement of the various parts. Good construction and careful wiring is essential in a receiver of this type.

you examine the circuit carefully, you will see that it is only the simple two-tube super (which is itself merely an ordinary regenerative set, with the addition of two coils and a condenser), plus one stage of audio-frequency amplification separated from the oscillating circuit by means of a filter.

For this set it is advisable to use a loop, as it is so

cardboard or bakelite form. The rotor consists of 60 turns of the same kind of wire wound on a form placed inside the tuning coil. A variocoupler rewound to the proper number of turns, and connected as shown in the diagram may be used. The tuning condenser is directly underneath the coils, and has a capacity of .0003 mfd. The three tubes (which must be amplifiers and for the best results should be power tubes) are placed in back of the rheostats. The dial between the first and second tubes controls a .001 mfd. condenser, as does the dial to the extreme right. The D. L. 1250 coil is placed flat on the base, directly in back of the tuning condenser. The 300-turn coil is fastened to the back of the first large variable condenser, and one of the 1500-turn coils is fastened to the back of the other .001 condenser. You will notice that in this set, a duo-lateral coil is used in the filter circuit in place of the usual iron core choke. The remaining 1500-turn coil is placed under the first .001 condenser. The two 12,000-ohm non-inductive resistances are placed on the base between the second tube and the second rheostat. The audio-frequency transformer is placed between the third tube and the third socket. The four .001 fixed condensers, which should preferably have mica as a dielectric, are placed in the most convenient positions possible.

The binding posts for all the batteries should be on the rear of the set. The only binding posts on the front are those used for the loop and for the phones. For best results with this, and in fact with any set, binding posts should be used in place of jacks. Jacks add to

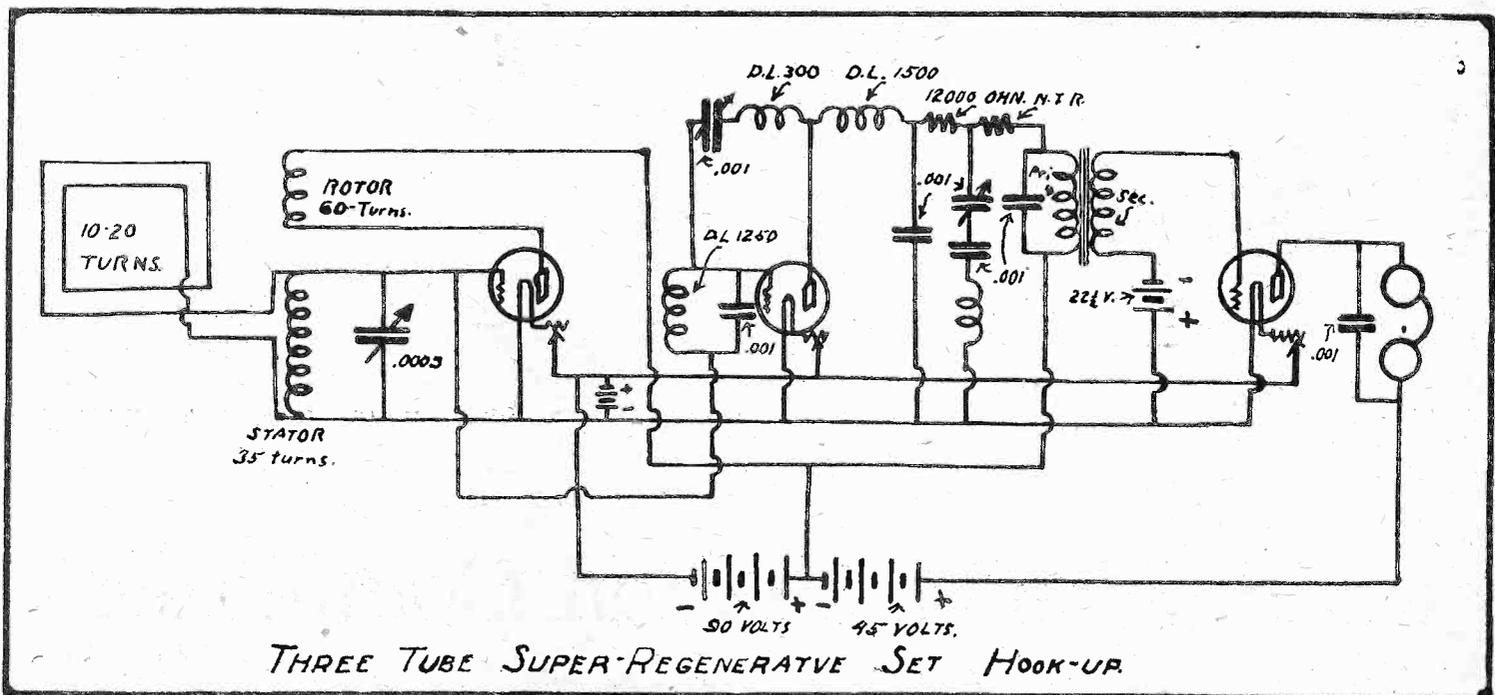


Fig. 2. Schematic diagram of the three tube super-regenerative receiver, with constants plainly marked. It is imperative that all these be faithfully adhered to if success is expected. Hard or amplifying tubes are employed throughout and the best of apparatus must be used.

extremely sensitive that with a loop it will give results equalling those of a six-tube regenerative set, using an outdoor antenna. Fig. 3 shows the construction of a satisfactory loop. It is made from 1" square wood, and is wound with about 20 turns of fairly large copper wire, spaced about  $\frac{1}{4}$ " apart. A clip is used so that the number of active turns may be varied.

The size of the panel is  $7\frac{1}{2}$ " x 20" and is planned according to the layout shown. The tuning coil consists of 35 turns of silk insulated wire wound on a 4"

the ease of operation, but they are detrimental to the most successful results. Once again—use large wire, bare, and solder every connection. The tuning inductance can be connected in series with the loop, instead of in parallel, as shown. This will simplify the operation of the set and it does not lessen the efficiency.

To operate the set, light all the filaments and connect the loop, phones, and the other batteries. Vary the first .001 condenser until a whistle is audible in the phones. This whistle should vary in pitch as the dial

is turned. If it is not audible, make sure that the tickler coil is connected correctly, and that there are no breaks in the connections. After the whistle is heard, vary the tickler coil until the first tube oscillates. Test for this by touching the antenna binding post. If a loud click is heard, the tube is oscillating. Now the set is operating properly and the signals may be tuned in with the tuning condenser. When a station has been tuned in, decrease the tickler coil and tune in very carefully with the tuning condenser. When the station is tuned to its loudest, increase the tickler until a point is reached when the signals roar in with full volume. It is well to disconnect the phones, if they are valuable, and connect the loud speaker before this point is reached, as with local stations, the amount of current flowing in the output circuit is sufficient to burn out a pair of ordinary phones. After the signals are tuned in, vary the filter condenser until they come in with the best quality and with the proper volume. If the set whistles, tune the tuning condenser and vary the tickler more carefully until the whistles are eliminated.

It will take the average fan only a few nights to "get on" to this set—and then, literally, the sky is your limit. This set will easily reach clear across the country, and will bring in stations up to hundreds of miles away on the loud speaker. The super-regenerative, due to the fact that it operates best on a loop and is extremely sensitive, is bound to be one of the most popular sets. The fan who has one, is the fan who is going to get the most enjoyment out of radio.

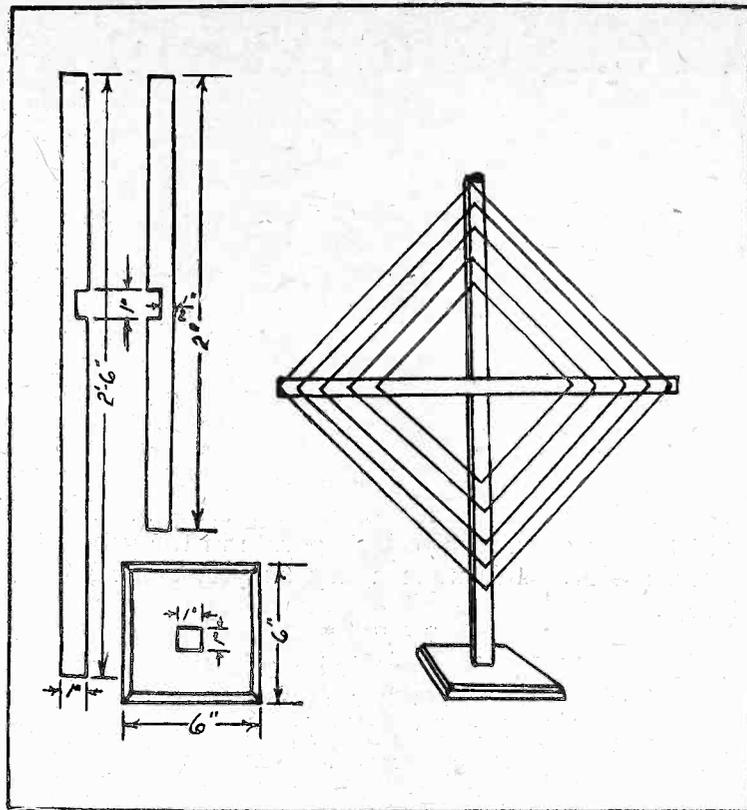


Fig. 3. Details of a suitable loop for use with the super-regenerative receiver as outlined in the accompanying text. Use only good, dry, well varnished wood in its assembly.

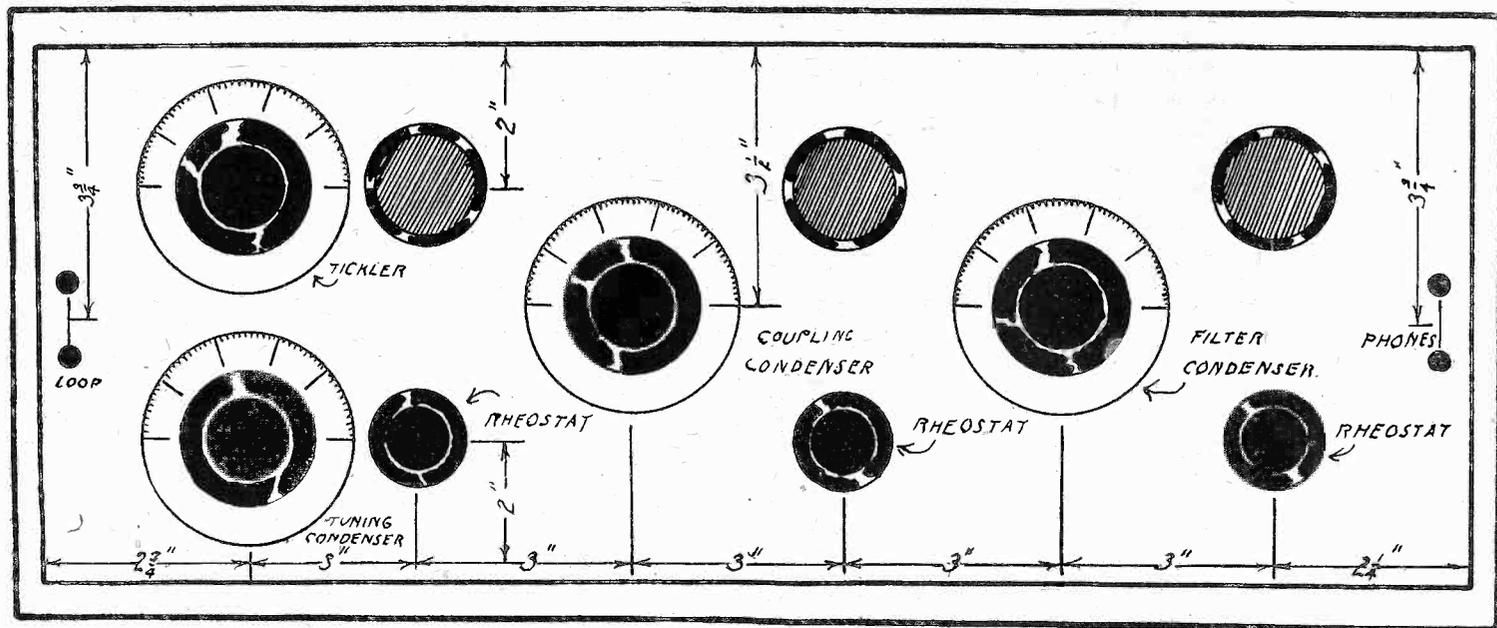


Fig. 4. Panel layout of the receiver as described. This suggested panel plan is well balanced, giving a pleasing appearance, and is also well thought out concerning the actual placing of the apparatus in the rear with regard to the length of leads and the placing of the various units and parts.

# Radio Standardization Committee Organizing

**A**S AN outgrowth of the radio standards conference held in New York last January the organizing committee met recently and prepared a proposed list of members representing the various phases of the industry.

Dr. A. N. Goldsmith, secretary of the Institute of Radio Engineers, has written each proposed member organization asking that a representative be named. The Inter-Departmental Radio Advisory Committee has designated its secretary, L. E. Whittemore, as its representative on the standards committee. Besides the

inter-departmental committee it is understood that the government will be represented by radio experts from the Army, Navy and Commerce Departments.

In organizing the committee broad representative lines are being followed, as is prescribed in the procedure of the American Engineering Standards Committee. Other representatives will be chosen by the commercial and manufacturing divisions of the industry, making a total of about 25 to 30 members, including producers, consumers and distributors of radio, as well as the general public interests.

# The Radio Woman

JUST realized the other day how my geography had improved since I became interested in radio. I always did dislike it in school and could never seem to remember it. Come to think of it, I know more about the general topography and locations of cities small and large now than I ever thought about in school. I wondered for a while just how it all came about, and then thought that it was due to hunting for towns on the map, which Friend Husband so kindly fixed up on our table, to locate stations. And furthermore I am getting to be a perfect whizbang at telling distances from New York. I do not even have to use our ruler any more, but can come within a very few miles of the airline distance at a mere guess. This ought to be a good idea to incorporate in the geography classes, as it would make a dry subject something of interest.

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When I told F. H. about it he said that a friend of his in the map business has sold more maps in the past year mainly for the radio fans than he ever sold before, and they were the odd sizes too. The people who used to buy maps always wanted either the large wall sizes or the small book size, but now he has a chance to get the medium size paper ones out of his hands, and really cannot print them fast enough to supply the demand. Another point in favor of radio. There is a line that no one would have thought would be helped by radio, and radio comes along and boosts it more than anything else could. Well, it is estimated that there are over 3,000,000 receiving sets in the United States today, which is an increase of about 2,000,000 over two years ago. Imagine selling even one-fifth of the maps that most of those people use! Makes you feel like being a map salesman.

\* \* \*

Last week I told you about my young friend who changed his two-bulb set into a three-bulb set and added a loud speaker. The job is now complete and everybody is perfectly happy in the change, especially Mother, who somehow never could adjust those ear phones exactly right.

\* \* \*

In the course of a month or so I expect to be told that this same youngster is planning some other improvement or enlargement. It's simply remarkable the way these children get the hang of things and really accomplish as much as their elders sometimes.

## How to Practice Code

SOME time in the life of the average fan, comes the night when he wants to decipher the various "dit-dit-dit-daahs" and "dah-dits" that float unescorted and unannounced into his receivers. He learns the code, studying it very industriously by means of a buzzer and key, until he knows every letter and number. But his great disappointment comes when he tries to decipher some of the ship or amateur code that is flying around loose. It is too fast, and the more he tries to decipher, the slower he seems to get. If he will, however, adapt his set to 2,500 meters, listen in on NAA time and weather signals, he will very easily find himself acquiring speed and soon will be able to copy the regular ship messages, or at least enough of them to show that he is improving. The NAA station sends at a speed varying between 12 words per minute for the weather to 15 and 25 for the press. Try it.

# The Radio Primer

*The Importance of Following Instructions.*—Many times a writer will mention in an article some particular part or piece of apparatus and then leave the selection of the particular piece to the amateur. Then again he may specify a certain coil or condenser capacity. He states that a certain number of turns should be used, or a certain manner of taking the tap-off points should be followed. If definite instructions are thus given, always follow them to the letter.

Why this should be done is more or less obvious to the fans, even if it is not exactly clear. However, consider the following before you start to kick. Suppose it is a receiver which embodies the super-regenerative principle. The author has worked it out very carefully, compiling statistics, working out definite capacities, inductances, and other important details. If you follow them exactly you will be assured of success, provided that you have not made some error in transcribing his instructions.

If you do not, however, there is where the rub comes in. In any receiver a certain part has certain definite work to do in the circuit. In the super circuits more than any other, the instructions must be followed. The super principle involves the exact handling of frequencies many times the original value of the signal, then rectifying them and amplifying them. The value that spells success or failure is that of the specific inductances and the resistances and capacities. Deviation of just one point in the construction will mean failure, or the inferior results that dissatisfy. Therefore when instructions are given, follow them exactly, even if they seem queer.

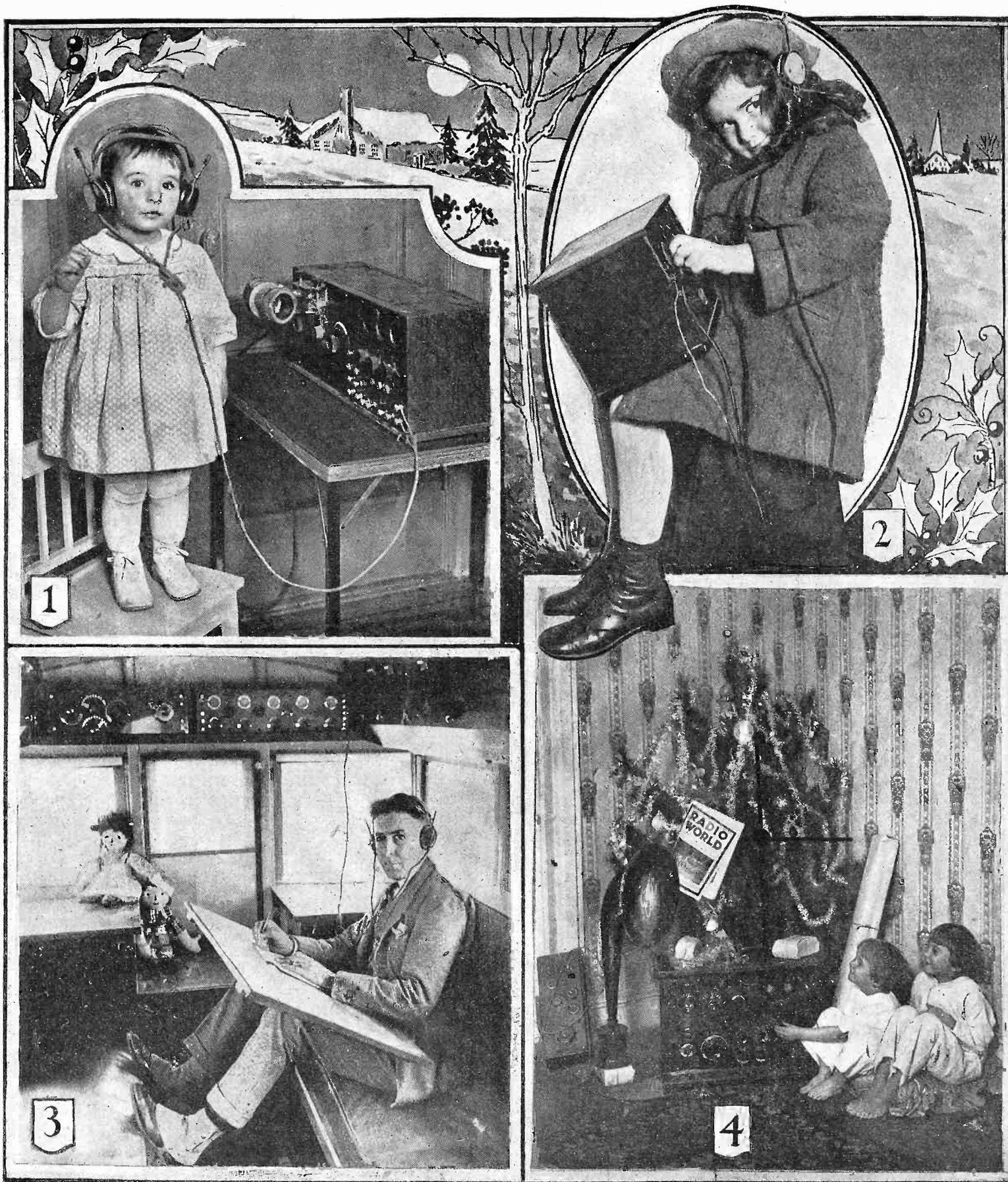
One instance of not following instructions, causing failure of a receiver, is cited to show the importance of this matter. The receiver mentioned, which is more or less popular, called for the use of a choke coil of .2 milhenry, shunted by a condenser of high value. The builder attempted the receiver, and because some one had informed him that a suitable choke coil of this value could be had by using a bell-ringing transformer primary, he used it and shunted it with a condenser that he thought would fill the purpose. Here were two flagrant violations of the first rule of construction, and when the receiver which had cost some hundred and thirty dollars did not work, the builder immediately blamed the author, until the author pointed out to him his serious error. Upon testing the particular transformer primary that had been tried out, it was found that it was approximately three times too large for the purpose, which coupled with the fact that the condenser was about half the value necessary was enough to prevent the circuit functioning at all. Follow directions explicitly and the receiver will work—otherwise do not expect it to function.

