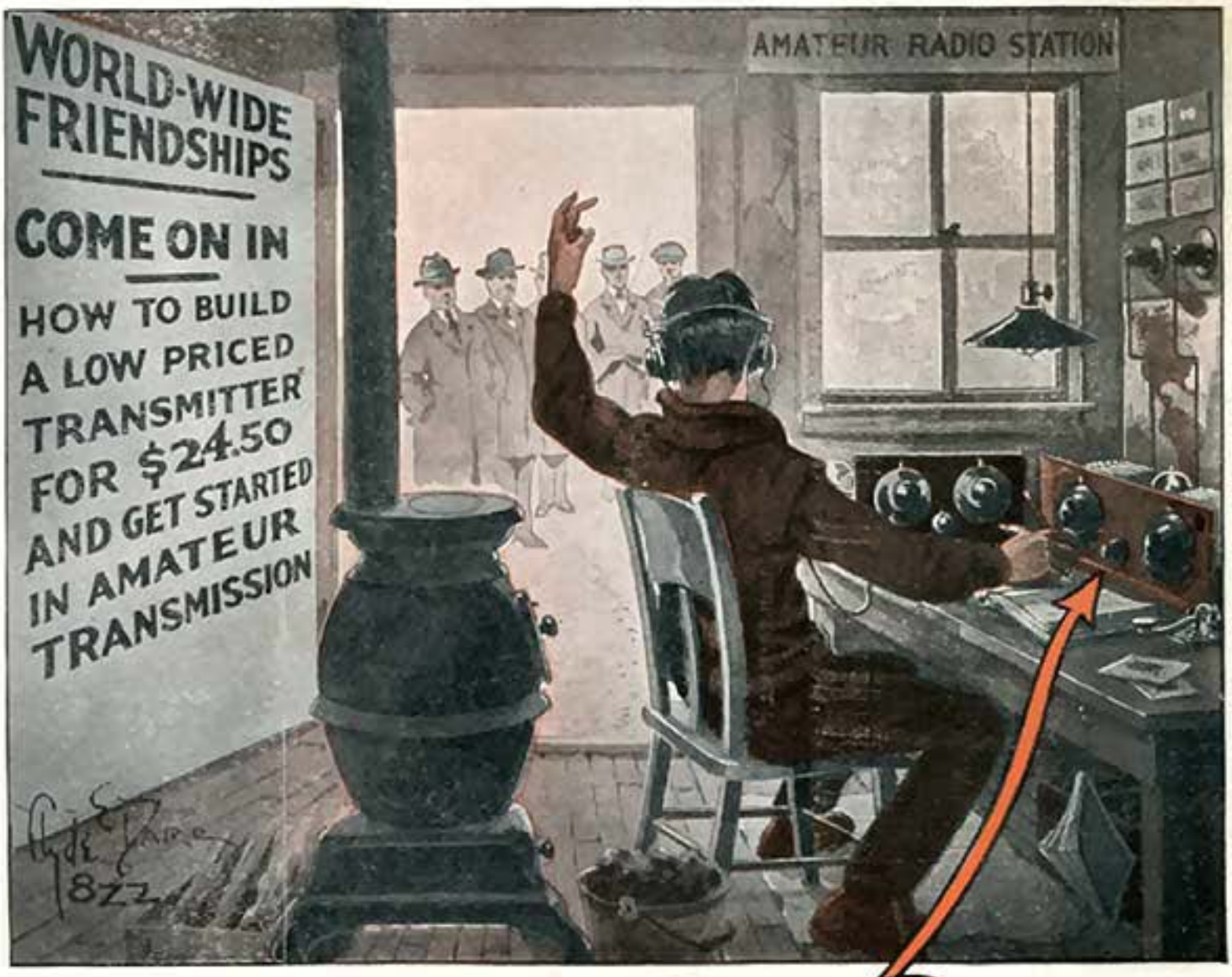
QST

DEVOTED ENTIRELY TO

AMATEUR RADIO

Published by the American Radio Relay League



APRIL
1926

IN THIS ISSUE

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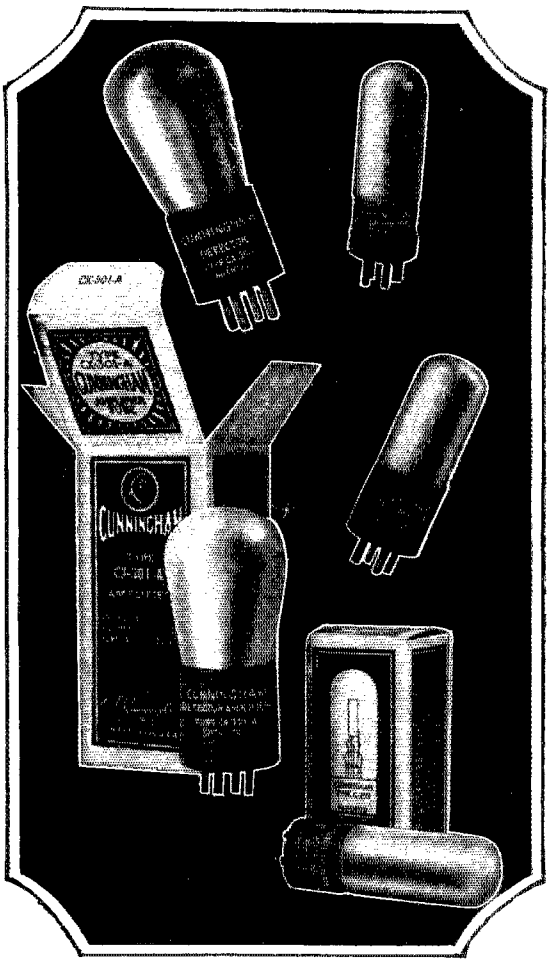
Cunningham RADIO TUBES