## New Broadcasters

LIST of Class A broadcasting stations licensed during the week ending November 16:

Call	Station	Frequency Keys	Wave Length Meters	Power Watts
WWAE	Alamo Dance Hall, L. J. Crowley, Joilet, Ill.	1,320	227	500
WRAM	Lombard College, Galesburg, Ill.	1,230	244	250
WABP	Weinrig, Robert Frederick, Dover, Ohio.	1,130	266	100
Transferred From Class C to Class A				
WEAJ	University of So. Dakota, Vermillion, S. D.	1,060	283	200

# Advance Impressions of the Christmas Spirit of Radio Giving



(1)—Little Ruth Taussig, two-year-old radio fan, slipped one over on the folks, and wrote a letter to the "Man in the Moon," telling him to speak to Santa for her. Big Brother helped her pen the note, and she is seen listening to "Friend Hercules" admonishing Santa—way up north—to remember to bring her all the dollies and sleighs she asks for. (C. K. and H.)

(3)—Johnny Gruelle, humorist and cartoonist, famous for his "Raggedy Ann" stories, had a full fledged radio-frequency receiver installed in his Pullman compartment. He is traveling across the country gathering from the air material for holiday stories and pictures. (C. International Newsreel.)

(2)—Little Grace Gottlieb is only five years old, but she boasts her own radio set. It may be only a crystal set, but it makes her the envy of the neighborhood and will keep Santa busy this season matching it up with other sets. Guess the Old Boy will have to start a special department to take care of all the orders he gets. (C. Kadel and Herbert.)

(4)—The dream of every kiddy on Xmas morning. To wake up and find a brand new Xmas tree, sparklin' with tinsel, candies and knick-knacks, a year's subscription to RADIO WORLD, and a brand new Federal receiver with a nice loud speaker. (C. Foto Topics.)

# A Simple Receiver for Clear Signal Reception

By C. White, Consulting Engineer

RECENTLY I have been spending quite a bit of time investigating the various causes of radio interference in a large coast city. Quite a bit of interference on the 450 and 500 meter lengths could be traced to ship stations and ships near the coast resorting to this wave band when the 600 meter band was overcrowded. But the most serious cause of howls and whistling interference was traced to the improper operation of various types of regenerative and kindred types of circuits. The noise generated in the apartment house district where there were as many as fifteen radio sets to one apartment house and as many more in the house next door was nothing short of appalling. It is easy to clear up the interference due to coastwise ships and land stations by requiring that a higher band be used when the 600 meter band is overcrowded instead of a lower band, but it is another problem to clear the air of the howls made by sets improperly constructed or operated.

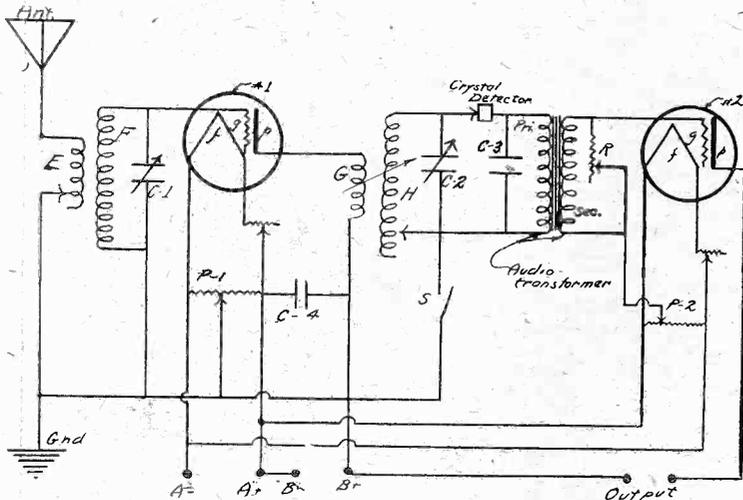


Diagram of a two-tube receiver incorporating one stage of tuned radio-frequency, crystal detector, and one stage of audio-frequency amplification. Excellent for clear DX work.

The only possible immediate solution for the problem is the conversion of such sets into non-radiating regenerative receivers or changing them into radio-frequency sets. It is a great pity that some people when tuning in have no consideration for the many more who are listening, but I believe that a solution will be found among the radio fans themselves. Indeed, there is a most noticeable trend that way at present. The average radio fan is no longer satisfied with a loud noisy circuit but wants one that is quiet and clear in tone. Some one has said that this year is a radio-frequency year and that the perfection of radio-frequency receivers is not only opening the road to clearer and better tone reception, but is also cleaning the road to clear operating conditions.

The future radio receiver will either consist of radio-frequency amplification with a non-regenerative detector or with a regenerative detector. Reradiation is not the fault of a regenerative receiver as much as the man who operates it.

If you really want a quiet circuit there is nothing for the same cost that can beat the circuit described herewith. It is exceedingly pure and clear in tone and

incorporates a degree of selectivity that is pleasing to the most critical. Yet the cost is very low and it can be assembled from parts that you most likely already have on hand if you have built a set previously. In fact, the entire set is so designed that no expensive new parts need be bought. For instance, the unit G-H is a variocoupler such as any radio fan will probably have on hand, and the condensers are all standard sizes, except the condenser C-4 which is a 1.0 microfarad telephone condenser. The unit E-F is the only special part and that can be cheaply assembled at home. If you have the style of condensers that can be readily adapted to open mounting such as table mounting, I would advise that this type be used in preference to the cabinet and panel style owing to the fact it allows you to readily make small changes in connections and experiment without loss of time. I do not care what circuit you use, if you are an interested radio fan, you are going to alter it from time to time to study the advantages and disadvantages of some new changes. If you are compelled to purchase condensers you will find it expedient to use table mount condensers that are enclosed in some sort of casing to protect the plates from collecting dust and dirt. You can construct such a casing for experimental work if your present condensers are of the "open behind the panel" type.

The unit E-F is wound with No. 22 S. C. C. magnet wire on a 3" diameter tube about 3" long. The coil F is wound on first and has 50 turns of wire untapped. Directly on top of it the coil E is wound with 12 turns, tapped for switchpoints at every third turn. By operating the primary untuned and with only a few turns of wire inductively coupled to the secondary a very high degree of selectivity is secured. The condenser C-1 which tunes the secondary circuit is an 11-plate condenser. The potentiometer P-1 serves to control the amount of amplification of the radio-frequency amplifying tube No. 1, while P-2 serves the same volume control for the audio-frequency amplifier No. 2. P-1 and P-2 must have a resistance of 300 ohms apiece or more. The variocoupler G-H is connected with the rotor as the coil G and the stator as the coil H. A 23-plate condenser (C-2) serves to tune the plate of No. 1 while a crystal detector is used to rectify the radio-frequency waves, hence giving or passing on an audible signal to the primary of the audio-frequency amplifying transformer. Across the secondary of this transformer a variable grid leak type of resistor is shunted. I have found that by so doing it is possible to greatly increase the quietness of operation.

Another special advantage of this circuit is the use of a variocoupler instead of a fixed coupling for the unit G-H. The change of coupling affords a more sensitive control of amplification than a fixed coupling inductance. The bypass condenser, C-3, should have a capacity of .002 mfd. A switch S allows the crystal detector circuit to be operated grounded or ungrounded. Sometimes better results are secured when this circuit is ungrounded; still, body capacity is eliminated by tuning in with S closed. Be sure to see that filament rheostats used have sufficient resistance to obtain perfect filament heating control over the entire operating range of the vacuum tubes employed.

# Developing Radio for Flying

By Carl H. Butman

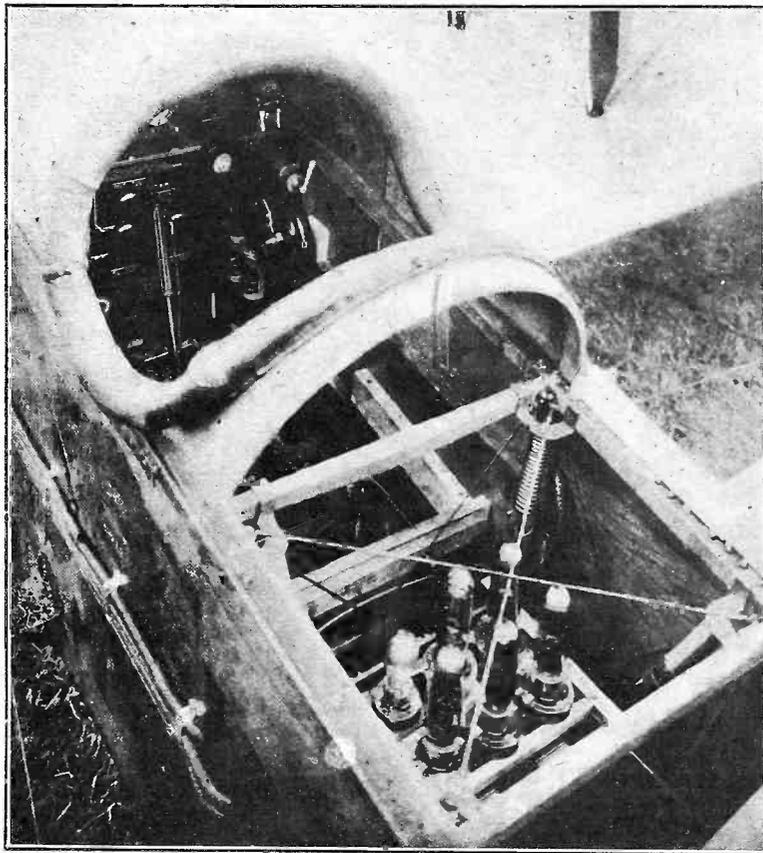
**T**HREE different bureaus of the government are rushing work to perfect telephone radio sets for transmitting from airplanes in flight. Such transmission is, of course, not new, but efficient sets answering specific requirements are desired by the Army Air Service, the Marine Corps and the Post-office Air Mail Service. The problem cannot be worked out jointly since the specifications are not similar.

Ever since the armistice the army has been trying to develop a combination radio telephone and telegraph set suitable for airplane use, and has just about succeeded. Recent tests with Model Set S. C. R. 134, between an airplane flown back and forth from Bolling Field, Anacostia, D. C., to Quantico, Va., about 45 miles, and the radio laboratory of the Signal Corps in Washington, proved the set was practically perfect. Outsiders listening-in on the two-way conversation were deeply interested, following the engineers' conversation carried on over NAA at Arlington, and then picking up Captain Johnson's replies on 400 meters from the plane. The sample transmitter built by the General Electric Company was found to be satisfactory, the main objection being the motor-alternator which furnishes the tone for the interrupted C. W. transmission, which, it is felt, can be readily corrected and production orders placed. Marine Corps radio and aviation experts recently tested out a new service combination set for use in airplanes, but without very successful results, due chiefly to bad weather conditions requiring low flying. Conversation between officers in the Navy Building, however, and Captain Pierce in a plane over Quantico was carried on, but further tests will be necessary.

What the marine fliers want is a short-wave telephone set using around 100 meters, whereas they have been forced to use a transmitting wave of 500, which they claim is too long and productive of harmonics. Navy set 1345 is therefore being modified and improved. Other tests in spotting practice held at Quantico, wherein a plane gave phone reports on target practice, proved satisfactory. The operator in the plane was heard as far away as Baltimore by radio fans who were listening-in.

For air mail pilots, who fly alone on their trans-continental trips, the Postoffice Department is seeking a "one-man" radiophone set which can be operated by the pilot while under way. Radio telegraphy is useless for mail routes, in the opinion of postal authorities, since they haven't room for an operator, and do not require their pilots to learn code. Radio telephony, therefore, carries the whole burden of aiding in aerial flight, getting orders, calling for aid and directions. A special

small and compact telephone transmitting set to operate on about 125 meters is desired. Tests have just been made on a new set developed by the General Electric Co., operating on 180 to 280 meters. Speech is sent out through five 50-watt XL transmitting tubes. The receiver uses seven UV199 tubes. The operation and adjustment is simple, and the transfer from sending to receiving is made by throwing a switch. After a year's work, a practical standard set has been adopted and an appropriation providing for a set for each plane will be sought. The necessity of small space and weight was



(C. Kadel and Herbert)

Cockpit of U. S. mail plane showing radio equipment. The controls for the receiver and transmitter are up in front with the pilot's controls, the tubes for the transmitting being placed in back on springs to prevent breakage due to vibration. Hood removed to show the apparatus.

one of the difficult problems, but it had to be solved in the interest of carrying as much mail as was possible.

Strangely enough, the navy takes an exactly opposite view on radio airplane communication from the postal authorities. Naval fliers have practically abandoned the telephone set and use only radio telegraph, all the pilots being skilled in code transmission.

## RADIOGRAMS

"Oh, What's the Use?" is a radio comedy in one act written by Lillian Taft Maize, 1069 Senate street, Portland, Oregon. It won first prize in the radario writing contest conducted by the Writer's Digest in cooperation with the Crosley Manufacturing Company, Cincinnati, home of radio station WLW. The radario was broadcast recently by WLW.

For the first time, according to navy officers, the United States battle fleet was commanded from an aerial flagship when Admiral Samuel S. Robison recently flew his four-starred flag from a navy seaplane. During a ninety-minute flight from San Diego to San Pedro, Cal., Admiral Robison was constantly in touch with his command by means of the radio equipment carried on his big F-5-L.

The Inquiring Reporter of the New York Sun stopped five men in the Public Library the other day and asked them this question: "What scientific discovery up to the present day has proved the greatest blessing to humanity?" One named ether, another insulin, while three specified radio.

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The late Dr. Charles P. Steinmetz, chief consulting engineer of the General Electric Company, was an inveterate smoker. Some of his intimates claim that they have seen him in swimming with a lighted cigar in his mouth. His cigar case was a bulging affair holding 18 or 20 of the special brand he delighted to smoke.

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Medical advice from the Public Health Service by radio is now being sent to vessels upon request, from New York, Key West, New Orleans, San Francisco, Honolulu, and Manila. This service has met with unquestioned success, and numerous cases have been handled which might otherwise have terminated seriously.

# Here Are Good Broadcast Programs

## Station WGI, Medford, Mass.

**360 Meters (830 Kilocycles).** Eastern Standard Time. **November 30.**—12:00 Noon—Program of selections on the Edison Laboratory Phonograph and by the Ampico in the Chickering 12:40 P. M.—New England weather forecast furnished by the U. S. Weather Bureau. 12:45 P. M.—Closing reports on farmers' produce market report. 3:00 P. M.—Amrad Women's Club program. 5:30 P. M.—Closing stock market reports furnished by Elmer H. Bright & Co., members of the New York and Boston Stock Exchange. Live stock markets reports. Government reports. 6:15 P. M.—Code practice, Lesson No. 176. 6:40 P. M.—Boston police reports, Boston Police Headquarters. 6:45 P. M.—Late news flashes, sport news, Boston American. 7:15 P. M.—Talk by John J. Rowlands, editor of "National Sportsman Magazine." Subject: "You and Your Hunting Ground." 7:30 P. M.—Evening program: 1. Selected verses by Mr. Charles L. H. Wagner, radio poet; 2. Musical program by the Cambridge Salvation Army Band; 3. Red Cross Health Talk under the auspices of the Metropolitan Chapter of the American Red Cross by Henry Copley Greene.

**December 1.**—6:45 P. M.—Code practice, Lesson No. 177. 7:05 P. M.—Boston police reports, Boston Police Headquarters. New England weather forecast furnished by the U. S. Weather Bureau. New England crop notes furnished by V. A. Saunders, statistician. 7:30 P. M.—Evening program: 1. Thirty-fifth of a series of talks on New England Business Problems, by Arthur R. Curnick, of the New England Business Magazine; 2. Evening's musicale to be announced.

**December 2.**—4:00 P. M.—Twilight program: 1. "Adventure Hour," conducted by the Youth's Companion; 2. Program to be announced. 8:30 P. M.—Evening program: 1. Talk on "World Unity" under the auspices of the Greater Boston Federation of Churches; 2. Evening's musicale to be announced.

## Station WOC, Davenport, Iowa

**484 Meters (620 Kilocycles).** Central Standard Time. **November 29.**—(No market or government reports on account of Thanksgiving.) 12:00 Noon—Chimes concert and local weather forecast. 5:45 P. M.—Chimes concert. 6:50 P. M.—Sport news and weather forecast. 7:00 P. M.—Thanksgiving service, conducted by the Rev. J. L. Vance, pastor Oak Grove Second Presbyterian Church, Rock Island, Illinois. (Musical numbers to be announced.) 8:00 P. M.—Musical program (1 hour)—P. S. C. Orchestra, Gerald M. Barrow, director. (In keeping with the Thanksgiving spirit, old-time numbers and classics will be substituted for the usual popular program.)

**November 30.**—10:00 A. M.—Opening market quotations. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 2:00 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—(Musical numbers to be announced.) Lecture by C. A. Russell. Subject: "Body Heat and Fever." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 8:00 P. M.—Musical program (1 hour)—Erwin Swindell, musical director.

**December 1.**—11:00 A. M.—Opening market quotations. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 12:30 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—(Musical numbers to be announced.) Lecture by C. C. Hall. Subject: "Chemistry of Aluminum." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 9:00 P. M.—Orchestra program (1 hour)—P. S. C. Orchestra, Gerald M. Barrow, director. (Popular selections released through the National Association of Broadcasters, of which WOC is a member.)

## Station KYW, Chicago, Ill.

**536 Meters (560 Kilocycles).** Central Standard Time. **November 29.**—9:30 A. M.—Late news and comment of the financial and commercial market. 10:00 A. M.—Market reports. 10:30 A. M.—Late financial news and comment. 10:58 A. M.—Naval Observatory time signals. 11:00 A. M.—Market reports. 11:05 A. M.—Weather reports. 11:30 A. M.—Late news and comment of the financial and commercial market. 11:35 A. M.—Table talk by Mrs. Anna J. Peterson of Peoples Gas Co. 12:00 Noon—Market reports. 12:30 P. M.—Late financial news and comment. 1:00 P. M.—Market reports. 1:20 P. M.—Closing market quotations. 2:15 P. M.—Late financial comment and news bulletins. 2:30 P. M.—Closing stock quotations, Chicago Stock Exchange. 3:00 P. M.—Late news and sport bulletins. 4:00 P. M.—News and sport bulletins. 4:30 P. M.—Late news and sport bulletins. 5:00 P. M.—Latest news of the day. 6:30 P. M.—News, financial and final market and sport summary. Financial summary furnished by the Union Trust Company. 6:50 P. M.—Children's bedtime story. 8:00-8:20 P. M.—Twenty Minutes of Good Reading, by the Rev. C. J. Pernin, S. J., Dean of English, Loyola University, Chicago. 8:20 P. M.—Musical program. Other artists and program will be announced by radiophone. 8:58 P. M.—Naval Observatory time signals. 9:00 P. M.—News and weather report. 9:05 P. M.—Traffic talks furnished by the Chicago Motor Club. News, sports and children's bedtime story.

**November 30.**—9:30 A. M.—Late news and comment of the financial and commercial market. 10:00 A. M.—Market reports. 10:30 A. M.—Late financial news and comment. 10:58 A. M.—Naval Observatory time signals. 11:00 A. M.—Market reports. 11:05 A. M.—Weather reports. 11:30 A. M.—Late news and comment of the financial and commercial market. 11:35 A. M.—Table talk by Mrs. Anna J. Peterson of Peoples Gas Co. 12:00 Noon—Market reports. 12:30 P. M.—Late financial news and comment. 1:00 P. M.—Market reports. 1:20 P. M.—Closing market quotations. 2:15 P. M.—Late financial comment and news bulletins. 2:30 P. M.—Closing stock quotations, Chicago Stock Exchange. 3:00 P. M.—Late news and sport bulletins. 4:00 P. M.—News and sport bulletins. 4:30 P. M.—Latest news of the day. 6:30 P. M.—News, financial and final market and sport summary furnished by the Chicago Journal of Commerce, and the Union Trust Company. 6:50 P. M.—Children's bedtime story. 10:00-11:30 P. M.—Late show: Orchestra selection, McVicker's Theatre. News, sports and children's bedtime story.

**December 1.**—9:30 A. M.—Late news and comment of the financial and commercial market. 10:00 A. M.—Market reports. 10:30 A. M.—Late financial news and comment. 10:58 A. M.—Naval Observatory time signals. 11:00 A. M.—Market reports. 11:05 A. M.—Weather reports. 11:30 A. M.—Late news and comment of the financial and commercial market. 11:35 A. M.—Table talk by Mrs. Anna J. Peterson of Peoples Gas Co. 12:00 Noon—Market reports. 12:30 P. M.—Late financial news and comment. 1:00 P. M.—Market reports. 1:20 P. M.—Closing market quotations. 2:15 P. M.—Late financial comment and news bulletins. 2:30 P. M.—Closing stock quotations, Chicago Stock Exchange. 3:00 P. M.—Late news and sport bulletins. 4:00 P. M.—News and sport bulletins. 4:30 P. M.—Latest news of the day. 6:30 P. M.—News, financial and final market and sport summary furnished by the Union Trust Company. 6:50 P. M.—Children's bedtime story. 8:00-8:58 P. M.—Musical program: Artists and program furnished by radiophone. 8:58 P. M.—Naval Observatory time signals. 9:00 P. M.—News and weather reports. 9:05 P. M.—Under the Evening Lamp service furnished by the Youth's Companion, including short stories, articles and humorous sketches. News, sports and children's bedtime story.