On Guard



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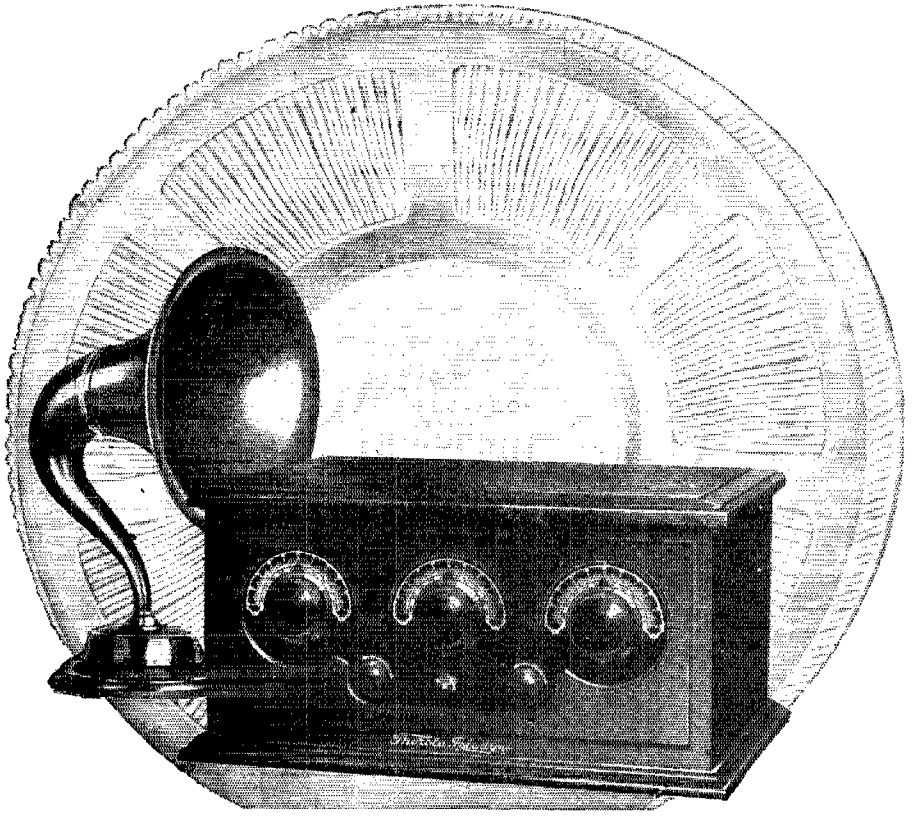

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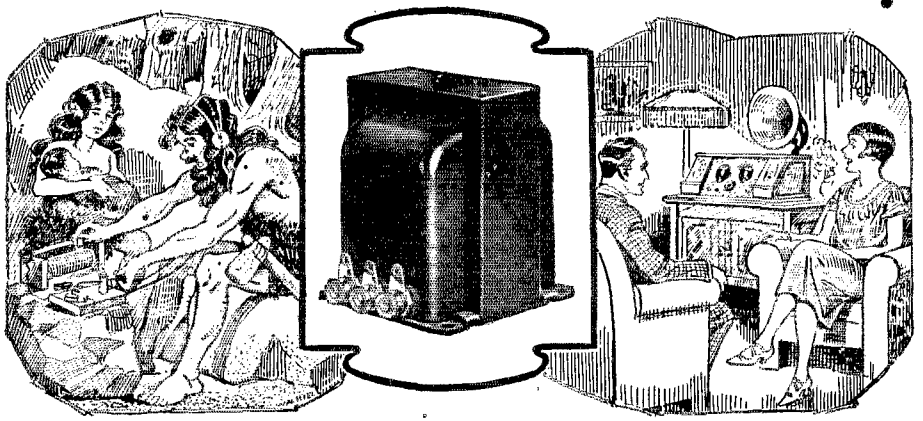

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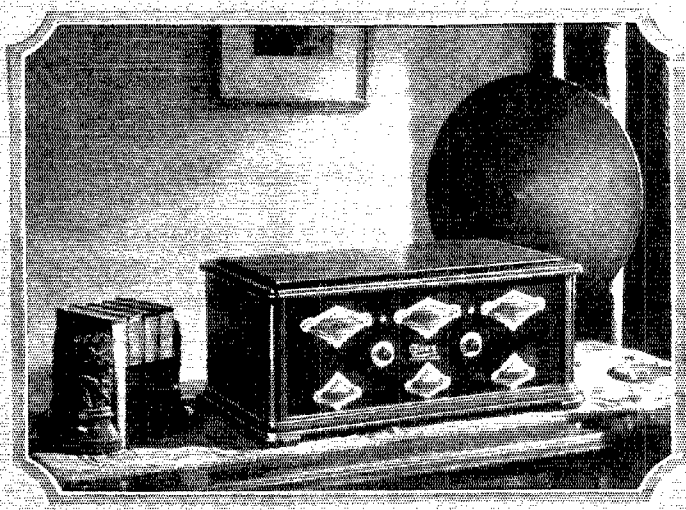
It is written:

"To see oneself is to be clear-sighted."

The clear-sighted see past the beautiful exterior of the Synchrophase to the true virtue within.

Doctor Yin



For Those Who Understand and Appreciate Quality —in Reception —in Construction

THE appearance of the inside of radio receivers reveals little or nothing to the uninitiated. But men who are "radio-wise" see a vast difference in set construction.

By the former the ear only can be used in judgment; to the latter, the eye tells almost as much as the ear.

Look inside a Grebe Synchrophase. Your eye will be as delighted with the quality of construction as the ear will be satisfied with the superior receptivity, which this construction not only makes possible but maintains.

Ask your dealer to demonstrate.

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Factory: Richmond Hill, N. Y.
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Exclusive Grebe Developments:

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Flexible Unit Control

Binocular Coils Reg. U. S. Pat. Off. and Low-wave Extension Circuits

Ask how and why they make Grebe reception so superior and dependable.

This company owns and operates stations WAHG and WBOQ; also low-wave re-broadcasting stations, mobile WGMU and marine WRMU.

The GREBE SYNCHROPHASE

TRADE MARK REG. U.S. PAT. OFF.

All Grebe apparatus is covered by patents granted and pending.

QST

The Official Organ of the A·R·R·L

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Official organ of the A.R.R.L. and the International Amateur Radio Union

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THE AMERICAN RADIO RELAY LEAGUE

The American Radio Relay League, Inc., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its Board.

"Of, by and for the amateur", it numbers within its ranks practically every worth-while amateur in the world and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisites. Correspondence should be addressed to the Secretary.

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EDITORIALS

The A. R. R. L. Spirit

EVERY once in a while one of you fellows writes in a letter and tells about the feeling of intimate acquaintance and friendship which he feels toward everybody concerned in the A. R. R. L. It always warms the cockles of our heart and inspires us. Just why we radio bugs seem to possess this brotherly feeling to a greater extent than other groups of people is not entirely plain. Sometimes we think it is because of the deeper and more abstruse problems which we have to face. We who are closely identified in the study of radio communication are brought very close to the wonders of Nature. The great laws which govern all things and which we must always observe, give one a very much deeper regard for truth than comes to those who follow only the ordinary matters of life. The fact that we are all troubled with the same things arouses a feeling of brotherhood. The fact that we appreciate one another's failures and successes brings us close together. The romance of sitting alone in a little out-of-the-way room among a lot of instruments and yet in communication with congenial spirits in other distant and out-of-the-way little rooms is conducive to profound and reverent thoughts. The fun which bubbles over from so many of us, and finds expression in *QST*, is one of the interesting manifestations of the effect of our work upon us.

We used to think that it was possible to feel close to each other when we were seven hundred strong but that this would disappear when we grew large. The personal element would not stand the stretching. But this is not the case. We seem to be just as close together as we were when we were only seven hundred, and if we can maintain it among seventy thousand—!

Now for a confession. The above two paragraphs do not represent the current ruminations of what the present Editor calls his brain. Instead they have been cribbed bodily from page 16 of *QST* for May, 1917, nine years ago. The quotation marks were left off while you read them just to prove that this A. R. R. L. spirit is an enduring thing, for those nine-years-old remarks are as apropos to-day as they were the day they were written. To-day we are nearly twenty thousand strong, the physical assets of our organization have increased enormously, our fame has been sung around the world, but our most precious possession remains that selfsame A. R. R. L. spirit!

—*K. B. W.*

Rotten Sign-Offs

THIS isn't an "Old Man" yarn but it might well be one of his subjects. As many of our members know, the headquarters office daily receives QSL cards from foreign amateurs and clubs to be addressed by us and forwarded to American amateurs. We forward as many as we can. If we haven't the call in the latest call-book, we send the card to the Supervisor for that particular district and ask him to forward it if the call has been issued since the call-book was published.

In spite of all these efforts there is on our desk a constantly increasing pile of "dead" cards—cards for which no call has been issued. What is the explanation? Poor transmitting on the part of American stations! Right now there is a large and healthy bunch of unclaimed QSL cards—for which there is no excuse. Many of you wonder why your station doesn't get reported; you blame the antenna, the location, the wave and everything else, when the fault may be your own hasty transmission. Some of the cards in our "dead" pile may be reports of your signals, but you will never know it, because in your haste you ran the letters together and the foreign amateur who reported you had to make a guess at what the call really was—and missed! You will never know that your signals reached South Africa or Australia, and the South African or Australian who reported you will have another grievance against the non-answering American ham.

Send at a natural speed, don't cultivate a "swing", and always sign deliberately, never hastily. It will react mightily in your own favor.

—*A. L. B.*

Breaking Into Amateur Transmission

By John M. Clayton, Assistant Technical Editor,

INTEREST in short wave amateur radio telegraphy is increasing in leaps and bounds. Our headquarters office has been flooded with requests for data on how to get started in ham radio. Old and young alike are finding that the *real* interest in radio operating lies not in the twirling of knobs on a broadcast receiver, but in two-way telegraphic communication with kindred spirits hundreds of miles away. There is nothing mysterious about this business of becoming a telegraphic amateur. One first needs a good short wave receiver. That is easy, for many such receivers have been described in *QST* from time to time.[1] A short wave receiver differs from the usual regenerative set as found in broadcast reception only in that the coils have fewer turns, the variable condensers fewer plates and the receiver must be free of body capacity effects. Fundamentally, both the amateur and the broadcast receiver are the same.

The transmitter is even easier, once the initial ice has been broken and you have plunged in. Transmitters, as well as receivers, have their tubes, variable condensers, antenna coils, secondary coils, grid condensers and leaks, A and B batteries (called filament and plate supply) and so on. These parts are connected in a circuit

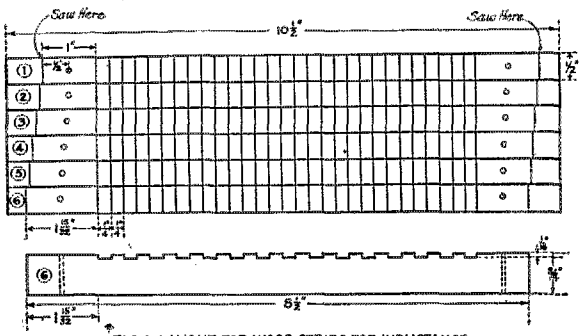


FIG. 1 LAYOUT FOR WOOD STRIPS FOR INDUCTANCE

not very different from the receiving circuit. When the coils and condensers have been adjusted to give maximum output on the wavelength you are interested in you are ready to become one of a group of thousands of ever enthusiastic transmitting amateurs. You will find that your interest in radio has taken a leap forward and that no matter how long you are a *telegraphing amateur* there will always be something new for you to try, some new station or country for you to communicate with and *always* some new interest.