## Station WBZ, Springfield, Mass.

**337 Meters (890 Kilocycles).** Eastern Standard Time. **November 29.**—10:00 A. M.—Church services direct from the Springfield Auditorium. 11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield Market reports. 7:00 P. M.—"Jim and Me," an outing story from Field and Stream, prepared by William G. Wood. 7:30 P. M.—Twilight tales for the kiddies. Letter from the New England Homestead. 8:00 P. M.—Concert by Fred Gardner, tenor; Marion Tryon, pianist. 9:00 P. M.—Bedtime story for grownups, by Orison S. Marden. 9:55 P. M.—Arlington time signals.

**November 30.**—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield Market reports. 6:00 P. M.—Dinner concert by the WBZ Quintette. 7:00 P. M.—"The Challenge," a dramatized story from the Youth's Companion. 7:30 P. M.—Twilight tales for the kiddies. Current Book Review, by R. A. MacDonald of the Court Square Book Store. Farmer's period—"Buying and Distributing the Farmers' Raw Materials," by Howard W. Selby, General Manager of the Eastern States Farmers' Exchange. 9:55 P. M.—Arlington time signals. 11:00 P. M.—Program of Chamber Music by the WBZ Quintette and Mrs. Harry G. Kitson, soprano; Mrs. Miriam Munyan Thomson, accompanist.

**December 1.**—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield Market reports. 7:00 P. M.—Dinner concert by the Hotel Kimball Trio direct from the Hotel Kimball dining room; Jan Geerts, violin and director; Angela Godard Lonergan, cello; Paul Lawrence, piano. 7:30 P. M.—Twilight tales for the kiddies. "Bringing the World to America," prepared by "Our World" magazine. 8:00 P. M.—Concert by Hazel L. Childs, entertainer; C. Russell Henderson, accompanist. 9:00 P. M.—Bedtime story for grownups by Orison S. Marden. 9:55 P. M.—Arlington time signals.

## Station WLW, Cincinnati, O.

**309 Meters (970 Kilocycles).** Central Standard Time. **December 3.**—10:30 A. M.—Weather forecast and business reports. 1:30 P. M.—Stock Exchange. 3:00 P. M.—Business reports. 4:00 P. M.—Piano selections by Jennie Kehrt. Babson reports. 8:00 P. M.—Programs arranged by the Editorial Staff of Sunday School Publications of the Methodist Book Concern. 9:00 P. M.—Crosley Theatrical Review, followed by the Roger Hill Dance Orchestra. 9:30 P. M.—Soprano solos by LaVergne Sims, with accompaniments by Marjory Carrigan. (Cincinnati Conservatory of Music.) 9:45 P. M.—Concluding selections by the Roger Hill Dance Orchestra. (Popular music on this program furnished by the National Association of Broadcasters, of which we are members.) **December 4.**—10:30 A. M.—Weather forecast and market reports. 1:30 P. M.—Business reports. 3:00 P. M.—Stock quotations. 4:00 P. M.—Current topics for women. 10:00 P. M.—Pemm Concert Quartette.

## Station KDKA, East Pittsburgh, Pa.

**326 Meters (920 Kilocycles).** Eastern Standard Time. **November 29.**—10:45 A. M.—Thanksgiving Day service at Point Breeze Presbyterian Church. Sermon by Dr. Percival H. Barker, minister. 11:55 A. M.—Arlington time signals. 2:30 P. M.—Pitt-State football game from Forbes Field, Pittsburgh, Pa. 6:30 P. M.—Dinner concert by the Pittsburgh Athletic Association Orchestra, Gregorio Scalzo, conductor. 7:45 P. M.—The children's period. 8:00 P. M.—Thanksgiving Day program. 9:55 P. M.—Arlington time signals. Weather forecast. 11:30 P. M.—Special late concert.

**November 30.**—10:15 A. M.—Union Live Stock Market report from the National Stockman and Farmer. 11:55 A. M.—Arlington time signals. 12:30 P. M.—Music. Weather forecast. 12:50 P. M.—United States Bureau of Market Reports furnished through the National Stockman and Farmer. 6:15 P. M.—Organ recital by Lucile Hale from the Cameo Motion Picture Theatre, Pittsburgh, Pa. 7:30 P. M.—"The Power of the Early Church," the Sunday school lesson for December 2, presented by Dr. R. L. Lanning. 7:45 P. M.—"A Trip With Santa," by Santa Claus from Rosenbaum's Toy Town. 8:00 P. M.—National Stockman and Farmer market reports. 8:15 P. M.—Radio Boy Scout meeting conducted by Richard Victor, Scoutmaster. 8:45 P. M.—Concert by the Blue Ridge Division Quartet. 9:55 P. M.—Arlington time signals. Weather forecast.

**December 1.**—10:15 A. M.—Union Live Stock Market report from the National Stockman and Farmer. 11:55 A. M.—Arlington time signals. 12:50 P. M.—United States Bureau of Market Reports furnished through the National Stockman and Farmer. 1:30 P. M.—Concert by Dougherty's Orchestra from McCreery's dining room. 6:15 P. M.—Dinner concert by the Westinghouse Band under the direction of T. J. Vastine. 7:30 P. M.—"Bringing the World to America," prepared by "Our World." 7:45 P. M.—The children's period. 8:00 P. M.—Feature. 8:30 P. M.—Concert by the Westinghouse Band, T. J. Vastine, conductor. 9:55 P. M.—Arlington time signals. Weather forecast.

## Station WFAA, Dallas, Texas

**476 Meters (630 Kilocycles).** Central Standard Time. **November 29.**—12:30-1:00 P. M.—Address, Dr. Thomas H. Harper, pastor Central Congregational Church, on "Our Thankfulness." 8:30-9:30 P. M.—Gussie Montgomery's Harmony Six, an orchestra.

**November 30.**—12:30-1:00 P. M.—Address, Dr. Robert Stewart Hyer, Southern Methodist University, on the Sunday school lesson, "Power of the Early Church." 8:30-9:30 P. M.—Musical recital presenting faculty representatives of North Texas State Teachers' College, Denton, Texas.

**December 1.**—12:30-1:00 P. M.—Address, J. P. Comer, literature, Southern Methodist University, "The Art of Reading." 8:30-9:30 P. M.—Piano recital, presenting Leland Johnston, retail sales manager The Baldwin Piano Company, composer and performer. 11:00-12:00 P. M.—Mrs. LaRue Nelson and Miss Grace Hudgins, voice, and Miss Inez Hudgins, piano.

**December 2.**—2:30-4:00 P. M.—Elks' Memorial Service, broadcast from the First Baptist Church. 6:00-7:00 P. M.—Radio Chapel Bible Class, Dr. William M. Anderson, Jr., pastor of First Presbyterian Church, teacher; half-hour Bible study and half-hour Gospel song. 7:30-9:00 P. M.—Evening service at First Baptist Church, Dr. George W. Truett, pastor. 10:00-11:00 P. M.—Jack Gardner's Orchestra in dance music recital.

## Station WGY, Schenectady, N. Y.

**380 Meters (790 Kilocycles).** Eastern Standard Time. **November 29.**—10:30 A. M.—Thanksgiving Day service, St. George's Church, Schenectady, N. Y. 7:45 P. M.—Musical program. A Few Moments with New Books, William F. Jacob, Librarian of General Electric Co.

**November 30.**—11:55 A. M.—Time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 12:45 P. M.—Weather forecast. 2:00 P. M.—Music and address, "House Economy," by Mrs. Charles A. Simon, Schenectady Woman's Club. 6:00 P. M.—Produce and stock market quotations; news bulletins. 6:30 P. M.—Children's program. 7:35 P. M.—Health talk, N. Y. State Department of Health. 7:45 P. M.—Radio comedy drama, "Shavings," by WGY Players. 10:30 P. M.—Union College program including educational addresses by members of Union College faculty.

**December 1.**—11:55 A. M.—U. S. Naval Observatory time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 9:30 P. M.—Phil Romano's Rain-bo Orchestra at the Kenmore Hotel (Albany, N. Y.).

## Station KSD, St. Louis, Mo.

**546 Meters (550 Kilocycles).** Central Standard Time. **November 29.**—Broadcasting direct from the Odeon concert given by St. Louis Symphony Orchestra, Francis MacMillen, violinist, soloist.

**November 30.**—Mrs. Katherine Cowan, soprano; Mrs. Charles H. Anstin, contralto; Waldo Finke, tenor; Frank Ingalls, basso; Mrs. Frank A. Neal, accompanist.

**December 1.**—Orchestra concert, organ recital, vocal and instrumental specialties broadcast direct from the Missouri Theatre.

(Concluded on page 22)

## RADIO WORLD

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### IMPORTANT NOTICE

While every possible care is taken to state  
correctly matters of fact and opinion in technical  
and general writings covering the radio field, and  
every line printed is gone over with a scrupulous  
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DECEMBER 1, 1923

## Boost Radio to Congress

INDICATIONS are that the United States Bureau of the Budget will approve appropriations amounting to only one-sixth of the Department's lowest estimate as necessary for the administration of radio matters during the next fiscal year. With all forms of radio activity increasing, the scope of the Radio Section has been extended until several times the work is being done by the same field force and the same personnel in the Washington office, that existed before broadcasting and extensive amateur activities began. The department needs both more men and more money.

What the budget has allotted, in addition to the regular annual appropriations, is not enough to secure the services of one additional clerk in each of the nine radio districts, where several assistant radio inspectors are needed, besides funds for tests, travel and office work. There are no funds for an increase in the Washington headquarters where thousands of licenses, complaints, and reports of different

kinds are handled every week, by an inadequate force.

An appropriation of \$211,000 was asked for radio supervision in the fiscal year ending June 30, 1925, which was only \$76,000 over the current appropriations. The increase was felt to be absolutely necessary for conducting the work of inspection of ships and shore stations, licensing of amateurs and commercial operators, and administration of radio in general. Later, officials of the department, under budget pressure, cut this figure to an increase of approximately \$60,000 but the budget is understood to insist that about \$149,000 is sufficient for the next year, an increase of only \$10,000.

Funds for radio research, experimentation and tests at the Bureau of Standards are also essential, and should be provided by Congress to insure adequate development in all lines of radio communication.

Manufacturers suggest that all fans urge their senators and congressmen to provide sufficient funds for the proper functioning of government radio supervision and development so that America may keep in the fore of wireless communication.

## Radio and Youth

THOMAS ALVA EDISON, in a recent interview, declared that radio "is one of the greatest things for the boys and young men of this country. It teaches them to experiment more and to think. The more of that sort of thing they do the better off the country will be." And the possibilities of financial reward for the intelligent, careful experimenter are well worth striving for. It is a notable fact that many of the most important radio inventions are the products of very young men. In truth, radio is a young man's industry. Except in the realms of pure science and laboratory research, where age and experience are necessary to achieve the desired results, the forward movement of radio will be found in the hands of comparative youth.

## Thanks Due the Daily Newspapers

DAILY newspapers all over the United States are entitled to the thanks of the radio industry for their assistance in popularizing National Radio Week. Hundreds of papers, even those which have no regular radio departments, carried many columns of radio news and publicity which kept the public informed as to what it was all about. Their help has been very valuable to the industry.

## Help Clear the Air

SOME listeners-in keep complaining that amateurs interfere with broadcasting. They do not actually know who is interfering but simply that some one transmitting code is interfering with their reception. Half the time it is probably ships which are sending or shore stations handling regular commercial work. What these "knocking" listeners-in should do, Department of Commerce officials say, is to learn to read code so they can identify the senders, getting the calls in order to report the offending stations if violations are found. Besides reporting the call letters of amateurs breaking the regulations, efforts should also be made to ascertain and report the wave lengths used.

Here is a real service those who own receiving sets can render simply by learning the code and reporting breaches of regulations to the District Radio Supervisors or the Department of Commerce proper. Present regulations make the air free to amateurs on 150 to 200 meter waves, except between 8 and 10:30 p. m. Amateurs have the right to use spark or tube sets; those owning tube sets can communicate by either code or voice. Broadcasting, as such, is forbidden amateurs; that is, music and entertainment cannot be sent out, but two station owners may converse, except in the evening broadcasting period. Special amateurs have the privilege of using wave lengths as high as 220 meters. International Morse is the code used by amateurs, and its rudiments should be mastered within a few months.

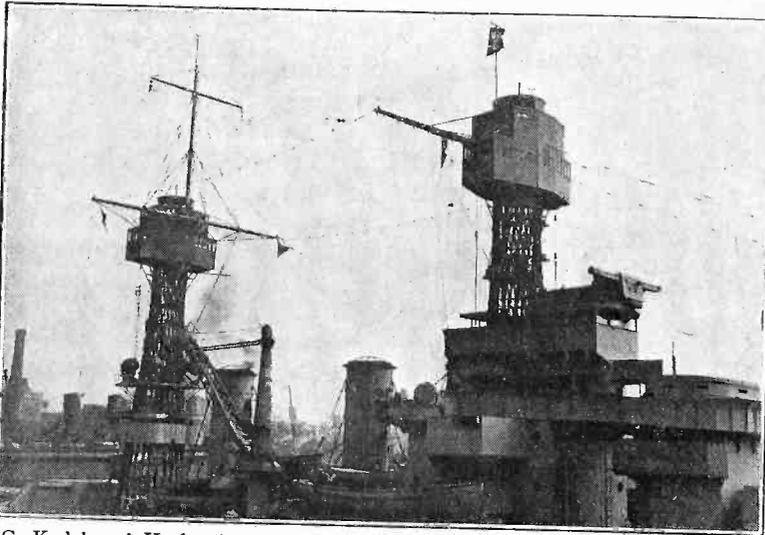
## Simplicity

GREAT art is simple, great inventions are usually not complicated, great music is composed of but a few majestic notes. Improvement in any device constructed on established basic principles consists in subtractions and not in additions. It is our belief that the radio receiving set of the future will be a very much simpler device than it is even today. The fewer the parts, the fewer the connections required and the less the possible leakage. Simplicity to the *n*th degree equals "fool-proof."

## "Broad-catchers"

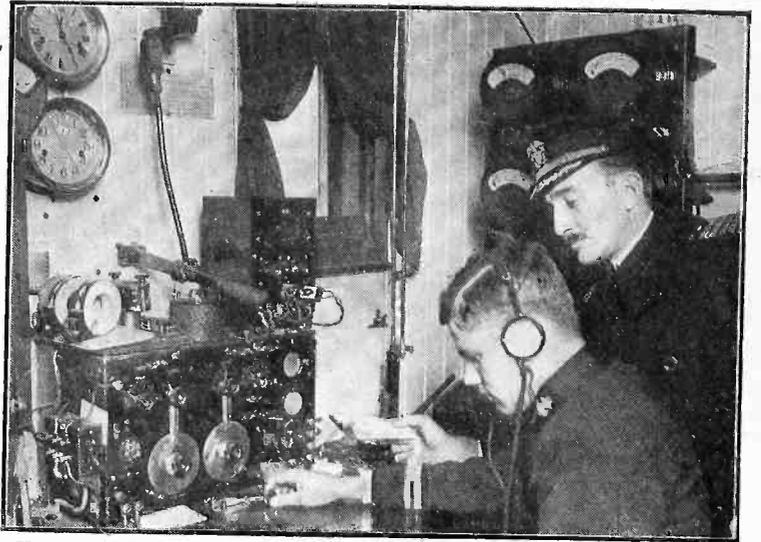
An advertiser in one of the British wireless journals uses the term "broad-catchers" for those who Americans refer to as "listeners-in." Rather neat, what?

# Soldiers and Sailors Monopolize This Group of Radio Photographs



(C. Kadel and Herbert)

The radio antenna system on board the U. S. S. "Colorado," the world's greatest battleship. This vessel, which is a marvel of marine achievement, is also practically a radio central. No less than eight antennae and antenna arrangements can be utilized. Besides this it has the most powerful spark, CW and telephone apparatus ever installed on any of the United States battleships. The commander of the vessel can communicate by means of radio from any part of the ship.



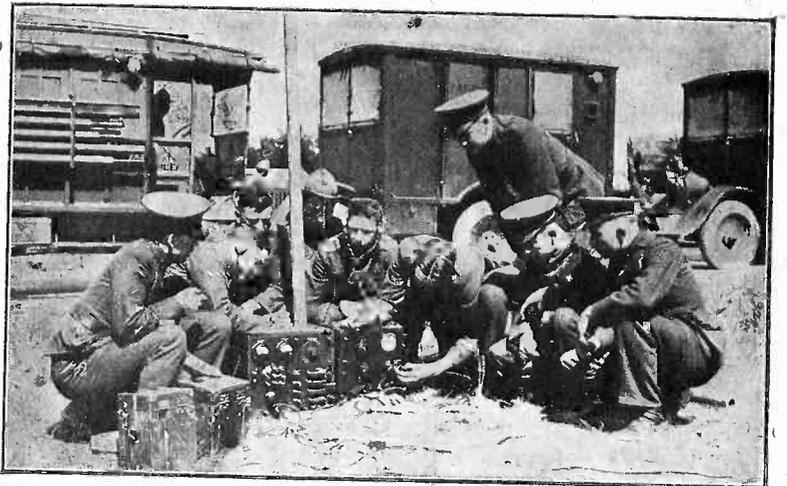
(C. Kadel and Herbert)

Capt. Charles H. Zearfoss (right), of the S. S. "Southern Cross," is stronger for radio now than he ever has been. When returning from Buenos Ayres recently, he ran into a storm with hundred-mile winds and fifty-foot waves that was the worst he ever experienced. It was only on account of advices from the weather bureau, sent by radio, that he was able to steer clear of the vortex of the storm and skirt it with no more damage than a few smashed lifeboats and some replaceable gear.



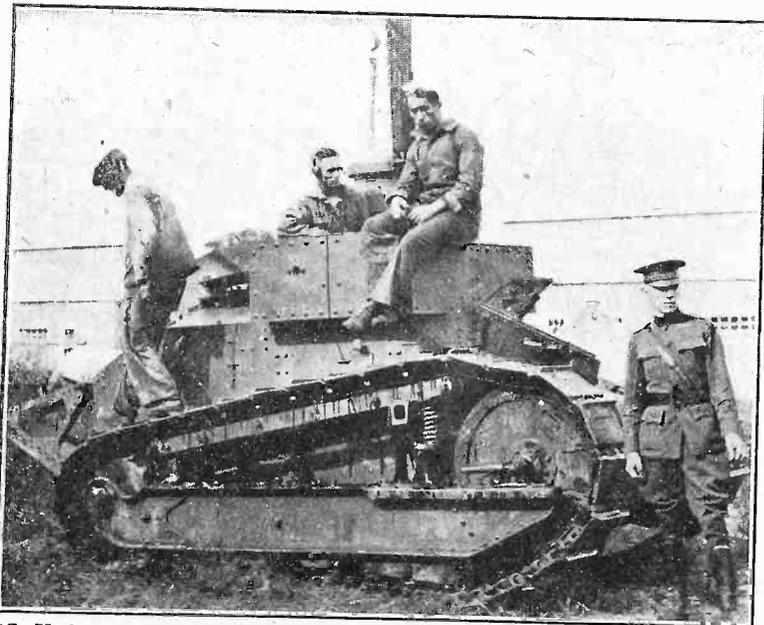
(C. P. and A.)

To all intents and purposes this looks like a photograph of a pack of sleeping beauties. As a matter of fact it is the members of the radio class of the Naval Air Station at Pensacola, Florida, learning the code while they sleep. It is an acknowledged fact that you can improve your code speed by listening to the signals while you are asleep. Your subconscious mind is at work all the time. One man sits at the key sending messages while the members of the class sleep with soundproof aviators' helmets on, and at the same time improving their speed.



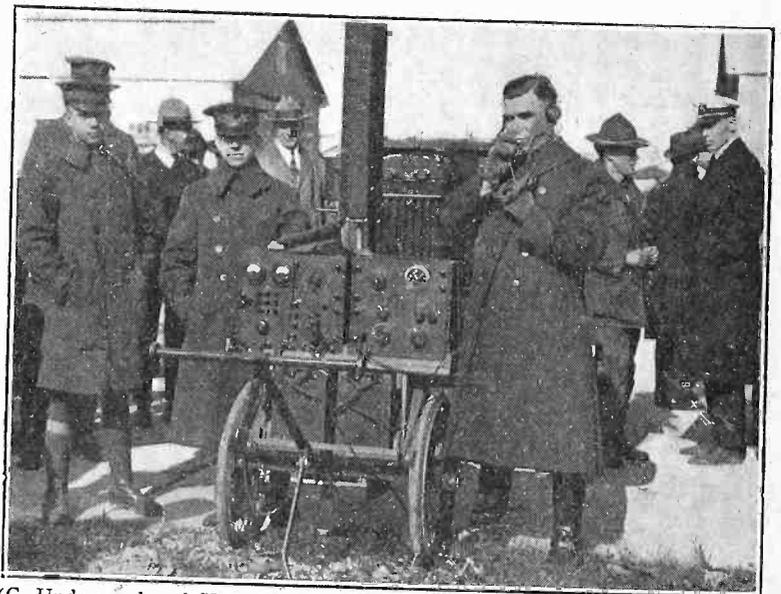
(C. Fotograms)

U. S. marine radio experts stationed at Quantico, Va., preparing for their fall maneuvers by practicing the speedy setting up of their receiving and transmitting apparatus. The antenna is set up on light poles and the entire apparatus can be put in operation in less than a minute and a half from the time the truck stops. The transmitter is supplied from storage batteries and a special generator on the car itself for furnishing the high power necessary for the transmitting.