1—See *QST* for June 1925, August 1925 and February 1926.

Getting Started

We are going to describe a transmitter that is simplicity itself. It can be constructed for a cost less than that of a three tube broadcast receiver! At the outset, some limit must be place on the simplicity of the set. Many amateurs have communicated over distances in the thousands of miles when using a single UV-199 receiving tube as the transmitting tube! Such work requires that the operator be an exceptionally good one the location of the transmitter and aerial almost ideal, or the conditions under which transmission was effected so erratic that the set is not at all consistent.

For everyday use the UX-210 7½-watt tube is more than satisfactory in a low power transmitter. Using this tube as a basis we constructed a simple set, having the absolute minimum number of parts yet having everything that is absolutely required to make a good workable low power set. The set has been in operation only five hours during which time no trouble was experienced in working stations as far south as Jacksnville, Florida; west as far as Minneapolis and north to Maine. No attempt is being made to claim that the little set will give you consistent communication over a distance of 500 miles every day. That would be foolish, for you already know that the range of broadcosting stations varies greatly from night to night. Some nights you can hear ordinary 500-watt broadcasting stations on the opposite coast and other nights you get almost nothing. Short wave telegraphy is not that bad. You can duplicate fairly regularly all of your communications except the very best. Your results will depend on your location, the way the transmitter is adjusted and the amount of time you spend "pounding brass". If you keep at the set long enough you can make freak records over distances as long as those any station can make, regardless of power. Enough to say that a vast number of amateur transmitters are equipped with a single 5-watt tube.

The radio telephone is a different thing. It is not nearly as good. The set will be complicated, it will take much more power to cover the same distance, static bothers a *lot more*, the set is *more* expensive and it makes a lot of interference in the neighborhood. If you *must* have a radiotelephone, this set can be turned into one rather easily, but why turn a telegraph set

with a 100-10,000 mile range into a radiophone with a range that is very unlikely to exceed 80 miles with the rarest luck?

List of Material

The following material will be required. Parts of equal quality can be substituted for the specified manufactured instruments. The market is full of excellent equipment.

One baseboard of hardwood, ½x8x18 inches.
One panel, hardwood or hard rubber, ¼x6x18 inches.
Two 250 μμfd. (.00025 μfd.) variable receiving condensers (Cardwell).
One 1,000 μμfd. (.001 μfd.) receiving grid condenser (Sangamo).
One 2,000 μμfd. (.002μfd.) receiving grid condenser (Sangamo).
One 5,000 ohm Lavite grid leak (receiving leaks not suitable).
One 201-A type tube socket.
One 2 ohm rheostat capable of carrying at least 1½ amperes.
Two Xmas tree lamps with sockets.
One 3½ volt flashlight lamp with miniature base.
One hard rubber or bakelite terminal strip ¼x½x6 inches.
Anther ditto ¼x½x3 inches.
Six binding posts.
One quarter pound of No. 28 or No. 30 D.C.C. magnet wire.
One cardboard or wooden form ¾ inches in diameter and 3 inches long.
Two pieces of hardrubber or bakelite tubing 3 inches outside diameter and 1 inch long. Wall thickness 1/8th inch.
Six hardwood (maple) strips ½x¾x10½ inches, notched as per specifications (given later).
Eight feet of No. 12 solid antenna wire.
Three hardwood strips ½x¾x4 inches.
Seven lengths of *number 12* flexible lamp cord, each length 8 inches.
Five Mueller test clips (get the nickeled variety, not the lead-coated).
Three lengths of No. 12 or No. 14 tinned bus wire.
Two brass angles ½x¾ inch for supporting panel
Two brass angles ¼x¾ inch for supporting inductance.
Ten brass wood screws, No. 6 round head, ¾ inch long.

The above material can be purchased for $16.50. To this list must be added the R.C.A. UX-210 tube which can be purchased for $8.00, bringing the total cost to $24.50! This does not, however, include filament and plate supply. These will be discussed in detail later.

The Primary Inductance

The only part of the set that is almost totally home-made is the inductance. The primary inductance will probably cause most of the trouble, although it can be constructed readily and in short order.[2] Your local cabinet-maker or carpenter can make the six wooden strips for you or you can do it yourself. The carpenter should do the complete job for about fifty cents so it is hardly worth the effort on your part. Referring to Fig. 1 a layout of the six strips is given. As will be seen these strips are a half inch wide, three quarters of an inch deep and ten and a half inches long. The first notch is cut 1½ inches from the end. The notches are all ¼ inch wide and about 1/16 inch deep and are spaced ¼

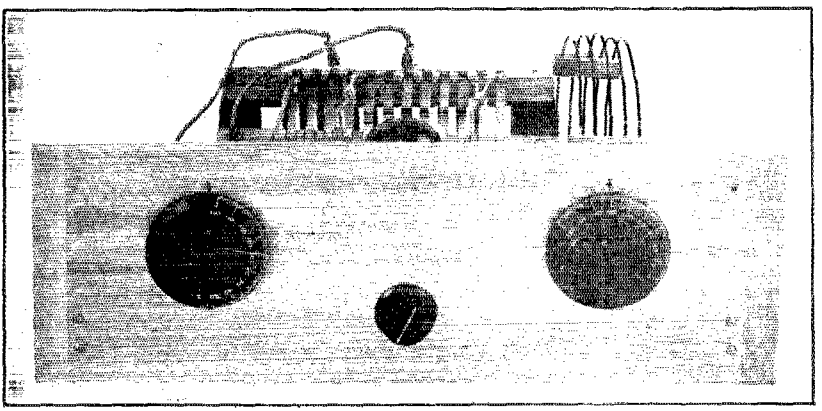


FIG. 2 FRONT VIEW OF TRANSMITTER
Don't overlook the flashlight lamp in the upper right corner of the panel.