(C. Underwood and Underwood)

They even incorporate radio on the lumbering tanks nowadays. This shows one of the battle tanks at the Aberdeen, Md., Proving Grounds, equipped with the split coil antenna that has proved such a remarkable success in this type of receiver. Special amplification is necessary because of the noise inside the tank when it is in action, and a special compact model receiver must be used. The coil antenna is seen back of the man sitting on the turret.



(C. Underwood and Underwood)

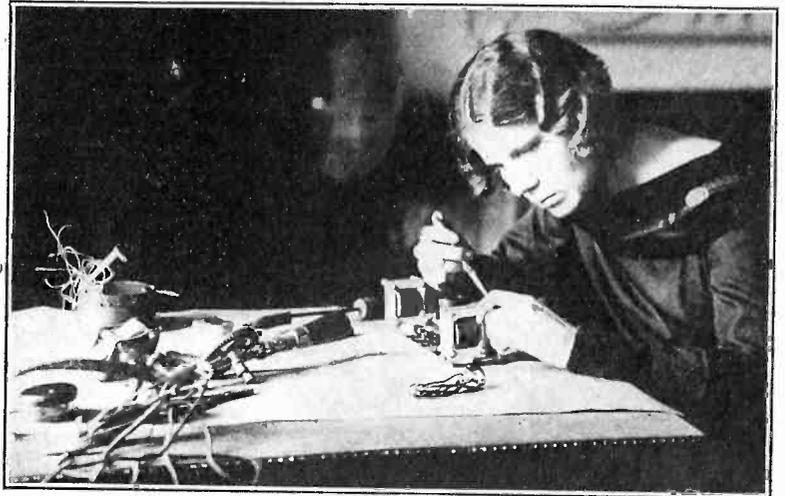
Capt. C. H. St. Germain, U. S. A., Infantry Tank Corps, directing tanks by radiophone during maneuvers at the Aberdeen Proving Grounds, Aberdeen, Md. A special type of transmitter is used, with a new antenna using a split ring coil as shown, which has proved that it is capable of extremely fine work on portable truck sets such as that illustrated. The sets used in both places are combined receivers and transmitters.

# Women Predominate in This Page of Radio News Photographs



(C. International Newsreel)

Lee Kugel, noted dramatic critic and manager, donated this up-to-date receiver to the members of the "Ginger" company. The illustration shows the members of the chorus gathered around the set the first day it was in use giving it the proverbial O. O. to see if "radio is all that it is cracked up to be." Here is a chance for a live radio salesman to make some good customers, if he has the pep to go after them.



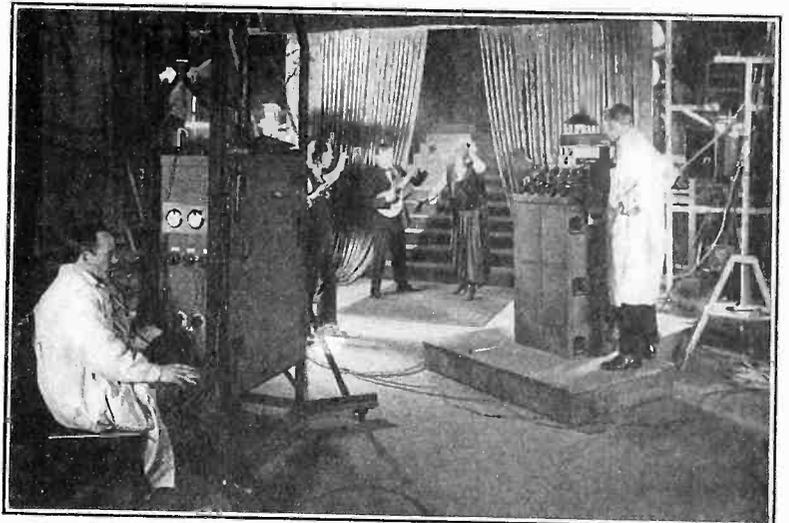
(C. United News Pictures)

Society debs have the fever and are "making their own" for charity. The latest method of doing charitable work is to make receivers and sell them, using the monies received for charitable purposes. Miss Edith McCoon, daughter of Mrs. James Hy McCoon, of New York, is seen wiring up a two-tube reflex receiver which she is building under the tuition of Maxwell Ringel, radio engineer. Somebody is going to have an awful "dent" in his pocketbook when the completed receivers are sold, but who can resist the smiles of "the younger 400"?



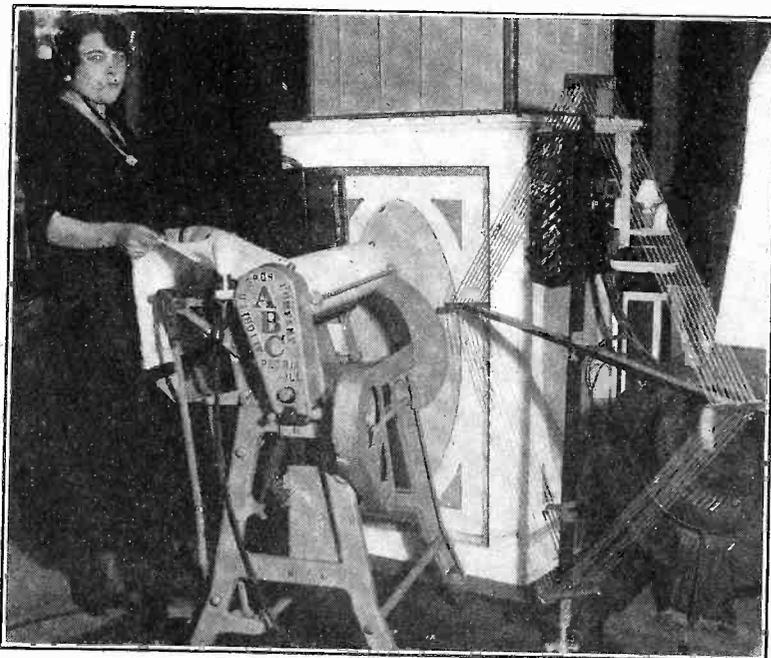
(C. Kadel and Heibert)

RADIO WORLD recently published a picture of a receiver with plate glass panels, naming 57 holes as the number that had to be drilled. After looking this one over at the recent electrical show, we stopped at 72 and refused to go on. It is a three-circuit regenerative circuit with a specially wound coil for grid feed back. Four tubes are used, with filament control jacks. Miss Elizabeth Martin demonstrating the set for the camera man.



(C. Keystone View)

How they broadcast in England. The performers are directed by the man in shirtsleeves, while the pickup device is placed to the right, and the actual power apparatus is shown on the left. Quite different from the ship-shape, orderly and soundproof studio, with its remote control and switching devices that we have over here. Wonder how the re-echo sounds over the radio? Must be there, because of the reverberation of the voices and noises in the room.



(C. Underwood and Underwood)

An exhibit of two necessary pieces of household paraphernalia that the up-to-date housewife cannot be without these days. First and foremost of course is the radio set. One cannot get away from the fact that radio is as important in the home as a dining room table. The other is an electric iron.



Ralph Lewis, Virginia True Boardman, Martha Sleeper, Johnnie Walker, Taylor Grove, and Josephine Adair, the cast in "The Mailman," listening in on a program between acts. Johnnie Walker is operating the receiver, which was made by one of the men of the studio for the purpose of entertaining the casts of the different companies which use the studio during the making of "movies."

# The Radio University

Conducted by the Technical Staff of RADIO WORLD  
for the information and instruction of its subscribers.

*I desire a one tube set that will enable me to operate a loud speaker on one tube, if such a thing is possible. Where can I obtain a circuit diagram of such a set? I do not desire distant stations, but good, clear reception on local stations.—E. Ziegler, Jamaica, L. I., N. Y.*

A single tube reflex, with crystal detector seems to fit your case. We have published several of these. The ones however that would suit your purpose best are published in RADIO WORLD for October 13, page 13, or October 27, pages 3 and 4.

*Kindly give me the address of the author who wrote the article, "Another Improvement on Single Circuit Tuners," published in a recent issue of RADIO WORLD.—James Maloney, 3 Smithfield Ave., Pawtucket, R. I.*

This article was written by A. A. Teeters, whose address is 81 Maiden Lane, New York City.

*Are the A—— transformers suitable for use in the inverse duplex circuit? Isn't it possible to use more than one telephone jack in this circuit—one say, for each stage of audio? Should any special precautions be taken to lay out the transformers in the circuit? Must the same constants be adhered to for the UV199 tubes?—A. L. Malstrom, 1996 Seward Ave., Detroit, Mich.*

The transformers you mention are suitable. It is not possible. You should arrange them so that there is no inter-coupling between the circuits of the various stages. Separate them and arrange them so that their fields are at zero (opposing one another). Yes.

*In connection with the Armstrong single tube super-regenerator, published in RADIO WORLD October 6, may any other tube be used besides the 216A? What plate voltage should be used?—G. R. Combs, 70 Broad Street, New York City.*

You may use the UV201, C201, or any other hard amplifying tube. 90 to 120 volts are best for this circuit. Watch out, however, when using this high voltage. Insulate every lead.

*I recently ran across a British radio journal and found a circuit purported to be a super-regenerative, or as they call it a super-reactive circuit with "high frequency bias." I enclose a rough sketch of it. Is it the same as the Armstrong super regenerative, or is it different? I notice that all their constants are given in henries, and that their other constants are changed around to suit their fancy. It does not work. Can it be made to work as it stands?—Jack Kaufman, Dallas, Texas.*

The copy of the circuit as you represent it seems to bear a resemblance to one of the first super-regenerators used by Armstrong. However, as the battery labeled "C Bias second tube," is connected it cannot possibly work, as it practically shorts the second and third tubes through the resistance M1. The circuit cannot possibly work the way the grid of the second tube is connected. It is evidently a mistake in your copying, as the grid of the tube just connects to the minus of the first B battery and nothing else, which is wrong. For a correct diagram of a three tube super-regenerator see page 20 of RADIO WORLD for September 22, 1923. The constants are all given in American values. The method used in most

all British Journals is to quote henries, millihenries, and the values as shown in this will prove to be practically the same, with but very few changes. A set such as this is extremely difficult to manipulate and construct unless you first lay the parts out on a "test board" and then place them in the complete cabinet in exactly the same relation to each other as was found best on the test board.

*Why is it that some days I can get distant stations and at other times I can not get anything but medium distance and locals? Is there any circuit which will perform absolutely faithfully over given distances all the time? If so, can you furnish such a diagram?—Carl Bader, Lancaster, Pa.*

There is no set that will get the same stations day after day with regularity. Conditions intervening over which you have no control prevent this. Even multi-tube reflex and radio frequency sets are bothered by the same trouble as you are with your single tube set.

*I desire a circuit that is a good DX getter and has volume with selectivity and flexibility. Where can I obtain such a circuit?—George Melos, 825 De Kalb Avenue, Brooklyn, N. Y.*

Every issue of RADIO WORLD has good circuit diagrams. For one that is especially selective and flexible, see C. White, RADIO WORLD, November 17, 1923.

*I have built a radio-frequency receiver and, desiring audio-frequency amplification, I constructed it as in Fig. 2 of the accompanying sheet. It works, but it seems to be different from those that I have seen before. Is No. 2 correct? I cannot get anything but squeals out of it, when using it with the lighthouse receiver as given in RADIO WORLD for August 25, 1923.—Joe Boyd, Box 167, Weynona, Okla.*

Both sketches are correct and both should work with any receiver they are hooked to. The first one is simply an amplifier that uses the same general B battery circuit with a separate A battery circuit for the last tube. The second one is a circuit that uses separate A and B batteries. They should work with any receiver. Watch your transformer connections and battery leads.

*You published a circuit in RADIO WORLD in answer to a request by Jack Kearnsby. Can RCA transformers, UV201A tubes, Manhattan variocouplers be used in this receiver with good results?—James S. Lawrence, 115 West Main Street, Freehold, N. J.*

The apparatus you mention may be used with the circuit named.

*I have a Westinghouse R. C. receiver using three WD12 tubes with 90 volts on the plate. What can I do to improve this? I can only get WJZ fair, and he comes in all over the dial. I use a 75-foot antenna.—B. Birnfield, Danner & Co., 621 Eighth Avenue, New York City.*

Your set should not work in this manner. Though it is a single circuit it tunes quite sharply. Take it to someone that understands the correct hooking up of these sets and have him check your connections. We are under the impression that you have it connected wrong. Use 22½ volts on the

plate of the detector, and from 60 to 90 on the amplifiers.

*Will any standard type of variometer work in the Grimes inverse duplex that uses antenna and ground? In connecting the potentiometer is the connection going to the secondary of the first audio-frequency transformer meant to signify the movable arm of the potentiometer? Of the four transformers mentioned here which do you consider the best? How does this circuit compare with the Stoup circuit employing one stage of R. F. and two stages of audio?—Wm. P. Moen, 8809 Tompkins Avenue, Cleveland, Ohio.*

You may use any good variometer. The connection you mention is the center or movable control. Would suggest either No. 3 or No. 4 as being the best, with No. 2 as a third choice in this circuit. You will get the added use of one extra tube over the receiver you mention. Your receiver uses four tubes, the Grimes uses three, but gets the effect of five (two radio-frequency, detector and two audio). There will not be much difference in volume, but there might be a difference in the distance, the Grimes receiving further.

*Is it possible to use a tin roof as an antenna? Is any special circuit necessary when this is to be done? Can the lighting plant wires of the farm be used? The wires run from the barn to the house, a distance of 500 yards, fed by storage batteries which are charged by a gasoline motor-driven generator. Could one wire be used as an antenna and the other as a counterpoise? Is a counterpoise necessary when a ground is used, and vice versa? Is it possible to do distance work with a crystal detector?—James Larkin, New London, Conn.*

If the leaders of the tin roof do not connect with the ground it is possible to use it for an antenna. No special circuit is necessary. The wires as you state would be entirely too long. Five hundred yards is 1,500 feet, which is about 15 times more than the average antenna should be. A counterpoise is not necessary when a ground is used. The counterpoise takes the place of a ground. It is possible to work distance under good conditions with a crystal.

*What is the right size wire to use for a loop antenna? How many turns should I use? What size? Is the use of silk wound wire any advantage in building a variocoupler?—John Schmidt. No address.*

No. 16 or 18 SCC or stranded litz wire of the same size will be right. For all practical purposes, a loop 16" per side, wound with 10 turns of the wire will be satisfactory. Silk covered is considered best. It also has the advantage of saving space, as more turns per linear inch of SSC wire may be wound than the SCC.

*You published a "Two-tube Loud Speaking Receiver," by B. C. Caldwell. Can I use my Radiotron tubes (detector and amplifier) with this circuit? Where are the B batteries placed?—Roscoe Mangus, Lakeville, Ind.*

You may use the tubes you mention. The batteries are placed in the plate circuit as shown.

*Are fixed crystal detectors as efficacious as the catwhisker type? Which is better, synthetic minerals, or galena?—Clark Bingham, Sleepy Hollow House, Charlotte, N. C.*

There are certain types of fixed crystal detectors that are very good, especially for portable sets. Galena is very sensitive if a good piece of the mineral is obtained, whereas synthetic minerals are generally sensitive over relatively large surfaces. For reflex work suggest the synthetic crystals.

# Christmas Suggestions for the Radio Enthusiast

## The Bristol Radio Family Is Growing

THE Bristol Company, Waterbury, Conn., manufacturers of loud speakers and power amplifiers, have completed what they term their "family of loud speakers." This "family" consists of five loud speakers incorporating the Bristol mechanism but varying in price. These form a line of good speakers that any one can afford.

The high standard of work that was established by these people in their first speaker has been kept up throughout the entire line, and the small one is just as high a grade of speaker as the "daddy," the only difference being in the size and price.

The one stage power amplifier forms another useful adjunct to their line. It is a single tube amplifier, or more specifically a stage of audio built to handle the enormous output of two stages, and further amplifies without distortion.

One point not to be disregarded in connection with these loud speakers is they are of the semi-dynamic type, needing no extra batteries of any sort. This allows them to be operated on receivers using the dry cell tubes. All types have the adjustable air-gap, allowing the best possible amplification for each signal. The Bristol Company also manufactures a non-adjustable type for the fan who wants to save a little money. This latter type is carefully adjusted at the factory for the best results on the average receiver.

All types are finished in a dull gold bronze harmonizing nicely with any receiver. Six-foot silk cords are furnished with regular phone tips, to enable the operator to place them in a plug the same as a pair of phones.

## A Loud Speaker Experiment

AN interesting experiment is being tried out by the Bel-Canto Manufacturing Company, makers of popular priced loud speakers. In order to determine just what status the actual consumer takes in regard to prices regulating the purchase of radio goods, they have decided to sell direct to the consumer, cutting out the middleman.

They claim that they are thus enabled to sell direct a loud speaker for \$10.00 which would otherwise cost the buyer \$25.00. In order to determine just what the actual feeling is in the consuming field, they are delivering the speaker by mail direct to the door of the party ordering, without any payment in advance. When the speaker is delivered the money is paid, with the option of a ten-day, money-back-if-not-satisfied proposition.

## Perfects New Loud Speaker

M. M. STEDNER of the Racon Electric Co., New York City, known throughout the radio field for his work in originating and developing the Woodhorn, has given radio that which it has lacked—a moderate priced loud speaker with the appearance of a much higher priced one.

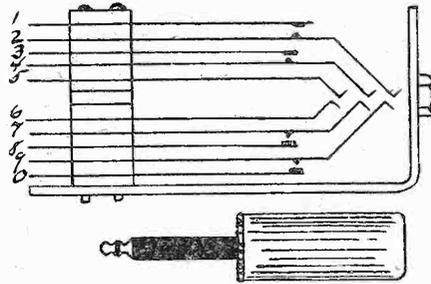
Mr. Stedner's newest product is known as the Serenada. It embodies an improved type of reproducer, which has adjustable magnets, insuring best results for all makes of sets and tubes and all B battery voltages. The horn stands 22" high and has a 14" bell. It is finished in either crystal black or crystal black and burnished copper.

## Eliminates Unnecessary Jacks

A NEW piece of apparatus, simplifying the operation of the receiver to a great extent in the switching of phones or loud speaker from one stage to another, has been designed by the B. W. Prall Co. It is a triple jack whereby the set may be switched from detector to the first or second stage simply by pulling or pushing the plug into the different positions. It may also be used for a double-throw triple-pole switch to change circuits, throw condensers into series-parallel connections, or any one of numerous other things where a small-space switch is needed.

It consists of a regular jack, as shown in the illustration, resembling the double circuit, but with ten poles instead of the customary four. This allows one to connect all the stages to one central point and connect or disconnect them by simply moving the plug a quarter of an inch either in or out. The plug is specially designed, differing from most plugs in that its sleeve is insulated and but two connecting nibs at the end project.

As can be seen by the illustration there are three positions, signified by the three spread arms. When the jack is all the way in, all three tubes are in the circuit. When it is on the second position, the



This device eliminates unnecessary jacks.

primary of the second stage is entirely disconnected, and but one stage is in use. When it is in the last position, all transformer primaries are disconnected, and the detector only is in use.

A jack such as this permits a saving in space, the only precaution being that care must be taken in the wiring to make absolutely sure that the poles of the transformers are run in the correct positions.

## For Fine Tuning

THE aim of every experimenter and listener is to get fine tuning coupled with selectivity that gives freedom from interference. The Amateur Radio Equipment Supply of Philadelphia manufactures a coupler which differs from the ordinary coupler in that it does not use rotors or form-wound coils. Two flat back-wound tapped coils are used. These are mounted upright on a panel, variation of the coupling being made by means of a screw adjustment, with the taps as rough wave length adjustment. The tuning thus accomplished is exceedingly fine, as a degree of coupling can be obtained that is micrometric in value. The close coupling is nearly absolute, as then the two coils are as close together as it is possible to get them.

While the coupler may be used in any circuit that employs an ordinary coupler, the best method has been found to be a single circuit with the addition of a grid return coil, shunted by a small value variable condenser, with additional capacity feed-backs through from the filament side of the coupler to the phone side of the plate circuit. Exceptionally fine tuning is possible, and the control of the regeneration is smooth and accurate.

## This Radio Receiver Appeals Especially to Women

A BEAUTIFUL piece of furniture containing a remarkably efficient and selective three-tube receiver with built-in loudspeaker is now found in the Ace 3 C Console made by the Precision Equipment Company, Cincinnati.

This type of receiver appeals particularly to the ladies on account of its being completely self-contained. Unsightly wires, batteries and other accessories are hidden from view. For range and volume it is all that can be desired. It is so simple that a child can tune it and bring in distance stations clear and loud.

A stand is provided if desired at a small additional cost, making a complete self-contained radio receiver of the floor type. The stand is designed to match perfectly the Console.

This is a three tube Armstrong regenerative receiver, containing the new Varind basket-weave variable inductance. This unit is wonderfully selective and the Crosley Type "D" condenser which is part of the equipment permits remarkably sharp tuning, enabling one to pick up distant stations through local broadcasting. Of course this set operates more efficiently on an out-of-door antenna, although excellent results can be obtained from a comparatively short antenna under average conditions. A single wire run along the ceiling or floor for a distance of from 30' to 40' will, under most conditions, serve as a very satisfactory antenna for long distance reception. This is due to the efficiency of this receiver, which enables it to function on very weak signals collected by even a moderately inefficient antenna.

The size of the cabinet is 13 $\frac{3}{8}$ " high, 23" wide and 13 $\frac{3}{8}$ " deep. It is made of solid mahogany beautifully rubbed to a piano finish.

The set is provided with a phone jack to plug in head phones for tuning, using two tubes. When the plug is removed the three tubes are automatically connected to the loudspeaker.

Any woman would welcome this set to her home—especially if it were a Christmas present.

## New Long Range Radio Receiving Set

THOUSANDS will find it easy to decide "what to give" this Christmas. A new radio outfit of the long range type is sure to bring joy, happiness and recreation. It is useful all day long—market reports in the day time, concerts and opera at night.

A very desirable new radio set comes complete from the aerial to the ground wire—everything is there—a high grade long range receiving set, six volt World radio storage battery, double phones with head band, U. V. Radiotron tube, 22 $\frac{1}{2}$  volt Franco "B" battery, aerial wire, lead-in wire, ground clamp, insulators. The outfit is complete all ready to hook up. Every part is guaranteed by the makers and by the World Battery Company.

Those desiring this set for Christmas should place their orders at once to assure delivery. The outfit will be delivered subject to inspection or will be shipped on receipt of the modest price, if the money is enclosed with the order. This set is complete and ready for use. You can listen to its remarkable reproduction of world's artists—you can get the latest market information without a penny's additional expense. It is made by the World Battery Company, Radio Div. 17-R, 60 E. Roosevelt Rd., Chicago, Ill.

# Radio Merchandising

Advertising Rates: Display, \$5.00 an inch, \$150.00 a page. Classified Quick-Action Advertising, 5 cents a word. Phones: Lackawanna 6976 and 2963

## New "B" Battery Occupies Little Space

A NEW type of "B" battery constructed on the skyscraper principle, so that most of its bulk is raised vertically instead of occupying valuable horizontal space, is now available to radio fans whose table area is limited. The new battery is No. 764 of the National Carbon Company. It gives 22½ volts, and is only 3⅞" wide. Its height is 5⅝".

It has been the practice of many radio users to install in their home sets the small "B" battery designed for portable sets, in situations where the saving of space or in first cost were considerations. Some set manufacturers, to provide cabinet space, have done the same thing. Although the small "B" battery is necessary for portable use, its small size gives so short a life that it is properly used only where small space and light weight are of first importance.

The new battery has twice the life of the portable battery, while standing on practically the same size base, and the cost is only about one-fourth more than the cost of the small one. It was developed after months of experimentation by engineers of the National Carbon Company, who knew that many radio users were increasing their battery operating cost in order to economize on space or to save in first cost. The new battery gives much lower operating cost without appreciable sacrifice in table space.

## The F. M. C. Supertran

ONLY after exhaustive tests and investigations by its manufacturers, as well as by several of the leading engineers in the country has the Supertran audio-frequency amplifying transformer been placed on the market. The product of a reputable company which has specialized for a number of years in the construction of small transformers is sufficient guarantee as to its tested merit before being introduced to radio users.

The Supertran may be used with any amplifying tube on the market today with excellent results. It is claimed that low organ notes and bass notes as well as the high tones of the violin and piano are brought out more clearly than with any other transformer now in use.

A high tone ratio is not necessarily productive of high amplification at all frequencies. Leading engineers recognize that it is not possible to make a transformer with a ratio of more than 5 to 1 which will not distort, but there is, however, a certain combination of turn ratio with inductance, capacity and quality of core laminations which will give the desired results without distortion. The Supertran is said to possess this combination. The design of the Supertran makes shielding unnecessary.

## Coming Events

BOSTON RADIO EXPOSITION, December 3-8, Boston, Mass.

SECOND ANNUAL RADIO SHOW, Los Angeles, Calif., February, 1924.

## Radio Trade Notes

Hurling Radio Agency, Milford, Ill., are desirous of securing the agency for a good receiving set.

\* \* \*

The World Radio Laboratories, 67 Hauxhurst Ave., Weehawken, N. J., are doing a mail order radio business and would like to hear from manufacturers and distributors of high grade radio material.

\* \* \*

Thomas M. Hanlon, 613 Bayview Ave., Inwood, Long Island, N. Y., would like to hear from jobbers in radio parts, panels, cabinets, etc.

\* \* \*

The Radio Shop, Cabot, Arkansas, is in the market for radio goods as distributors.

\* \* \*

The Boyer Electric Co. has changed its name to Bethlehem Electric Construction & Supply Co., Bethlehem, Pa.

## New Radio and Electric Firms

Metro Electrical Repair Co., Brooklyn, N. Y., electric machinery, \$10,000; R. Menditto, C. G. Rose, T. McCann. (Attorney, D. Hamler, 15 Park Row.)

Browne Co., New York City, radio instruments, \$20,000; W. Scadron, L. Isaacs, I. Sickle. (Attorney, L. Scadron, 1540 Broadway.)

G. H. Fisher Radio Corp., New York City, \$20,000; W. Scadron, L. Isaacs, I. Sickle, 123 Liberty st., New York City.

Hynds, Inc., manufacture musical and radio instruments, \$100,000; William G. Hynds, Frank P. Torbert, Jr., New Brunswick, N. J.; Stephen A. Corker, New York. (Martin E. Smith, Wilmington.)

## Dry Battery Suit Decided

THE suit of the C. F. Burgess Laboratories and the Burgess Battery Company against the French Battery and Carbon Company, of Madison, Wisconsin, was ended when a decision was handed down recently by Judge Stevens. The court upheld the contentions of the Burgess companies that a conspiracy was entered into by the French Battery and Carbon Company and the co-defendants, James B. Ramsay, president of that company, and O. E. Ruhoff, vice-president and directing chemical engineer, to "wrongfully procure the inventions and trade secrets of the laboratories and to appropriate them to the use and benefit of the French company."

## A Valuable Radio Annual

THE Radio Dealer, 1133 Broadway, New York City, has issued its Year Book for the season of 1923-24. It is a handy-sized volume of 416 pages and contains much information of value to the radio businessman. Manufacturers of over 500 distinct items of radio apparatus are listed. All the listings in the book are based on signed reports from the companies mentioned. The general information of the radio industry contained in this volume is well worth its modest price—one dollar.

## Radio Literature Wanted

Manufacturers of and dealers in radio apparatus and accessories are notified that literature and catalogues describing their products have been requested, through the Service Editor of RADIO WORLD, by the following:

Herman Rudy, 272 North Washington Ave., Battle Creek, Mich.

Charleston Radio Club, 278 King St., Charleston, S. C.

Jason W. Collins, 88 White St., East Boston, Mass.

M. McCann, 419 Randall St., Eau Claire, Wis.

Nelson S. Bell, Wellesley Hills, Mass. (Installer and repairer.)

Henry Juillard, La Salle Tool Co., La Salle, Ill.

Stanley Vine, Fayette, Iowa. (Retailer.)

Radio Supply Co., P. O. Box 1864, Orlando, Fla. (Retailer.)

Liston L. Mallard, Moseley Bldg., Kinston, N. C. (Wants to buy receiving set.)

H. J. Wasserman, 633 N. Tyndall Ave., Tucson, Ariz. (Retailer.)

A. R. Baker, Cairo, Mo.

Sterling S. Bushwood, P. O. Box 471, Sherburne, N. Y.

W. K. Wonders, 2460 Calvert St., Detroit, Mich.

Fred Cheetham, 55 Scarisbrick Road, South Port, Lancashire, England. (Manufacturer.)

Hurling Radio Agency, Milford, Ill.

J. M. Finlayson, P. O. Box 1012, Huntington, W. Va.

William Leslie, 818 New Castle Ave., Sharon, Pa. (Wants to buy or build a receiving set.)

## Here Are Good Broadcast Programs

(Concluded from page 16)

### Station KHJ, Los Angeles, Calif.

395 Meters (760 Kilocycles). Pacific Time. November 29.—10:00 A. M.—Union Services broadcast from First Methodist Episcopal Church. Sermon by the Rev. Elmer E. Helms. 2:30-3:30 P. M.—Broadcasting football game from the Los Angeles Coliseum. 6:45-7:30 P. M.—Children's program, presenting Dickie Brandon, 4 years of age, and Emerson School of Self Expression of Glendale. 8:00-10:00 P. M.—Continuity program, "Thanksgiving Night at the Old Farmhouse." 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra by line telephony from the Los Angeles Biltmore Hotel.

November 30.—12:30-1:15 P. M.—Music. News items. 2:30-3:30 P. M.—Matinee musicale. 6:45-7:00 P. M.—Children's program, presenting Richard Headrick, screen juvenile. 7:00-7:30 P. M.—Organ recital from First Methodist Episcopal Church. Arthur Blakeley, organist. 8:00-10:00 P. M.—Program presented by Southern Branch of the University of California, Men's Glee Club. Mabel Pierson will talk on "Biology and Evolution," through the courtesy of the Braun Corporation. 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra by line telephony from the Los Angeles Biltmore Hotel.

December 1.—12:30-1:15 P. M.—Music. News items. 2:30-3:30 P. M.—Matinee musicale. 6:45-7:30 P. M.—Children's program. 8:00-10:00 P. M.—Children's de luxe program. 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra by line telephony from the Los Angeles Biltmore Hotel.

### Station WRC, Washington, D. C.

469 Meters (640 Kilocycles). Eastern Standard Time. November 29.—3:00 P. M.—Fashion Developments of the Minute. 3:10 P. M.—Song recital by Katherine Wright. 3:25 P. M.—The Magazine of Wall Street. 3:35 P. M.—Current Events by the Review of Reviews. 3:45 P. M.—Violin-cello recital by Albert Kahn. 4:00 P. M.—Travel talk prepared by the National Geographic Society. 5:15 P. M.—Instruction in code practice. 6:00 P. M.—Children's hour by Peggy Albion.

November 30.—5:15 P. M.—Instruction in code practice. 6:00 P. M.—Children's hour by Peggy Albion. Army Night. 8:00 P. M.—Piano recital by Gertrude Smallwood. 8:15 P. M.—Song recital by Cecile Sale. 8:30 P. M.—Violin recital by Alexander Podnos. 8:45 P. M.—Song recital by William Shanahan. 9:00 P. M.—A talk on army matters. 9:15 P. M.—Concert by the United States Army Band. 9:55 P. M.—Retransmission of Government time signals.

December 1.—Station will remain silent during the broadcasting of the Army-Marine football game. 5:30 P. M.—Instruction in international code practice. 6:00 P. M.—Children's hour by Peggy Albion.

**MAGNAVOX**  
*Products*

EVERY condition in the art of radio reproduction is most successfully met by Magnavox apparatus.

*Reproducers*

- R2 with 18 inch horn \$60.00
- R3 with 14 inch horn \$35.00
- M1 with 14 inch horn; for dry battery sets . \$35.00

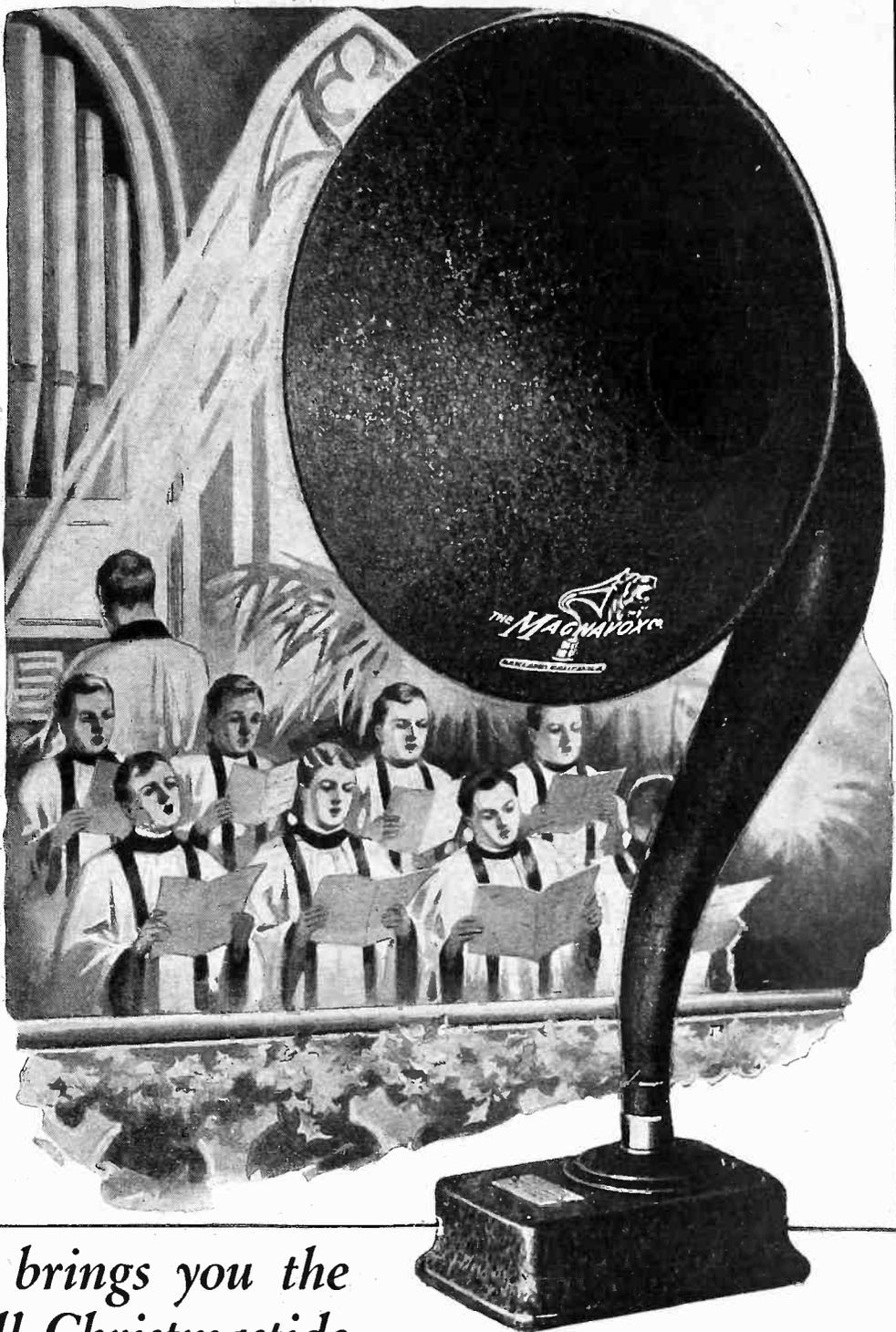
*Combination Sets*

- A1-R consists of Magnavox Reproducer with 14 inch horn and 1-stage Amplifier . . . \$59.00
- A2-R same with 2-stage Amplifier . . . \$85.00

*Power Amplifiers*

- A1-One-stage . . \$27.50
- AC-2-C-Two-stage 55.00
- AC-3-C-Three-stage 75.00

Radio users will be sent new 32-page Magnavox Radio Catalogue on request.



*Magnavox brings you the  
Voice of All Christmastide*

THE Art of Radio Reproduction is enjoyed by every Magnavox owner. Despite the ever-increasing quality and variety of Broadcast Programs, many a receiving set gathers dust unlamented because of insufficient sensitivity or an unsatisfactory "loudspeaker."

Every Magnavox owner is a master of the art of radio reproduction—the results obtained by the use of Magnavox Reproducers and Power Amplifiers cannot be equalled with apparatus constructed in the ordinary way.

The special attention of dry battery receiving set owners is called to the new Magnavox Reproducer M1, illustrated above.

Magnavox Products can be had of good dealers everywhere.

**THE MAGNAVOX COMPANY**  
Oakland, Calif.

New York Office—370 Seventh Avenue  
Perkins Electric Limited—Canadian Distributors  
Toronto, Montreal, Winnipeg

**MAGNAVOX PRODUCTS**  
*There is a Magnavox for every receiving set*

# WGY-WJZ Linked for Big Events

A NEW union between two of the largest broadcasting stations in the country was manifest by the recent announcement that "This is station WJZ of the Radio Corporation of America, New York

City, and station WGY of the General Electric Company, Schenectady, New York, broadcasting the Princeton-Harvard football game directly from Palmer Stadium, Princeton, New Jersey."

The joint broadcasting, made possible by the cooperation of the Western Union Telegraph Company which has made a special installation of 170 miles of land

wire connecting the two stations, was exceptionally satisfactory if the number of congratulatory telegrams and letters received by both stations is a fair indication.

The installation, having proved so successful, will in all probability be used in the future for the dual broadcasting of events of major public interest.

## Answer, Yes!

Mrs. Upstart—On this invitation to the Highbrows' affair I see R. S. V. P. I wonder what that means?

Daughter—Why, you silly thing! I suppose they are going to have a radio concert from that station.—N. Y. Globe.

# Serenada

- the loudest loud speaker
- clear, sweet tone!!
- no distortion!!!

## It's Adjustable!

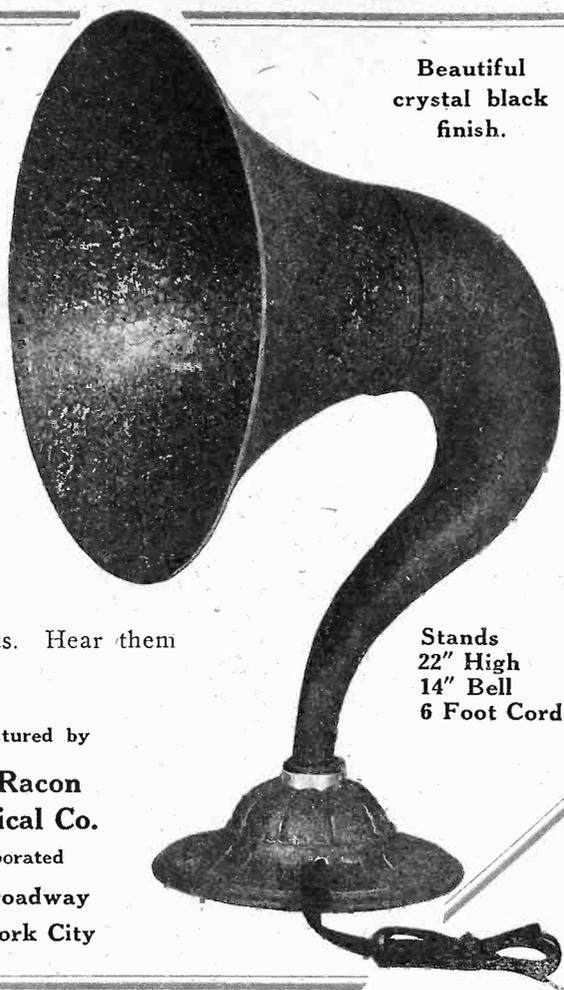
Adjustable to all "B" battery voltages, to various tube and transformer impedances, to any volume you want. Adjustable magnets eliminate rattles and insure maximum volume.

### GUARANTEED

to be satisfactory in all respects. Hear them at your dealers.



Manufactured by  
**The Racon Electrical Co.**  
Incorporated  
537 Broadway  
New York City



Beautiful crystal black finish.

Stands 22" High  
14" Bell  
6 Foot Cord

# Sterling

## Receiving Phones De Luxe

De Luxe in quality, workmanship and performance. Made to last and of materials unexcelled in lasting and wearing qualities.

Light in weight with navy type head bands and black enamel shells. 2400 ohms. Made to give the best of receiving qualities on crystal or tube sets.

## EASY TO ADJUST—STAYS ADJUSTED

Sterling Head Phone can be adjusted quickly and easily and when adjusted can be locked to stay. Just one of the many Sterling features.



\$6.00  
List Price

A Christmas Gift  
Sure to Please

### WHY YOU SHOULD USE ONLY A1 PHONES

A Radio Receiving set is no better than the phones; for the phone is the mouth of the set—giving the message to you.

Think it over. Buy only Phones manufactured to give perfect service.

The **STERLING GUARANTEE** is unconditional. You must receive entire satisfaction or money refunded.

### TRY YOUR DEALER IF HE CAN NOT SUPPLY

Sterling Phones De Luxe

WRITE US DIRECT

## DEALERS

If you do not sell Sterling Phones you are not supplying the best. Write today for liberal discounts and sample.

# Sterling

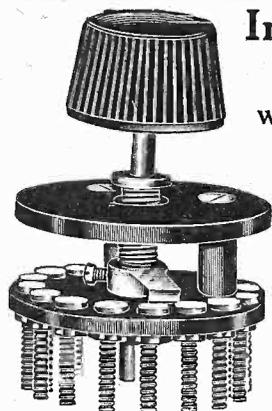
DEVICES MFG. CO.