2—See page 34 of this issue if you want to purchase the primary and secondary coils ready assembled.

inch. Get the carpenter to cut them out, making all the strips the same length—ten and a half inches. If you are handy with a hacksaw you *can* cut them yourself. Line up all the strips so that their ends are together and clamp them in a vise Then lay out the notches in pencil and cut across all six strips at once. After that the notches can be gouged out with a small chisel or a pen-knife, finishing them down with a small fine file.

After all the notches have been cut the ends of the strips must be cut off at the places marked "saw here" in the figure. Strip 1 is cut an inch from the first notch. Strip 6 is cut off 1 15/32 inches from the first notch and the intermediate strips are to be staggered as shown in the photograph. The cuts are about a twenty-fourth of an inch. Guessing the amount is much easier. This staggering is necessary in order to get the proper pitch to the winding which is to be put on later. As all of the strips are the same length when finished after they have been cut off at the left end it is merely necessary to measure 8½ inches from the left and cut them again.

A hole is drilled one-half an inch from the end of each strip. A number 27 drill should be used. The strips should now be placed in a vessel containing boiling paraffine. They should be left to soak for at least an hour. Don't be worried if the strips show no trace of paraffine when they have been remove. Despite the fact that the paraffine is not visible on the surface of the wood, nevertheless the wood is soaked full of it. This completes the wooden strips.

Next, the hard rubber or bakelite rings are laid out and drilled with six holes ½ inch from the edge. These holes are spaced equally around the circumference of the ring. The quickest way to do this is to take a compass or divider and by the hit and miss system try and try again until the edge of the tube is divided into six parts. The holes should then be drilled with a No 27 drill.

The wooden strips are bolted to the hard rubber rings by means of 6-32 round head brass machine screws an inch long. Take particular care to see that the strips are put on in the correct order from 1 to 6, and also be sure that none of them are put on with the ends reversed.

The copper or brass strip is next wound on, first anchoring the strip by means of a 6-32 machine screw through a hole in the strip and the wooden spacer. If Ford magneto coil strip is used it will be necessary to solder two lengths of it together. One coil contains about 10 feet. Do this before you start winding the strip on the form.

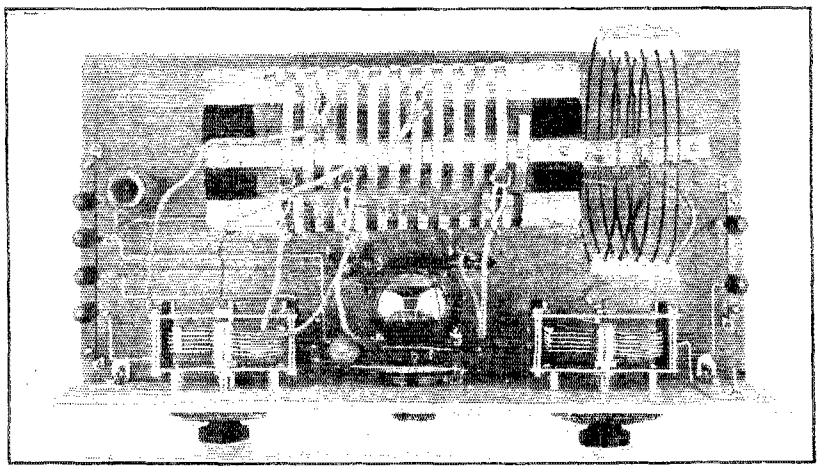


FIG. 3 REAR VIEW OF COMPLETED SET
Carefully note the position of all of the clips on the big coil.

A brass angle is attached to one end of the inductance and another angle at the 5th turn from the opposite end. These angles are held in place by means of wood screws in the strip. The angles hold the inductance in a horizontal position (see photographs).

The Secondary Inductance

The secondary or antenna coil is much simpler. It consists of 5 turns of No. 12 wire threaded through three wooden strips with the turns spaced ¼ inch. Five holes are drilled in the strips and the wire is first wound on a form 3 inches in diameter and allowed to spring off after 9 turns have been put on. It is then carefully threaded through the wooden spacers until 5 turns with a diameter of 6 inches have been

formed. This type of construction was made because the losses in the secondary coil are not so bothersome and we can get away with smaller conductors in the antenna coil. If it is desired to make a more substantial job of the secondary, a coil similar to the primary may be made up using 5 turns instead of 11.

A hole is drilled through one of the spacers near the end of the strip and through this hole a No. 6 brass wood screw 1 inch long is passed. When the set is finally tuned up and adjusted this wood screw is screwed into the baseboard and holds the secondary inductance firmly in place.

The Complete Assembly

A glance at Figs. 2, 3 and 4 will show the relative position of all of the parts. Figure 2 shows a front view of the panel. The left dial controls the condenser shunted across the primary inductance, and the right dial controls the condenser in series with the secondary which is directly behind this condenser. In the upper right hand corner of the panel is the flashlight bulb used to show the relative amount of antenna current. We did not have a socket for this bulb so we drilled a hole in the panel and "threaded" the flashlight bulb into this hole. The rheostat is controlled by the small knob between the two dials. Inked-in arrows served as indicators for the condenser dials.

A view of the apparatus behind the panel is shown in Fig. 3. The terminal strip on the left holds four binding posts, two of which are for the filament supply and the other two for plate supply. The terminal strip at the right holds binding posts for antenna and counterpoise or ground connections. Both of these strips are shown in detail in Fig. 5.

On either side of the rheostat (Fig. 3) can be seen the Xmas tree lamps. These lamps are held in a vertical position by means of the bus wiring running to the lamp sockets. The bus is forced into the two small holes in the base of the sockets. It is stiff enough to make a rigid assembly of both sockets. Directly behind the rheostat is the UX-210 tube and tube socket, and to the right of the tube (attached to the plate terminal of the socket) is the 2,000 μμfd. Sangamo condenser used as the plate blocking condenser. To the left of the tube is the 1,000 μμfd. receiving condenser. Soldered to the terminals of this condenser is the Lavite grid leak. Both grid and plate condensers are mounted vertically in order to shorten the leads from the condensers to the large inductance.