345 W. Austin Ave. Chicago, Ill.

# BUILD SETS FOR XMAS GIFTS

We Carry a Complete Line of Reliable Apparatus for All the Well-Known Circuits

## Aetaco Back Mounting Inductance Switch



Will Not Absorb Moisture

12 Points Sure Contact

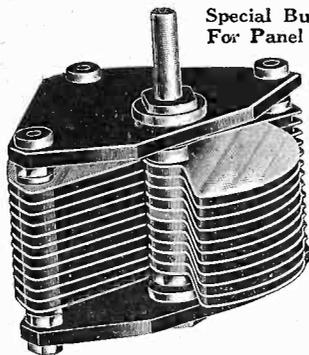
This switch is NOT made from fibre.

For convenience in mounting the set and for continued reliable service, the AETACO back

mounting inductance switch is unsurpassed. The AETACO trade mark is sufficient guarantee of its quality and workmanship.

12 Point Back Panel Mounting Inductance Switch, Special Bushing.....	\$0.75
16 Point Inductance .....	.65
12 Point Inductance .....	.50
Indoor Spring Wire Aerial .....	1.00
Standard 4-Prong Socket .....	.50

Special Bushing For Panel Mounting



THE FAMOUS

## Aetaco Condensers

Aluminum Plates stamped and pressed to insure precision in operation. All spacers are machined brass, nicked finish, "Special Bushing."

### CONDENSERS

43 Plate Condenser.....	\$1.75
23 Plate Condenser.....	1.50
17 Plate Condenser.....	1.35
11 Plate Condenser.....	1.10
5 Plate Condenser.....	.90
3 Plate Condenser.....	.80

## CHRISTMAS SPECIALS

Portable Set in Cabinet 7½x7½, including "A" and "B" Batteries, Detector and 1 Step. While they last, very special..... \$12.00

A special lot of John Firth Piano finish Cabinets, slightly imperfect, 8½x17½; 11½x8; 6¼x8½. Each..... \$1.50

Panels cut to fit same at 2c square inch. MURAD TRANSFORMERS, T11, 106 to 500 meters. Each..... \$1.25

MICHIGAN VERNIER RHEOSTATS, U.V.10, \$1.00 EACH.

Postage Must Be Included on All Orders.  
WHOLESALE AND RETAIL

# AMERICAN RADIO STORES

235 FULTON STREET

NEW YORK CITY

## Women and Radio

WOMAN now has the world at her elbow—thanks to radio.

No longer need the woman of leisure in the city wonder what to do with her spare time, nor kill time in the vain effort to dispel ennui.

Radio, which has brought both entertainment and educational features to her drawing room, not alone for her but for her guests, is coming to be as fully appreciated by women as by the most ardent male radio fan.

One indication of this fact was seen in the surprisingly large number of women in attendance at the recent radio show in New York, and in the alert and intelligent interest which they displayed in new circuits, equipment, and recent improvements in the art.

But radio is even more popular in the homes of women who reside on isolated farms and in small towns at a distance from the great urban centers of music, entertainment and general culture. To women thus situated, radio is not merely a joy, it is rapidly becoming a necessity.

Radio has a universal appeal to all classes of women. For every woman, housewife or lady of leisure, there is a program in the air somewhere which will appeal to her.

Furthermore radio lightens her burdens. For instance, instead of having to invent a story to tell the children at bedtime, she can turn to a station broadcasting a bedtime story, which ten times to one, is better than she herself could tell. Or, instead of wondering what to cook for dinner, she can tune in on another station and obtain a menu. All this by turning a knob. Each day, too, some of the largest stations broadcast information about up-to-the-minute fashions in dress.

In fact, with the growth of women's interest in radio it is rapidly assuming an indispensable place in every home. No longer is radio a complicated maze of wires and controls which confuse women and discourage their use of it. Circuits have been developed which require fewer operations and controls than ever before. Some of them, particularly the reflex circuit, are as easy to operate as a phonograph—and have a vastly wider range and variety of timely programs. In the reflex set only half as many tubes are required

as in other sets, and the control is simple and dependable. Its characteristics of simplicity and loud and clear reception of distant as well as nearby stations strongly commend it to women fans.

Then, too, many women are making their own sets nowadays. Many of them think it less difficult to assemble such sets as the reflex type than it is to make a complicated pattern of lace. One company has issued a booklet entitled "Amplification Without Distortion," which

particularly appeals to women fans because of the simplicity and non-technical explanation of the principles of radio and of the assembling and operation of circuits.

Women are taking radio to their hearts—and homes. This means that it has come into the American home to stay and will be an increasingly important factor in promoting happiness, culture, and good cheer in the humblest as well as the most pretentious home in the land.

## The Marvelous, Critical Control

# ERMCO-STAT

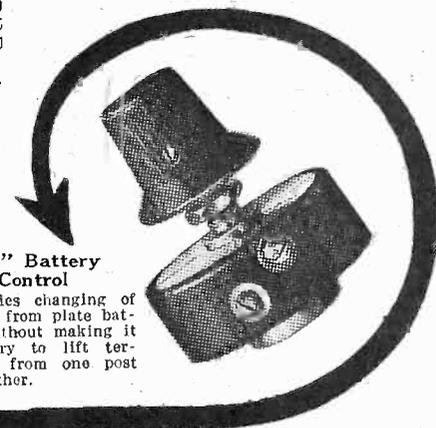
The ERNCO-STAT—1 amp., 75 ohms—is useful as a VERNIER. Advisable in circuits where CRITICAL CONTROL of filament is desired.

MECHANICALLY and ELECTRICALLY PERFECT. Complete BREAK. Sealed container assures uniformity and permanency. No possible loss of mixture. Most expensive construction at lowest retail price. USED BY MANUFACTURERS.

AT ALL RADIO DEALERS

Type "A"—1 Amp., 75 ohms.....\$1.80  
5 Amp., 30 ohms. (4 or more tubes) \$2.25  
Type "B" for "B" Battery.....\$1.80

Manufactured by  
ELECTRIC REGULATOR MFG. CORP.  
Woolworth Building, New York City



"B" Battery Control

Simplifies changing of voltage from plate battery without making it necessary to lift terminals from one post to another.

## The Marvel-Switch

THREE-WAYS

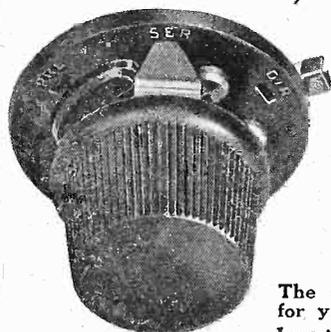
Series,  
Parallel,  
Direct-Ground

Dial-Mounted

Strictly anti-capacity. Offers the best arrangement for switching from long to short waves, or from short to long waves.

The greatest value for your money.

Instructions for mounting given with each instrument.



Patents Pending

List Price \$1.25

Attractive discounts for dealers and jobbers. Write for descriptive circular.

IF YOUR DEALER CANNOT SUPPLY YOU, SEND PURCHASE PRICE TO

MARVEL-SWITCH CO.

28 WEST 25TH STREET NEW YORK

## Ackerman LOUD SPEAKER

Complete. Ready for Immediate Use.

\$9.50

Delivered Anywhere in the U. S. A.

A marvelous speaker for the price of a headset.

Superior to many of the higher-priced amplifiers.

Thousands of radio fans have welcomed this popular-priced quality speaker.

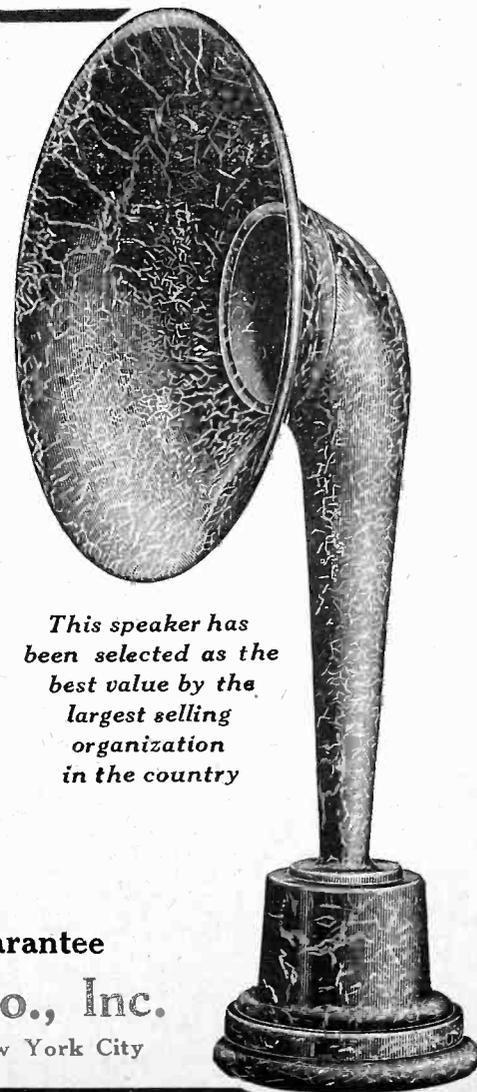
Standing 21" high, with 11" bell and made of heavy metal, eliminating vibration, together with its special loud speaking unit, this speaker reproduces voice and music far beyond expectations. Finished in plain black or brown; also special alligator grain in black and green or black and yellow.

If your local dealer is unable to supply you, send order direct to us and pay postman on delivery.

Sold on a Money-Back Guarantee

Ackerman Brothers Co., Inc.

301 West 4th Street (Dept. "R. W.") New York City



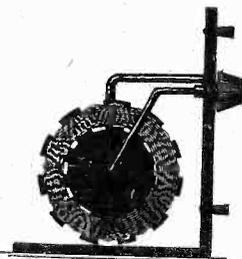
This speaker has been selected as the best value by the largest selling organization in the country

The  
"Conradio" Nifty-Switch



"No wires to hitch if you use a Nifty-Switch"  
The niftiest switch ever devised for "A" and "B" battery circuits. Fits directly on binding post of the set as shown in cut. (No holes to drill.) No need to turn the rheostat off, no dangerous "B" battery current in your set when not in use, if equipped with NIFTY-SWITCHES.  
**SIMPLE—CONVENIENT—EFFICIENT**  
Keep Astride with Progress—Equip Your Set with "CONRADIO" NIFTY-SWITCHES  
Price 35c Each

"Conradio" Variometers and Vario-Couplers



Spider Web winding, which has been proclaimed most efficient by foremost Radio Engineers. Sharp tuning qualities; Compact in size; Low in cost; only 1 hole to drill in panel. Complete with mounting, knob and pointer. Guaranteed highly efficient.  
**CONRADIO VARIO-COUPLER . \$2.00**  
**CONRADIO VARIOMETER . \$2.00**

Conradio Variometers are particularly recommended for the Autoplex Circuit.

**CONRAD RADIO COMPANY**  
76 Boylston St. Jamaica Plain, Mass.  
**DEALERS!—Write for attractive proposition.**

Professional  
testimony



**LABORATORY** tests prove FIL-KO-STAT superior to all other rheostats. It guarantees scientifically correct filament control and longer tube life. R. B. Clarkson, Radio Data Expert, in his article on Filament Control says: "only the FIL-KO-STAT construction appears to give the idea' results."

30 ohms full resistance—adjusted to all tubes—no discs to break—no carbon powder rheostat.

**FIL-KO-STAT**

Made and Guaranteed by  
DX Instrument Co. Harrisburg, Pa.  
Radio Stores Corp., 218 W. 34th St., New York  
Sole International Distributors

A Gift of Distinction

Beauty Monogram Auto Signal

A tail lamp and stop signal combined, including an illuminated interchangeable name or monogram of automobile.

CAN be installed on any car in a few minutes and without any alterations to the car. Full directions are enclosed in box.

In ordering mention make of your car.

Order Today!

Price complete ready to attach

**\$5.50**



Packed in a Xmas box.

Mailed Prepaid.

Send remittance to

Safety First Auto Signal Co.  
Racine, Wisconsin

A Delightful Christmas Gift for Someone

**Complete Radio Outfit**

With High Grade Long Range Vacuum Tube Receiving Set..... **\$29.50**  
Everything Included. Nothing More to Buy.

Special Holiday Season Price

The Year's Sensation

Think of it! A complete guaranteed Radio Outfit at less than half price. Hear all the Long Distance Broadcasting Stations. Opera, Football Scores, Market Reports, Lectures and Vocal and Instrumental Concerts from coast to coast. World's 60% price brings this wonderful set in the reach of every purse. Take advantage of this startling special holiday season price now.

Send No Money

You need not send a penny. Just give us your name and address; radio set with complete equipment will be shipped C.O.D. subject to inspection the day your order is received. Or we will allow 5% discount for cash in full with order. Act quick before World's special holiday season price is withdrawn. Order today.

**WORLD BATTERY CO.**

RADIO DEPT.

Desk 6, 60 E. Roosevelt Rd., Chicago, Ill.

Nothing More to Buy

This receiving set has a World 6 Volt storage battery, guaranteed for two years, also a Radio Corporation U.V. 200 detector tube, double head phones, 22½ volt large size Franco Battery, aerial wire, lead-in wire, ground clamp, insulators, and hydrometer. This is a complete outfit, ready for use the minute you get it. There are no extras to buy. Every part guaranteed by the maker and by us.  
**Everything Guaranteed.**

Within Reach of Every Purse

CHRISTMAS



SPECIALS

Crystal Set, Complete, ready to install, satisfaction positively guaranteed, with two pairs of Premier Phones.  
(Regular value, \$15.00)..... **\$9.75**

Stanley & Patterson Devaux Gold Seal Headsets (gold-plated). A handsome Christmas gift for the Radio fan..... **\$6.00**

To all readers of the RADIO WORLD we offer a Special Discount of 10% on all Radio Parts they wish to buy for Christmas presents for their friends.

**THIS OFFER IS GOOD UNTIL JAN. 1st**

Lionel Electric Trains, nicely boxed, 10% Discount From Regular Prices.

Write Us Regarding Your Christmas Problems.

**SUNBEAM ELECTRIC CO.**

71 THIRD AVENUE

NEW YORK CITY

Hear From Everywhere Perfectly with the

**SLEEPER-MONOTROL GRIMES INVERSE DUPLEX CIRCUIT**  
One control—no aerial, no ground.  
Four tube set, \$140 Three tube set, \$115  
Booklet on request

**SLEEPER RADIO CORPORATION**  
88 Park Place New York City

**IT'S A FRAME-UP**

IT WILL SOON COME TO TRIAL

Quinby Radio Construction Co.

**MARVEL SPECIALS!**

B BATTERIES  
Highest Quality Guaranteed

\$1.75	22½ V Small.....	\$0.70
3.00	22½ V Large.....	1.20
4.25	45 V Medium.....	1.69
5.50	45 V Large.....	2.20

D X Tubes, Guaranteed

6 Volt.....	\$3.95
1½ Volt.....	4.19
\$6.50 Big Four Crystal Receiving Set....	5.69
With Head Set.....	8.09

Write for our Free Monthly Price List. Remittances Must Include Postage. Dept. R. W.

**MARVEL RADIO SPECIALTY CO.**  
132 NASSAU STREET NEW YORK

Due to increase in business activities, it has been found necessary to install two telephone trunk lines in the office of RADIO WORLD. These two trunk line numbers are Lackawanna 2063 and Lackawanna 6976. If one is busy, try the other.

**SEND FOR YOUR FREE COPY  
TESTED HOOK-UPS**

SUBMITTED BY USERS OF OUR



**Wonderful  
Transmitter  
Button for Loud  
Speakers.  
Amplification  
and Experiments**

**Price \$1.00** POSTPAID  
with instructions  
**K. ELECTRIC CO.**  
15 PARK ROW NEW YORK

**RADIO FANS**

Tune in on station  
**WEAF (New York)**

every Thursday at 8.50 P. M. and  
listen to a story or article selected  
from

**HEARST'S  
INTERNATIONAL**

This is one of the most popular weekly features  
"on the air"

**FREE**

Write for Free Copy of the Latest Radio Reprint  
E. It contains a complete story from Hearst's  
International Magazine. Address Radio Editor,  
Hearst's International Magazine, 119 West 40th  
Street, New York City.

**PERFECT RECEPTION**

Enjoyed on detector one or  
two steps with

**ONE PRALL TRIPLE JACK**

Postpaid: JACK, with Plug and Diagram

**\$3.25**

Guaranteed satisfaction or money back

**B. W. PRALL CO.**

160 College Ave.

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**DEALERS Write for trade terms**

**WE REPAIR  
RADIO TUBES!**



WD-11...	\$3.50	UV-199...	\$3.50
WD-12...	3.50	C-299...	3.50
UV-200...	2.75	UV-201A...	3.50
UV-201...	3.00	C-301A...	3.50
C-300...	2.75	UV-202...	4.00
C-301...	3.00	C-302...	4.00
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Mail orders solicited and  
promptly attended to.

Dealers and agents write for  
special discounts.

**H. & H. RADIO CO.**

P. O. Box 22-B

Clinton-Hill Station Newark, N. J.

**"Old Songs Are Best"**

THE songs of the old days are favorites  
with radio fans, according to a sur-  
vey made in connection with the second  
annual Chicago Radio Show. Just what  
the public most wants to hear was the  
purpose of the survey, a questionnaire  
having been broadcast from three stations.

More than 100,000 responses were re-  
ceived. A very large number express a  
preference for songs sung years ago. The  
radio public is largely composed of heads  
of families, with the younger generation  
only a small part of the listeners, accord-  
ing to E. F. McDonald, Jr., president of  
the National Broadcasters Association.

Responses came from every State in the  
Union, every Province in Canada and  
even from the MacMillan Arctic expedi-  
tion, now within eleven degrees of the  
North Pole.

**KELLOGG  
CONDENSER**



**Very true!**

**rotor plates bolted  
at ends—no "shorts"**

Now when it comes to condensers real  
radio bugs can appreciate this: heavy  
aluminum plates securely bolted across  
to assure uniform air space between  
the plates; a five-plate vernier gives  
"clean cut" tuning; heavy Bakelite  
end pieces make a rigid mounting; no  
"shorts" because it is impossible for  
plates to touch.

Here is a condenser that will be true  
to you. The price, which is always  
standard, is \$8.75 for 43 plate and  
vernier but that does not prevent the  
real radio rascal from having it  
wrapped up to take home—this very  
night. Another thing, this price in-  
cludes dial and vernier knob.

**Use—Is the Test**

**KELLOGG SWITCHBOARD  
& SUPPLY COMPANY**

**CHICAGO**



**Charges Radio and Auto Batteries  
at Home Over Night for a Nickel**

For a friend who owns a radio set or auto, what  
would be more appropriate than a gift which  
would eliminate the inconvenience and ex-  
pense of taking his battery to a service station  
every time it requires recharging? The



is such a gift, appropriately dressed up in a  
beautiful package. It charges any Auto,  
Radio or "B" storage battery in the quickest,  
simplest and most efficient manner possible.  
Connects to any lamp socket—operates  
silently—requires no watching. Fully auto-  
matic in operation—absolutely safe. Beauti-  
fully finished in mahogany and gold. Un-  
qualifiedly guaranteed. Over 125,000 already  
in use.

At all good dealers, \$18.50 complete (\$25.00  
in Canada)—no extras to buy.

FREE: Ask your dealer or write direct for  
free copy of Homcharger list of broadcasting  
stations and GOLD SEAL bulletin.

**Insist**  
on the **GOLD SEAL**



It's your guarantee against  
substitution and appears  
on name-plate and package. No other  
charger is just as good.

*The Automatic Electrical Devices Co. 135 West Third St., Cincinnati, O.  
Largest Manufacturers of Vibrating Rectifiers in the World*

**MASTER RADIO AT HOME**

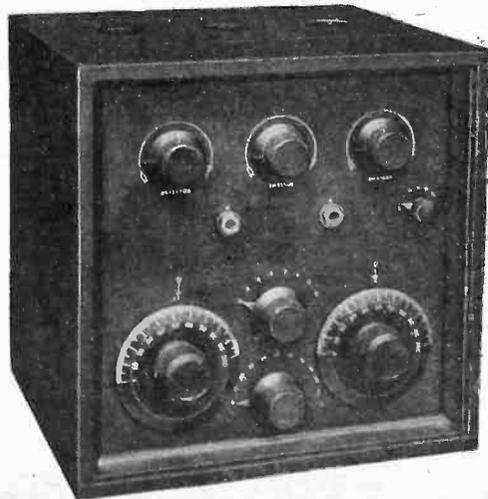
You can become one quickly. Write TODAY for  
scholarship. Our up-to-the-minute Home Study  
Course in Radio is the last word. Covers all  
angles and every new development; includes over 600  
diagrams and drawings of Radio Sets, circuits,  
hook-ups, parts, etc.

**\$40 SCHOLARSHIP FOR PROMPT ACTION**  
given without charge to the first thousand who  
enroll. This introductory offer to widely advertise  
the course cannot be repeated.

**THIS OFFER UNRIVALED**  
A complete \$50 Radio Course, including 600 dia-  
grams and drawings—40 separate lessons, and all  
it will cost if you act quick is \$10. Never a  
bargain like it before.

**WRITE TODAY.** If you would be sure of a  
scholarship send in your enrollment with \$10  
TODAY. Money back if dissatisfied. You take no  
risk. Circular showing reduced reproductions of  
the 600 diagrams and drawings sent on request.