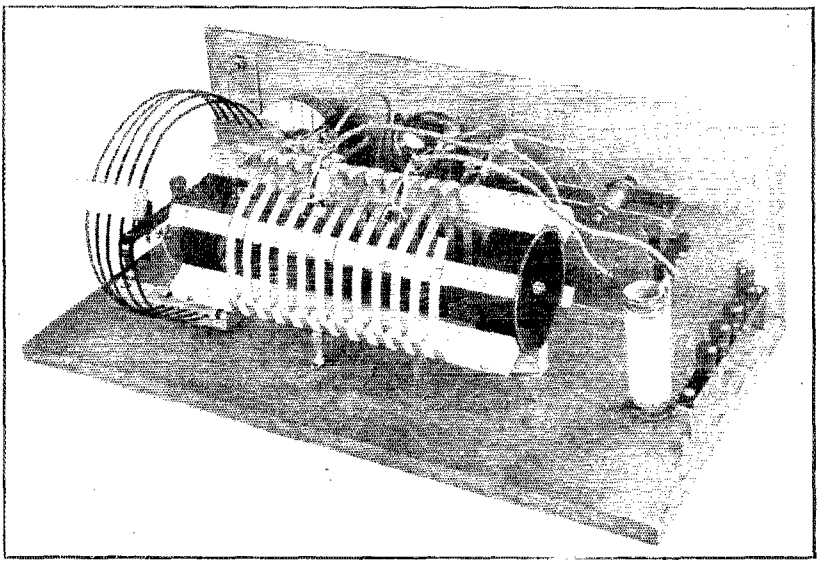


FIG. 4 ANOTHER VIEW OF THE REAR OF THE SET
The R. F. choke at the right and primary coil in center.

Again, in the upper right hand corner, mounted on the panel, will be seen the flashlight lamp, and lastly to the left of the inductance, mounted at right angles to it, is the radio frequency choke. This coil consists of 150 turns of No. 28 or No. 30 D.C.C. magnet wire wound on a cardboard or wooden form ¾ inch in diameter. The choke is held in place by virtue of the stiffness of the connecting wires.

Figure 4 is a view of the rear of the trans-

mitter from a different angle. The radio frequency choke appears at the right. It should be mounted in this position so that it will be as far away from the large coil as possible. The large coil is suspended ¾ inch above the baseboard so that the secondary (at the extreme left) can be slid over the left hand end of the main coil. The main coil is mounted on ¾ inch brass brackets as shown in this photograph. The

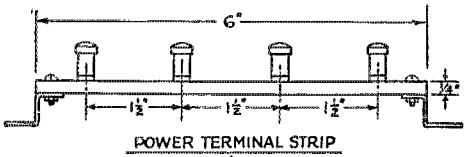


FIG. 5

brackets are screwed into the wooden spacer strips and into the baseboard. The left hand bracket, however, cannot be mounted at the end of the coil since it will interfere with the secondary when the latter is over the primary. For this reason this bracket is mounted back in from the left end of the coil, as shown in the photo.

No detailed panel or baseboard layouts are given as it is not necessary to follow this layout to such extremes. It will be well, however, to follow the general plan shown in the photographs as the important leads are of minimum length when this scheme is duplicated.

The Secondary Circuit

The complete circuit is shown in Fig. 6. This is known as the inductivity coupled Hartley circuit. It will be easy to follow the circuit if we refer back to the illustrations as we go along. The antenna lead-in is connected to the front binding post at the right of Fig. 3. A wire runs from this post to one terminal of the flashlight lamp in the upper right hand corner. Another wire goes from the other terminal of the lamp to the *stationary* plates of the right hand variable condenser. From the rotary plates of this condenser a flexible lead connects to one end of the secondary inductance coil, S. This coil is directly behind the right hand condenser. The other end of this coil is connected to the back binding post on the same terminal strip with the antenna post. The counterpoise or ground is connected to this binding post. This completes the secondary or antenna circuit. Note that there is *no* physical connection between this circuit and the rest of the apparatus. The coupling between this circuit and the balance of the circuit is *inductive* and not direct as it would be were there any wires running between the antenna coil and the primary (P) coil.

The full 5 turns of the secondary coil B are connected in the circuit at all times, no clips or taps being arranged to change the amount of wire in this coil. The distance between the S and P coils can be called the "coupling distance". As shown in the photograph this distance is relatively large, that is, the coils are far apart. In operation the coils will assume this position, or possibly the secondary may have to be slid further in toward the primary.

The Primary Circuit

That part of the circuit associated with the largest coil P is called the primary. It is in this coil that the radio frequency currents are set up and transferred to the antenna circuit and the antenna.

The filament supply is connected to the binding posts A. In series with one of these posts is the 2 ohm filament rheostat R2. It does not matter in which lead this rheostat is connected. From the rheostat a wire is run directly to one of the filament terminals on the tube socket, the other filament terminal being connected to the other A post. As shown in Fig. 7 the two Xmas tree lamps are connected in series directly across the filament leads and as close to the terminals of the tube socket as possible. These

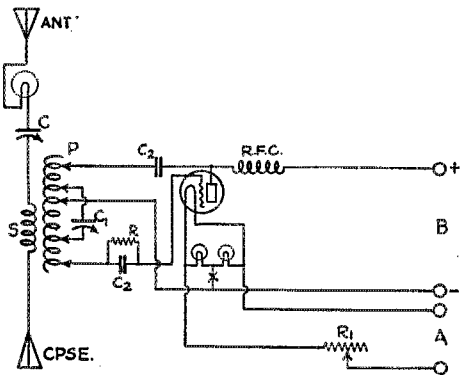


FIG. 6 THE INDUCTIVELY COUPLED HARTLEY CIRCUIT

lamps serve as a center-tap device, permitting the use of an un-tapped filament heating transformer. This completes the filament wiring.

From one of the four binding posts on the left of the set a wire is connected to one end of the radio frequeny choke coil. The other end of this coil is connected to the plate ter-

minal of the tube socket. To this same plate terminal (and at the socket) the 2,000 μμfd. fixed condenser is connected. One of the flexible leads with a clip on the other end is attached to the other terminal of the fixed condenser (C2). One terminal of the grid condenser is connected to the grid terminal of the socket, the Lavite resistance R is soldered across both grid condenser terminals, and the other end of the grid condenser has a lead and clip attached.

The other plate supply binding post is connected to the center-tap between the Xmas tree lamps (see Fig. 7). A flexible

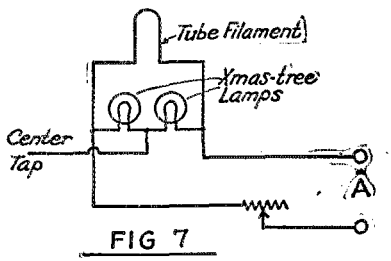


FIG 7

lead and clip are also attached at this point. Two additional leads with clips are soldered to the condenser terminals on the variable condenser at the left of Figs. 2 and 3 (C1). Now the set is completely wired!

There yet remains the job of providing the filament and plate potential, the erection of a suitable antenna and the tuning of the transmitter. These things are easy. They will be discussed fully next month. In the meantime get busy and get the transmitter finished. If you are stuck on anything do not hesitate to write our Information Service Department.

The South Dakota Convention

THE Dakota Division, 5th Annual South Dakota State Convention, is a thing of the past, but February 11th and 12th will linger in the memory of the fifty odd "Hams" who were present, for a long time to come. The thanks of all go to the Coyote Amateur Radio Club under whose auspices the convention was held. With the buildings of the University of South Dakota at Vermillion thrown open to the delegates, interest was shown in the engineering shops and laboratories. Doctor Brackett of the University gave a lecture on constructional hints which furnished some valuable information on transformer construction. Then came Will Doohen with a good talk on "Latest Developments of Switchboards and Portable Instruments", this being followed by some interesting motion pictures on electrical subjects. Oh! we forget that Doohen's talk and the pictures were given in the Coyote Theatre.

The end of a perfect day was reached by the big traffic meeting conducted by Berkner of 9XI, and Crosby's (9AGL) discussion on filter and rectifier problems illustrated by the use of a Braun Tube Oscillograph. After which the "boiled owls" held sway until the "wee sma' hours", competing for prizes.

Saturday's "doings" started auspiciously with a very interesting lecture on "Radio Picture Transmission" by Prof. C. M. Jansky, Jr., of the University of Minnesota (he is also Director for the Dakota Division). Many phases of amateur radio were also discussed. Dr. Brackett of 9DH spoke on quartz crystal oscillators and the discussion which followed showed that the fellows are greatly interested in crystal-controlled transmitters.

In the evening the Waldorf Hotel was literally taken possession of by a big bunch of super-heated enthusiastic hams, each with a one-kilowatt tin whistle, who partook of a well prepared feast. After talks by Prof. Jansky, Nick Jensen and Lloyd Berkner of 9AWM came the prize contests, and competition ran high. Of special interest was the popularity contest in which Nick Jensen, the dear old dad of South Dakota hams came out on top. Musical entertainment was furnished by two YL's, Miss Walker and Miss Davenport and Miss Stenseth helped select the prizes to the satisfaction of all.

With a splendid talk by Dean Akeley of the University, in the words of Nick (there is only one) "the best radio convention ever held in South Dakota was brought to a close".

The Coyote Amateur Radio Club wishes to express its thanks to all delegates for their attendance and especially to Nick Jensen, Prof. Jansky, Berkner (9AWM) and Carpenter (9DX) for their great assistance in putting the convention across and our gratitude also goes to the manufacturers, 37 in number, who contributed prizes for the convention. (Wish it were possible to give all the names, but let it be said they are all the consistent advertisers in *QST*. —Ed.)

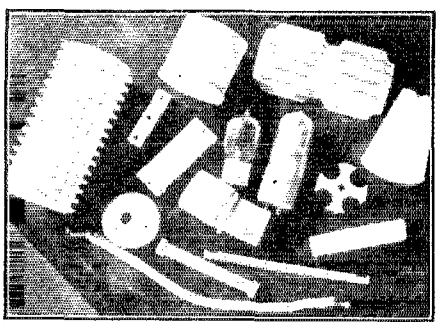
Isolantite—A Unique Material

By Austin C. Lescarboura* and Robert S. Kruse**

WHAT would you think of an insulating material twice as hard as glass, tougher than cast iron, completely moisture proof, electrically excellent, and capable of being machined accurately? Impossible? Not at all. There is such a material, although it is hard to tell the story without seeming to write a prospectus, the material is so peculiar.

Of course anyone can see that a material as hard as agate cannot be threaded, turned and drilled. It must first be soft and then become hard *after* machining. Porcelain does something of that nature, in fact it is a type of distant relative of Isolantite, but the beginnings and the endings of porcelain and Isolantite are quite different.

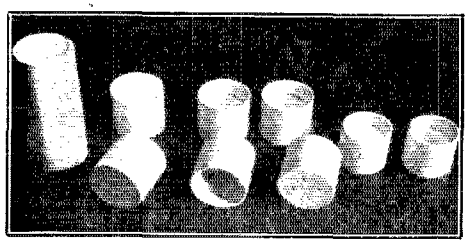
Porcelain is made of clays and other ingredients stirred together to make a paste, then formed, dried and finally baked. No precise machining is possible because the material is shrinking all the way through the process, therefore it is not possible to make the pieces of exactly the same size and shape. That isn't all. Inside the piece of raw porcelain there are impurities—water is an actual part of the material and various other things are there, either because they cannot be driven out, or else because they are needed to stick the "dough" together. When this compound has finally been baked it has become a sort of glass sponge with the holes filled by particles of other substances.