**BURGESS ELECTRICAL SCHOOL**  
Yorke Burgess, Superintendent  
Dept. 1, 748 E. 42nd Street, Chicago, Ill.  
Canadian Branch: 201 E. Crawford St., Toronto



**The  
SKYOLA RECEIVER**

**\$80.00**

**The Set That Is Different. Type S...**

A marvelous Set consisting of Detector and Two Stages of Audio Frequency  
Amplification. Simple, compact, efficient. Stations easily tuned in by the  
new Special Patented Non-Regenerating Circuit. No squeals or howls.  
Good, clear Reproduction Guaranteed.

**4 BULB SET, ONE STAGE RADIO, DETECTOR  
AND TWO AUDIO, TYPE SR, PRICE..... \$90.00**

Liberal Discounts to Jobbers and Dealers

**CLARENCE E. MORRISON**

SEND FOR PRICE LIST  
of RADIO APPARATUS.

**2 STONE STREET  
NEW YORK CITY**

### Experiments with One-Wire Antenna

RECENT exhaustive tests with one wire antenna on merchant vessels have demonstrated the practicability of using a single wire for low power transmitting purposes as well as for receiving. Aboard ships this feature would eliminate cost, space and weight. It would make the necessary lowering of the aerials on cargo vessels during the loading much easier, and reduce the necessary insulators, wire, spreaders, etc. Also the single wire aerials could be hoisted higher than a three or four-wire antenna.

Amateurs who have no facilities or cannot afford to erect masts high and strong enough to carry a heavy four-wire aerial, should find the single wire of considerable benefit when using 1 KW or less power;

for 2 KW transmission, it is said the single wire antenna is not to be compared with larger antenna.

Most every one knows that the single wire aerial picks up less interference. Its efficiency in transmitting is not quite as great as a four-wire aerial, but experts believe the decrease in cost, weight and ease of handling would compensate for loss in efficiency.

The recent tests included the use of both inverted L and T type aerials, and several forms of wire. A four-strand wire cable twisted over a manila rope core was found most satisfactory.

### Quick Replies

A western dispatch says that a man broadcast a message to his sweetie, naming the day and got 47 instantaneous answers.

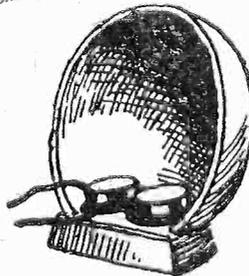
### Capitol Theatre Broadcasting One Year Old

LAST Sunday marked exactly one year since the Capitol Theatre, New York City, installed its regular radio broadcasting service. Much water has passed under the bridge since the day that the first microphones were installed in the theatre and Richard Strauss' "Ein Heldenleben" broadcast to a palpitating public. Now the Capitol entertainment is acknowledged to be the best on the air and when the name "Roxie" is mentioned, five million radio fans stand up as one man and cheer. "Roxie" arranged a special program in honor of the occasion last Sunday night. George B. Christian, Jr., former secretary to the late President Harding, and an ardent radio fan, came up from Washington to speak from the Capitol studio.

**DUPONT MAKES  
New Pyralin**

*Shelton*  
**Loud Speakers**

**\$3.00**



It is built differently to take advantage of the most correct acoustic principles and reproduces music and speech with a clear tone.

MADE EXCLUSIVELY FOR US  
AT ALL DEALERS

Use the SHELTON with ANY good phones and get wonderful results. We are distributors for Nath. Baldwin phones and the new Baldwin Loud Speaker. Satisfaction guaranteed. C. O. D. or cash with order. Dealers write for discounts.

DISCOUNT TO DEALERS

**THE SHELTON COMPANY**

185-189 CLINTON AVE.

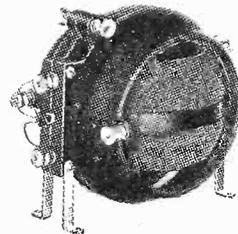
NEWARK, N. J.

**It Costs You No More  
to Buy**

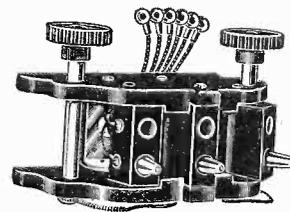
**Columbia Bakelite  
Moulded Apparatus**

### The All-Circuit Variometer

The Columbia Variometer is fully bakelite moulded, green silk, pig-tailed, and provides for all circuits of today and tomorrow; the stators may be split. You cannot obtain a finer tuning variometer. Body capacity minimized. Regenerative, Ultra-Audion, Flewelling, Reinartz and Reflex Circuits all provided for. Diagrams with each instrument.



Type C109A, Price . . . . \$5.50



The Geared Coil Mounting you have been looking for. Moulded of genuine bakelite; geared 5 to 1 reduction; 6 inch silk leads. A True Columbia Product.

Type C401, Price . . . . . \$5.00

#### A Few More Columbia Products:

- Bakelite Moulded Variocoupler, Type C120 . . . . . \$6.00
  - Bakelite 180° Variocoupler, Type C135 . . . . . 5.00
  - Bakelite 3 Coil Geared Mounting, Type C401 . . . . . 5.00
  - Bakelite 2 Coil Geared Mounting, Type C402 . . . . . 3.50
  - Inside Coil Mount Geared and "Vernier" Type C403 . . . . . 6.00
  - Coil Plugs . . . . . .50
  - All Meter 180° Couplers . . . . . 7.00
- And Complete Line of Mounted Coils.

All good dealers have Columbia Products. Insist on them.

**Columbia Radio Corp.**  
155 N. Union St. Chicago

## Christmas Radio Gifts To You Your Friends

SHIPPED DIRECT

This Week's Specials—Prices effective to Dec. 8th

No. 1—Flewelling Circuit  
1—75 Turn Green Lattice Coil, \$2.45  
1—100 Turn Green Lattice Coil,  
with Plug Mountings, complete

No. 3—Hazeltine Circuit \$5.95  
3—R. F. Transformers  
2—Micro-Mike Condensers

No. 2—3 Tube Reflex  
2—Estru Variometers  
2—R. F. Transformers, 4 to 1 \$11.20  
complete

No. 4—Ultra-Audion Circuit  
1—Uni-Flex, 150-T-10, Tapped Coil . . . . \$1.60  
Or 1 Uni-Flex, 150-T-10, Mounted . . . . 2.20  
Or 1 Estru Variometer . . . . . 4.35

### Extra—Special—Extra

No. 5—Auto Plex Wonder Circuit \$9.85  
2—Estru Variometers  
1—1250 Turn Green Lattice Coil

No. 6—Special for Milo-Plex Circuit \$4.55  
1—Estru Split Variometer

Or No. 50—2 Estru Variometers \$10.25  
1—1500 Green Coil

### How to Order

Please give number, description and price to avoid mistakes. Total the amount of the order and send P. O. money order, certified check or bank draft with your order. Write your name and address on letter and envelope.

Write for  
Descriptive Circular  
of Regular Stock.

We Prepay  
Transportation.



2903 W. MADISON STREET, CHICAGO

# OUT OF THE ETHER

## Chats About Broadcasting Stations

By Hirsch M. Kaplan

KDKA surprised us by broadcasting the clash for the light heavyweight championship between Harry Greb and Sailor Jones. If those who listened in on this did not wait for further announcements from this station, after the bout, then they missed a treat, for the Queen City Orchestra rendered a program of dance music. One selection by them was enough to make you pick a partner.

The already popular J. E. K. Trio rendered another one of their classical instrumental recitals. This time they played at station WJZ.

Radio fans have a chance to increase their knowledge if they will tune in station WMAQ any evening and listen to the lectures as offered by the various colleges and universities.

WNAC came through with a splendid offering of Russian Ballet music as played by the Anna Pavlowa Orchestra. This same program was also heard from WEAN.

Miss Ross, through station WSB, entertained us with several piano selections which we greatly enjoyed.

Just a point for discussion. Don't you think that there is too much popular dance music put on the air these days? Popular music after being heard over and over again becomes monotonous, while on the other hand, if it were classical music, the more you hear it the better you like it. Is that not true? Let the various broadcasting stations consider this matter and arrange their programs accordingly.

How did you like the program of popular hits as played and sung by the Louisville Ten, of course, from WHAS? Were they not "hot stuff?"

If you didn't tune in WHAZ the other night and hear the popular musical program as rendered by the Melody Belles, then you certainly did miss something. For, as we said before, they are some "Toodley-Oot-Tum-Tums."

WGI keeps us smiling by offering as a

part of their evening program several passages from "Judge."

May Singhi Breen sure can "Say It With a Banjo." She rendered her program from WHN.

WBZ came through with another lecture in the course in short-story writing by Dr. J. Berg Esenwein.

Because most of the radio stations operate on a wave length between 360 and 492 meters is no reason why you should not tune higher, if possible. If you don't, then you will miss having many an enjoyable evening.

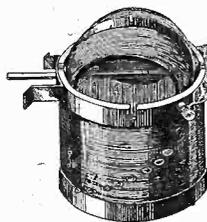
KSD came through with a splendid program of string music as played by Aberg's Concert Ensemble. Arne Arnesen, also from this station, played

several numbers, which convinced us that Mischa Elman and Heifetz have some close competition. That's saying something!

WOR's broadcasting of an old-fashioned "Hallowe'en Party" certainly was a novelty for us radio fans. It was so realistic that I imagined the entire party was taking place in my presence. By the way, WOR is anxious to have their radio audience write in and tell their interpretation of the call W-O-R. Do you know? If so, kindly write them, care of L. Bamberger & Co., Newark, N. J.

Folks, why wait for WEAf to broadcast their two hours of excellent Saturday night dance music, when you can make it three hours of dancing by tuning in WGY, at 9 p. m., and listen to Phil Romanos and his Rainbow Orchestra?

200-600 Meters



List Price \$6.00

### BEL-TONE TYPE A-10

THE IDEAL VARIO-COUPLER BRINGS IN DX AS CLEAR AS A BELL. MADE OF DARK RED MOULDED RADION. THE SUPREME INSULATION. DOUBLE SILK COVERED WIRE USED THROUGHOUT. ALL METAL PARTS NICKEL PLATED. WORKMANSHIP, MATERIAL AND PERFORMANCE GUARANTEED.

If you cannot secure one at your dealers send purchase price to us with your dealer's name and address.

**BEL-TONE RADIO CO.**

161-167 JAMAICA AVE.

BROOKLYN, N. Y.

## LEARN RADIO

Get into the world's greatest field of profit and pleasure. Big money-making opportunities. Easy to learn. Trained men are in demand—mechanics, operators, designers, inspectors. Qualify for these high salaried positions, or make big money in your spare time. Unlimited possibilities on land and sea.

**I WILL TRAIN YOU AT HOME TO BE A RADIO EXPERT**

You, too, can learn, quickly and easily, to design, construct, install, operate, repair, maintain and sell all forms of Radio apparatus. No previous experience necessary. My methods are the latest and most successful in existence.

**FREE** Wonderful home construction tube receiving set, of the latest design. **Write Today "Radio Facts" FREE**

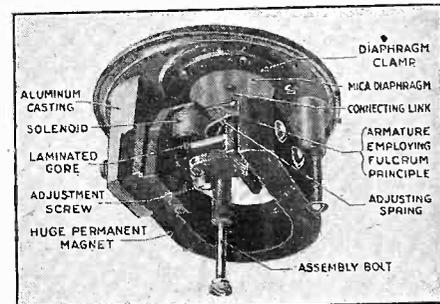
A. G. Mohaupt, Radio Engineer, AMERICAN RADIO ASS'N, Dept. 10, 4513 Ravenswood, CHICAGO

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**TYPE "A1"**  
21" FIBER HORN  
\$25.00

**TYPE "B"**  
(For Phonographs)  
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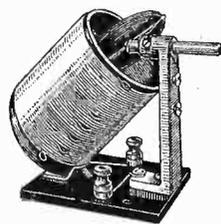
An ear phone is an ear phone no matter how fancy the horn that covers it may be, and, due to the delicate construction of an ear phone it is utterly incapable of giving true tone reproduction, especially, when relatively large currents are passed thru its coils, such as the output of a two-stage or power amplifier.

The Trinity Loud Speaker element embodies the well-proven and tested principles of the phonograph reproducer with the soundest principles of electromagnetic design best adapted for loud speaker operation. It is not an ear phone when placed on a head band and a loud speaker when covered with a horn. It is a sturdy loud-speaking element ALWAYS.

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180° Variocoupler  
Greatest Selectivity  
200-600 Meters

The Rotor is mounted without the use of any mass of dielectric resulting in minimum losses with consequent selectivity and sharp tuning. is ideal for the portable set.

Requires only 2 1/2" of panel width, about one-half as much as most couplers, and

Absolutely guaranteed, which means that if not perfectly satisfactory, your money will be returned without question.

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Price \$3.00 net

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Due to increase in business activities, it has been found necessary to install two telephone trunk lines in the office of RADIO WORLD. These two trunk line numbers are Lackawanna 2063 and Lackawanna 6976. If one is busy, try the other.

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2 VOLT STORAGE BATTERY for WD11—WD12 \$5.00	6 Volt, 100 Amps. \$8.50
6 V., 80 Amps. \$8.50	6 Volt, 120 Amps. 14.50
6 V., 80 Amps. 10.00	6 Volt, 140 Amps. 16.00

## Radio Compass on "Leviathan" a Success

ON her last voyage out of New York the S. S. "Leviathan" carried a radio compass, invented by Frederick August Kolster, of the Radio Section, U. S. Bureau of Standards. Mr. Kolster sailed on the ship to instruct the navigating officers in the use of his device.

A cablegram from Southampton on the vessel's arrival states that the compass produced satisfactory results. Mr. Kolster is quoted by a New York Herald reporter as follows:

"This is the first time it has been used on a liner, though some United States warships used it near the close of the war. We are limited only by the power of the transmitting station or beacon. On the voyage from New York we took cross bearings from the Lizard to Ushant, positions which were known, and found that the radio compass gave the exact position.

"We also were able to determine the whereabouts of many ships beyond visibility. I invented the compass primarily for use in fogs. Our experiments show it practically eliminates all danger of collision in fogs. I adopted the principle of ascertaining by ear rather than by eye. Attached to the compass is a telephone receiver which receives signals from any station or vessel, and that signal operates the wheel of the compass, stopping it at a position giving the exact bearing of the transmitting station or vessel.

"When mounted on a magnetic compass the instrument shows the magnetic bearing."

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**DO YOU WANT TO BUY, SELL OR EXCHANGE RADIC OR OTHER GOODS? TRY THIS DEPARTMENT AT 5c A WORD**

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**SPECIAL**—Radiola Senior complete with Brandes Phones and WD-11 tube, \$39.50, formerly \$65.00; Senior Amplifier complete with two WD-11 tubes, \$39.50, formerly \$68.00. Act quickly, supply limited. Postpaid. Charles Horton, Monticello, N. Y.

**DON'T USE "B" BATTERIES.** Send one dollar for blue print of hook-up using no "B" Battery, list of parts, etc. Harold Flanders, Box 84, Salina, Kansas.

**SACRIFICE!**—Crosley 3-tube set with Federal loud speaker, tubes, storage battery, and all accessories, complete. \$70.00. H. Randelman, 156 Pulaski St., Brooklyn, N. Y.

**RAILWAY POSTAL CLERKS: START \$133 month.** Railroad pass. Expenses paid. Test examination free. Columbus Institute, R-3, Columbus, Ohio.

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**EDISON STORAGE BATTERIES,** \$4.00; nearly new; cost \$40.00; Edison Elements, 15c dozen; 500 volt generator. Miners' lamps with Storage Battery, \$2.00. 824 North Fifth, Philadelphia, Pa.

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**BUILD AN ULTRA-AUDION REGENERATIVE SET** at home. Postage 20c. Selective, loud and clear. Parts furnished with drilled panel ready to mount. Cabinet, phones and tube extra. A. L. DUNN CO., 2 Betts Place, South Norwalk, Conn.

**A 3-TUBE "DX GETTER" CHEAP.** Set practically new, consists of receiver in cabinet, 3 tubes, batteries, phones, complete for only \$55.00. Guaranteed circuit—not home-made. Act quick—first money gets it. J. J. WALSH, 105 West 40th Street, New York City. Telephone Penna. 2049.

**LOOK**—Crosley No. VI receiver—one stage tuned radio frequency and detector—for only \$16.00. Regular price \$30.00; with tubes \$24.50. De Forest Reflex Set \$60.00. The supply is limited—so hurry. N. E. RISTEY, Spring Grove, Minn.

**MAGNAVOX R3 or M1**—Latest nationally advertised reproducers. List, \$35. Introductory, \$25. The factory sealed carton is your guarantee. RADIO CENTRAL, Dept. W., Abilene, Kans.

**TRADE**—Pistols, fieldglasses, etc., for radio parts. D. BECK, Box 30, Herrick, Illinois.

**LONESOME?** Make new friends. Write Dolly Gray Agency, Box 186B, Denver, Colorado.

**A REAL LONG DISTANCE GETTER!**—The Kond-Koil Tuner Special (Variable Condenser and Variable Coil on one mounting). Tuner and Special Circuit for \$3.00. KAUFMAN RADIO CO., 4209 12th Avenue, Brooklyn, N. Y.

**EXCHANGE JOLLY, INTERESTING LETTERS THROUGH OUR CLUB.** Betty Lee, Inc., 4254 Broadway, New York City. Stamp appreciated.

**HEAR 2,000 MILES ON A ONE TUBE SET.** A marvel of simplicity. Easily built, using standard parts. Diagram 50c. Scientific Radio Laboratory, 25 Third Avenue, New York.

**RADIO MAN WITH 10 YEARS EXPERIENCE** and who is familiar with most apparatus desires position as manager of radio store or department, preferably in small or medium size town. Address, Box X, Care of Radio World.

**GENUINE EDISON ELEMENTS (new)** for making "B" Batteries. Obtained from U. S. Government. A positive and negative element—6c.; glass tube—3c.; all other parts at reasonable prices. Postage, etc., 50c. extra per order. Free instructions. TODD ELECTRIC COMPANY, 103 West 23rd Street, New York.

**PATENTS**

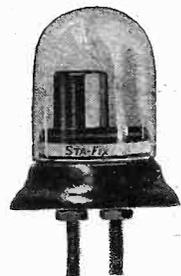
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Replaces crystal in all circuits. Overcomes difficulties with reflex work. Gives greater volume, greater selectivity and steadies the circuit. No adjustments for change of wave lengths. Real results. Absolutely guaranteed. At your dealers, or order direct. Socket 50c.  
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**Sta-Fix Detector**



PRICE  
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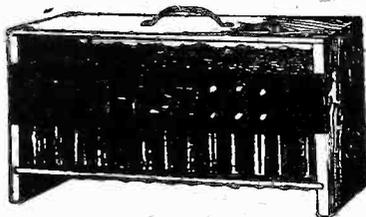
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**THIS** Detector is guaranteed to be perfect in every detail and properly adjusted to be clear in tone and volume, and subject to **FREE** exchange if found imperfect.

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Rechargeable Storage 'B' Battery  
**Build Yourself a 100-Volt Storage 'B' Battery From Edison Elements, \$9.00.**  
140 Volt \$13.50, consisting of drilled elements, tubes, separators, wire, electrolyte and complete instructions. Assembled Battery 100 Volt, 1500 Milliamps, \$17.50. 140 Volt \$23.50.  
Unassembled 100 Volt Battery, consisting of elements, cabinet and tubes, Bakelite panel board, double pole, double-throw switch, rubber knobs \$13.50. 140 Volt Battery \$17.50. Drilled elements 6c per pair; glass tubes, 2c each; separators, 1c each; nickel wire 1c per length; rubber covered switch wire 2c per foot.

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Gives micrometric adjustment outside the field of inductivity.

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**Repairing Radio Tubes**

**R**EPAIRING radio vacuum tubes has long been one of the most discussed subjects among radio fans. In 1922, and many times since, the demand for tubes has far exceeded the supply; this naturally induced the thought that if new tubes could be made, the old ones could be repaired. It looked an easy job to replace the burnt out filament, re-pump the air out of the new bulb, and the tube would be as good as it ever was. A few adventurous individuals apparently thought it was no harder to refill a radio tube than to half-sole a pair of shoes. They learned differently.

The real reason why radio tubes can now be successfully repaired is because the internal elements (the grid, plate and supports), can be put through a process that, it is claimed, returns them to the same chemically pure metals they were before they were made into the original tube. This work requires very careful handling under the cleanest conditions possible.

The initial operation is that of removing the base. The bases are accumulated and sent through their process, cleaning out, reaming the contact post holes, then dipping the base in acid to remove all marks, as well as dirt, and polished and set aside to await the tubes when finished.

In the meantime, the tube, which remains intact after removal from the base, is started on its long journey. The outside glass is cracked off; the plate, grid and stem through which the lead wires run, are separated, cleaned, and put through a special process. Following this girls wearing gloves made for the purpose, start the very careful assemblage of the elements around the new filament wire, which has been welded to the supports on the stem.

The next move is up to the glass blowers. The new glass bulb, which has been tubulated, is sealed on to the stem; a test is then made for leaks, and if none appears the tube goes to the exhausting station, where it goes through a long drawn-out process of expulsion of all air from the tube. To do this properly, it is necessary to heat the tube from the inside, as well as from the outside. Only the most carefully constructed station can properly do this work. The least slip at this juncture means all the previous labor lost, and the spoiled tube has to go through the preliminary operations again.

Before basing the sealed up tubes are put through a test to determine point of oscillation, consumption of current, degree of vacuum, etc. They are carefully tested again for leaks, and if perfect they go to the basing operation, which also must be done carefully, and they must pass another test, the same as the previous one, in order to be certain they are based properly and that nothing has happened to them since the first test. After this they are tested for performance in an actual set, and if passed they go back to their original owners.

Although it requires a thoroughly trained organization, and the use of the most modern equipment obtainable, it is possible to repair tubes so that, it is claimed, they equal in performance the new ones.

Radio World mailed every Tuesday. \$6.00 year (52 numbers).

**Cockaday Coil Set \$2.50**

Including full size blue prints of panel layout, complete picture hookup, and fully illustrated instructions for construction and operation.

Coils are fully assembled, made exactly as specified by Mr. Cockaday. D coil bank wound. Far more efficient than any home-made coils.

Standard parts for this sensational circuit—panel, coils, condensers, verniers, variable resistance, vernier rheostat, socket, double jack, dials, switch, contact points, posts, bushbar, wire, spaghetti, etc. (no tubes or phones).

Complete for \$11.65

Postage additional on all shipments. Send no Money. **PAY THE POSTMAN** All Goods Shipped Parcel Post C. O. D.

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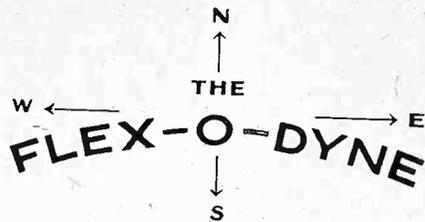
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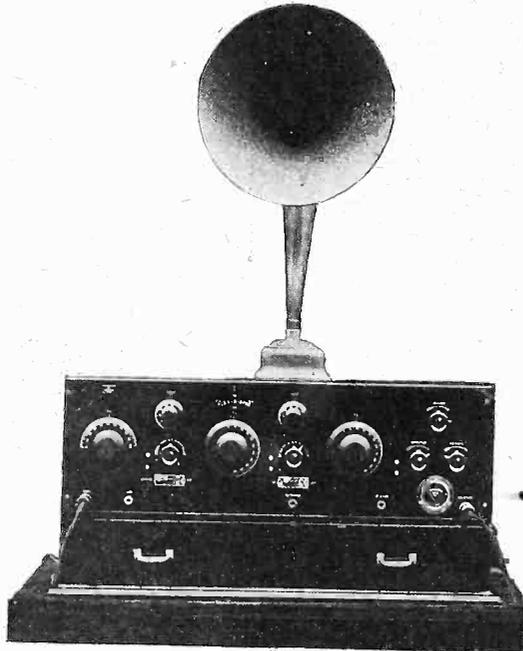
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WHY NOT NOW?**

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**THE GUARANTEED  
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NEW YORK CITY

**Marconi Predicts Three  
Important Radio  
Advances**

WILLIAM MARCONI in an interview with the London correspondent of the New York Herald recently said he had high hopes of three new adaptations of wireless being placed in the service of humanity within the near future—radio telephonic communication between Europe and the United States and even greater distances, the prevention of mine disasters through wireless installations and the perfection of wireless for use in conjunction with submarines.

"We, as well as the Western Electric Company, have had numerous successful experiments with the wireless telephone over distances up to 2,000 miles, but at 3,000 we encountered troubles similar to those which prevented the wireless telegraph being used extensively for commercial purposes for a long time," said Mr. Marconi.

"The telegraphic service is now working well, regardless of atmospheric conditions, and a new apparatus on which we are now busy gives promise of doing the same for the telephone. Trans-Atlantic fees will be fairly high when this service is inaugurated, as the outlay on the apparatus essential to each circuit will be heavy."

Of the other two developments Mr. Marconi said: "I am personally far more interested in seeing wireless made serviceable in mines than its extended use with submarines. The one will be of peacetime service and probably the means of saving hundreds of lives, while the other would be of use only in wartime, and we all trust the necessity for such use may not arise.

"As a matter of fact, wireless now works more efficiently through the ground than the water, so we are giving our first attention to the solution of the simpler problem. We have already used wireless with complete success 100 feet below the surface of the earth, and when the depth is increased to, say, a mile, it will be time to consider how it may best be employed for the prevention of mine disasters or in assisting rescue operations.

"Several governments, including the United States, probably are doing more on their own initiative to adapt wireless to the submarine than we, as the experiments first began in the latter days of the war; but it is not too much to say that the day is coming when the reorientation of submarines in relation to fleet operations will be controlled through the ability of the submarines to know exactly where they are and where are all the other warships through wireless apparatus."

**TWO GREAT NEW RADIO BOOKS**

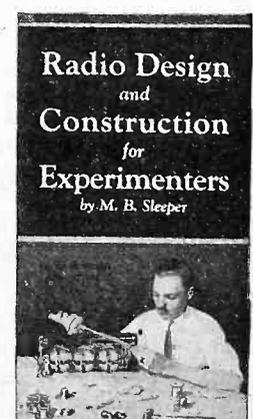
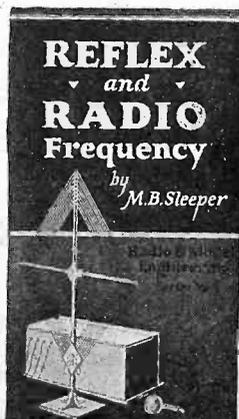
By M. B. SLEEPER

**"REFLEX AND RADIO FREQUENCY"**

**"RADIO DESIGN AND CONSTRUCTION  
FOR EXPERIMENTERS"**

Two of the best and livest books written by this acknowledged authority. Packed full of information. These are really great text books and are of inestimable value to radio novices, amateurs, and experimenters. Sixty cents each, postpaid, or both books for \$1.00.

The Columbia Print, 1493 Broadway, N. Y. C.



**These Got By the Censor**

Fond Mother—"Now son, run upstairs and say your prayers and then go to bed."

Son—"Aw maw, can't I just stay up till paw tunes in one DX station, can't I maw?"

Fond Mother—"Not tonight, dear; run along. Father's hand is very unsteady this evening and we won't listen to any DX."

\* \* \*

Peter, Peter, pumpkin eater,  
Had a girl and couldn't keep her.  
Then he bought a radio set—  
Now he's a reg'lar ladies' pet!

\* \* \*

Johnnie Bull—"My word, old top, it is certainly wonderful how you Yankees have taken up broadcasting. They tell me that there are over 500 stations going night and day in this country."

Yank—"Huh! You must have been reading last night's papers—175 new stations

just opened this morning with some dandy programs. I logged 57 of them before breakfast."

\* \* \*

First Fan—"Why, my set is so sensitive that a person entering the room actually tunes a local station out."

Second Fan—"Huh! that's nothing. We had to get rid of our dog, 'cause every time he wagged his tail it used to make the stations fade in and out like thunder."

\* \* \*

Jones—"I hear that Bill is suing for divorce. I thought that they were the greatest of pals."

Jims—"They were until they couldn't agree as to whether they should listen to prize fights or style and fashion talks. Bill has agreed to let his wife take the set, but he wants the car."

**HOW TRUE, HOW TRUE!**

**F**OUR little dealers,  
Feeling sad but free,  
One wouldn't advertise,  
Then there were three.

Three little dealers,  
One felt pretty blue,  
Failed to dress his window,  
That left but two.

Two little dealers,  
All their rivals gone!  
One forgot his overhead,  
That left only one.

One little dealer,  
Decided he could get  
Some lessons from experience,  
So he is growing yet!

—Kiwanis Magazine.



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Comes With The Use Of The**

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**AUDIOPHONE**  
REG. U. S. PAT. OFFICE

**because nothing is lost from the original  
broadcasting.**

Not only is it easily possible to distinguish the words of the speaker, but also the minute graduations in pitch, timbre and quality of overtones which distinguish individual voices. The Audiophone is complete

and self-contained—needs no separate battery or other accessories—goes to you ready for use on connecting to your receiving set. It will prove a source of lasting pride and pleasure.

- Senior Audiophone . . . . . Price \$32.50
- Junior Audiophone . . . . . Price \$22.50
- Baby Audiophone . . . . . Price \$12.50

**Bristol One Stage Power Amplifier**

If greater volume is desired, over what you already obtain, use the Bristol One Stage Power Amplifier. No C Battery required. . . . . Price \$25.00



Senior Audiophone

One Stage Power Amplifier

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We, the makers of ESTRU Lattice Coil Specialties, have an Xmas Message for you in building a receiving set. Use one or more of the 77 Estru Specialties. 77 listed to date. More added every month.

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Estru Variometer  
Grid Type Plate Type Price \$5.00

**Radio Dealers  
Everywhere**

Are you selling the radio fan guaranteed radio equipment?

Estru makes only

**One Quality—The BEST**

- Estru Variometers
- Variocouplers—Lattice or Uni-Flex
- Estru Lattice Coils
- Plain or Tapped—Unmounted, Mounted, Uni-Flex or Plug.
- R. F. Transformers
- Micro-Mike Condensers

Write to-day for descriptive circulars on all Estru products.

**Lattice Coil Specialties**

- R. F. Transformer
- 4 to 1 Ratio, \$2.00
- Uni-Flex Lead Coil
- 50-100-150 Meters, \$2.00



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Each movement a definite new resistance. Positively does the work where others fail. Gradual resistance over entire range of 1/4 to 10 megohms. Eliminates circuit noises, moisture proof, non-microphonic. At your dealers' or order direct.  
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to get out of town. If you want new stations on your crystal set **WRITE ME TODAY.** Mine works 400 to 1,000 miles without tubes or batteries! Thousands have bought my plans and now get results like mine. **CHANGES OFTEN COST LESS THAN A DOLLAR.** Send self-addressed envelope for further information. Leon Lambert, 562 South Volusia, Wichita, Kansas.

**Yes, This Is Some Record!**

**DX Nite Owls, Attention!**

**THE DX season is now upon us.**  
All faithful DXers are requested to get ready for the fray and prepare themselves for the night vigil.

Send your records to the DX Editor of **RADIO WORLD.**

Write only on one side of the paper and write clearly.

Give full particulars of your location, your set, your aerials and other items of interest.

**Here is a Little Work From a Real Worker**

From R. V. Hammer, 216 N. Walnut Street, Creston, Ia.

In looking over the DX column of **RADIO WORLD** for November 10 I noticed some good ones. I have done some good work along this

line myself the last two years. I use the standard 3-circuit variometer tuner which I built myself. I have added an extra variometer in series with the original grid variometer which enables me to tune from 150 meters to 600 meters. Below is a list of stations 500 miles and more which I have heard since October 1, 1923:

KPO, 1,575 miles, San Francisco, Calif.; 6KW, 1,570 miles, Tuinucu, Cuba; CYB, 1,565 miles, Mexico City, Mex.; KFI, 1,450 miles, Los Angeles, Calif.; KHJ, 1,450 miles, Los Angeles, Calif.; PWX, 1,500 miles, Havana, Cuba; KGW, 1,535 miles, Portland, Ore.; WEAN, 1,235 miles, Providence, R. I.; CHBC, 1,220 miles, Calgary, Alt.; CFAC, 1,220 miles, Calgary, Alt.; CFCN, 1,220 miles, Calgary, Alt.; CJCA, 1,290 miles, Edmonton, Alt.; WBZ, 1,170 miles, Springfield, Mass.; WEAF, 1,100 miles, New York City; WJZ, 1,100 miles, New York City; WGY, 1,100 miles, Schenectady, N. Y.; WHAZ, 1,120 miles, Troy, N. Y.; WBAR, 1,000 miles, Philadelphia, Pa.; WFI, 1,000 miles, Philadelphia, Pa.; WIP, 1,000 miles, Philadelphia, Pa.; WOO, 1,000 miles, Philadelphia, Pa.

WOR, 1,090 miles, Newark, N. J.; WDT, 1,100 miles, New York City; WCAP, 960 miles, Washington, D. C.; WRC, 960 miles, Washington, D. C.; WBAK, 960 miles, Harrisburg, Pa.; WCAU, 1,000 miles, Philadelphia, Pa.; WGR, 835 miles, Buffalo, N. Y.; WMAK, 845 miles, Lockport, N. Y.; WHAM, 905 miles, Rochester, N. Y.; WBT, 860 miles, Charlotte, N. C.; WOA1, 875 miles, San Antonio, Texas; CKCK, 850 miles, Regina, Sask., Can.; WEAY, 800 miles, Houston, Texas; WHAB, 850 miles, Galveston, Texas; WSB, 770 miles, Atlanta, Ga.; KDKA, 790 miles, Pittsburgh, Pa.; WCAE, 790 miles, Pittsburgh, Pa.; WCX, 610 miles, Detroit, Mich.; WWJ, 610 miles, Detroit, Mich.; WJAX, 680 miles, Cleveland, O.; WTAM, 680 miles, Cleveland, O.; WPAL, 625 miles, Columbus, O.; WNAV, 690 miles, Knoxville, Tenn.

WFAA, 610 miles, Dallas, Texas; WBAP, 625 miles, Fort Worth, Texas; WBAV, 625 miles, Columbus, O.; WDAQ, 610 miles, Dallas, Texas; WJAD, 690 miles, Waco, Texas; KFFQ, 600 miles, Colorado Springs, Colo.; CKY, 655 miles, Winnipeg, Mant., Can.; WSY, 690 miles, Birmingham, Ala.; KFFZ, 610 miles, Dallas, Texas; KOP, 610 miles, Detroit, Mich.; WSAT, 645 miles, Plainview, Texas; WHK, 680 miles, Cleveland, O.; KFJD, 575 miles, Greeley, Colo.; WHAS, 520 miles, Louisville, Ky.; WLW, 560 miles, Cincinnati, O.; KFJK, 550 miles, Bristow, Okla.; WSAI, 560 miles, Cincinnati, O.; WMC, 500 miles, Memphis, Tenn.; WJAF, 500 miles, Muncie, Ind.; KFJM, 515 miles, Grand Forks, N. D.; KLZ, 585 miles, Denver, Colo.; WCAT, 500 miles, Rapid City, S. D.

In addition to the above I have heard 60 other stations whose distance from Creston is less than 500 miles. Adding the stations heard last winter, but not heard so far this winter, I have heard in all 205 different broadcasting stations from 34 States and Canada, Mexico, Porto Rico and Cuba. I believe that my location as well as the set has a good deal to do with this reception, as two of my friends in this city have done as well and perhaps there are several others.

But it does not stop with the above as I am hearing two and three new stations practically every night. My record for one evening's listening is 60 stations.

*Natural Re-PRODUCTION*

**Atlas AMPLITONE LOUD SPEAKER**

Every voice inflection faithfully reborn in the Atlas re-Production. Distortion made impossible by the marvelous patented "double diaphragm." Ask your dealer for a demonstration.

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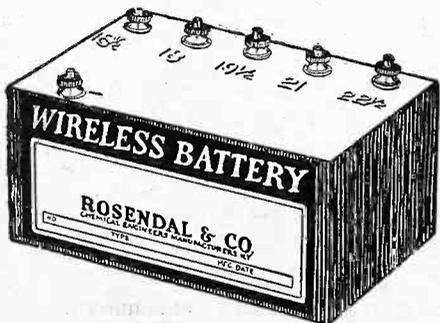
What have you accomplished with your Atlas Amplitone? Tell us about it.

**\$25**

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It is all important when buying a "B" Battery that you get it fresh—not one that's a month or two old. A Battery deteriorates whether it's being used or not and it stands to reason that a fresh Battery will last longer in your set.

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22½ V. Plain	\$1.25	\$1.00	\$0.70
22½ V. Variable	1.38	1.13	0.75
45 V. Plain	2.50	1.75	....
45 V. Variable	2.75	2.00	....

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**WD-11 and WD-12**

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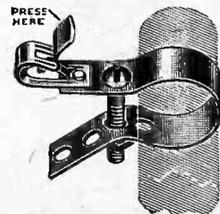
WD-11 or WD-12	\$3.50
C-300 or UV-200	2.75
C-301 or UV-201	3.00
C-302 or UV-202	3.50
C-301A or UV-201A	3.50
DV-6 or DV-6A	3.00
C-299 or UV-199	3.50

All tubes guaranteed to work like new.  
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Equipped with Fahnestock Patent Wire Connectors Easily Attached

No Soldering—For Radio Use Only

AT YOUR DEALERS

**FAHNESTOCK ELEC. CO.**

Long Island City, N. Y.

## Two California Amateurs Suspended

MAJOR J. F. DILLON, district radio inspector, announces suspension of the licenses of two amateur radio operators at San Diego, Calif., for violation of the radio regulations. The two suspended, E. A. Greenquist and S. McKinley, were charged with sending messages during the broadcasting period between 8 and 10:30 o'clock in the evening. Inspector Dillon states that the suspension is for an indefinite period.

## Cost Finding in the Radio Industry

THE Radio Trade Association, 1133 Broadway, New York City, is sending to its members a very comprehensive questionnaire prepared by Henry L. Seidman, chairman of the committee on cost finding. The request is made that the questionnaire be filled out and returned without any marks of identification and all members are urged to respond promptly. The data so obtained will be combined in a report which will be sent to all members. At this stage of the industry's development this matter is especially important and the trade should meet the committee's request promptly.



AS an acceptable gift that will bring untold lasting pleasure to the entire family, a Crosley Radio Receiver is just the thing. Local interference may be easily tuned out, and distant stations brought in clearly and distinctly. The Crosley Model X-J, illustrated above, is a 4 tube set consisting of one stage of tuned radio frequency amplification, detector and two stages of audio frequency amplification. There is also the Crosley Model VI; price \$30, an exceptionally good 2 tube set and the beautiful Console Model X-L at \$140. For Sale by Good Dealers Everywhere. Free Catalog Sent on Request. CROSLY MANUFACTURING CO. Powel Crosley Jr., President 12401 Alfred St. Cincinnati, O.

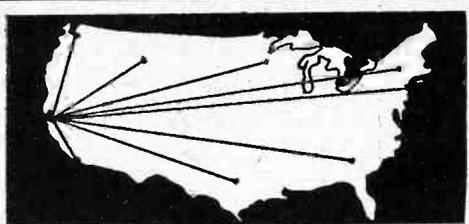
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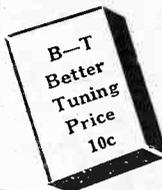
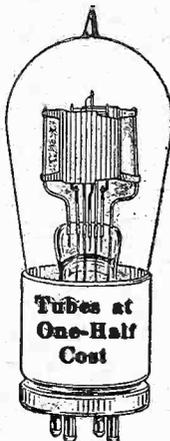
Broadcasting from Atlantic Coast, Mexico, Hawaii, Canada and Cuba heard in California by users of CROSS COUNTRY CIRCUIT. Range due to simplicity of set and only one tuning control. Easily and cheaply built by any novice. Dry cell tubes may be used. All instructions, blueprint panel layout, assembly photo, etc. Postpaid 25c. Stamps accepted. **VESCO RADIO SHOP, BX RW-117, Oakland, Cal.**

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UV-201A	3.50
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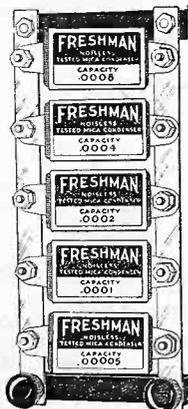
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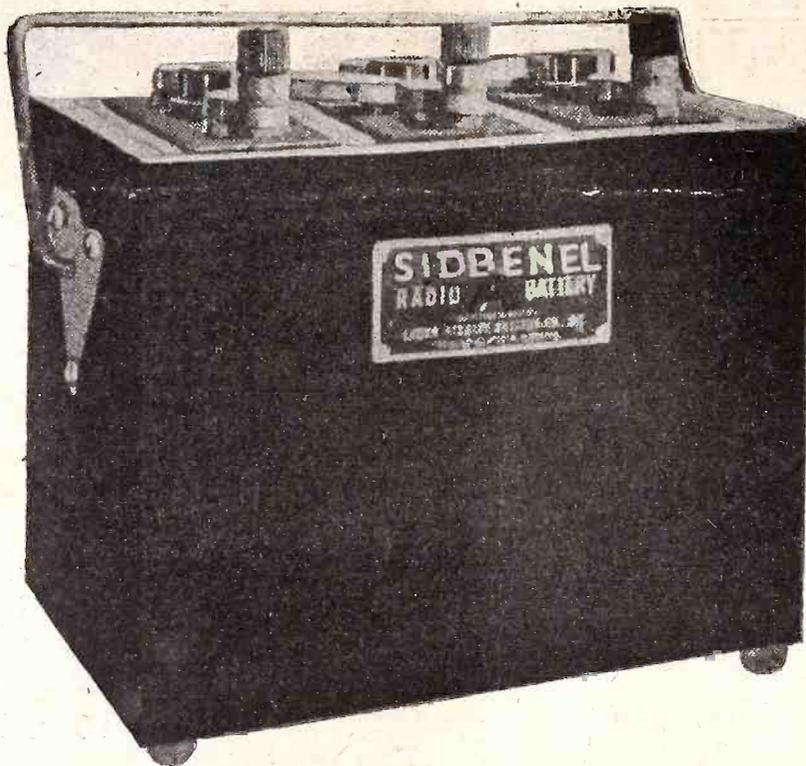
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