VARIOUS PARTS MADE FROM ISOLANTITE

A Powder

Isolantite starts from natural materials—but from that moment on, things are worked out in a different manner entirely. The process begins with a mineral product which is pulverized to such a degree that it will float in air—a cupful of it can be poured out but very little of it will reach the floor—it will mainly float about in the air of the room. This mineral product is chemically purified to a point where it will readily pass the government tests for the purity of drugs. It contains no organic matter whatever, likewise there is no water—not even as water of crystalization. This powder is then poured into a mould—and it pours much in the same fashion as water, except for the tendency to blow away. The mould is set under a press. Now if the ram of the press is run down into the mould and then brought up again we will find a surprising thing—*the power has entirely failed to stick together, even under a pressure of 25 tons per square inch.* The reason is that there simply is nothing in the mixture that will cause the grains to stick—nothing fatty or moist. But, if the thing is done with a certain chemical agent present the powder *does* stick together very promptly, or rather it ceases to be a powder at all and becomes a new substance. The right pressure must be used but the chemical "catalyzer" is absolutely necessary. Just what the substance so used is may not be mentioned here—although its nature is known to the writers.



THE STAGES OF MAKING A TUBE BASE.
At the left—rod as taken from the mould. Next, slices cut by gang saw. Next, cups as taken from lathe. Next, cup with drilled holes. At the right, finished base with trademark stamped thereon.

The powder is formed in two round or square rods or blocks, according to the product to be made. The blocks are pressed in a wide range of sizes, starting with rods 1/16" in diameter and ending with rods 10" in diameter or 8" square. The pressure of the hydraulic press is controlled by 5 separate checks.

Each press has several heads or working cylinders and is operated by 2 girls to gain the necessary speed. One girl loads an empty cylinder, with a definite amount of

* Austin C. Lescarboura, Tribune Bldg., New York City. Technical Literature.
** Technical Editor *QST*.

powder, then as the cylinder moves around the machine the mould is entered by a ram which compresses the material under chemical action as mentioned. The second girl unloads the cylinders.

Since the moulds are accurate the rods and blocks are accurate—as in the case of Bakelite mouldings.

Machining

The next step is to cut the rods into pieces of the desired length. This is done by gang saws, automatic screw machines, etc., or by other methods, depending on the job. The pieces are then finished to their desired final form just as metal parts would be, using all the ordinary methods of a machine shop.

Let us consider for example the operation of producing an Isolantite vacuum tube base. The rod comes from the press of the correct diameter, the automatic cutter has made the pieces of the right length. The piece is now hollowed out on a high speed lathe, shown in one of the photographs. The cutting tool is so shaped that it cuts the inside of the shell to the correct shape, even to a small internal groove. The piece is then drilled for the various pins. The plain shell is placed in a jig saw under a gang drill, and 4 drills make the connecting pin holes while an auxiliary drill makes the pinhole at the side.

Isolantite can be threaded, both inside and outside. The Isolantite threads have even greater strength than metal so that an iron screw which has been screwed into threaded Isolantite will actually be stripped before the Isolantite threads give way.

The material can also be ground and lapped. As stated before—the material is in all ways handled in accordance with good machine shop practices for metal.

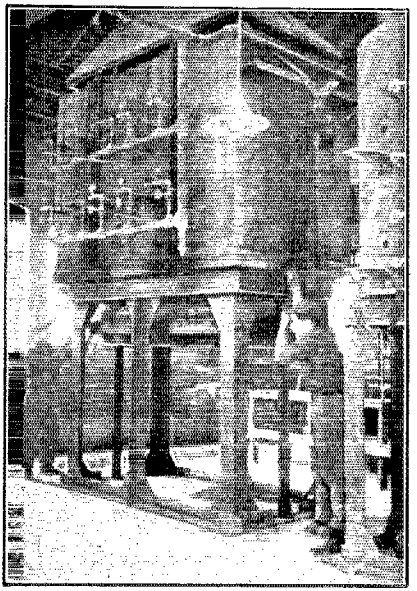
Firing

So far we have been talking of a material easily worked, having in its makeup much the same sort of things that are found in such well-advertised products (or natural materials) as Andalusite, Sillamanite, and Steartite—in other words silicon, oxygen and magnesium. Isolantite is chemically purer than the above compounds mentioned and therefore is more uniform. Porcelain analyses in much the same manner except that it is certain to contain some water and quite likely to contain iron. These undesirables will boil out in firing, but this will change the shape of the piece.

Here is a curious advantage of the new material—it does not have these impurities involved in itself, therefore there is no need of an extra firing. This means two things—the piece will not change shape or size and it can be fired at high speed.

The B Point

So far, the material has been soft and easy to cut or polish. The pieces are now stacked in carborundum saggers (trays) which in turn are piled on the floor of a furnace, after which the floor is lifted into



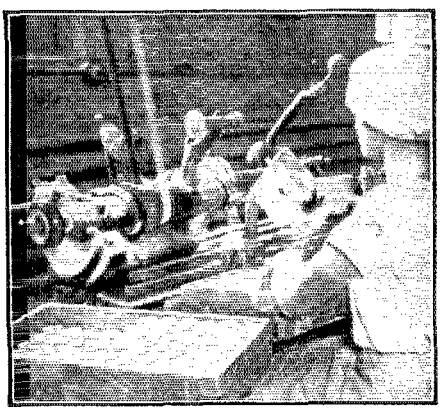
THE FURNACE.

Above—Loaded floor being hoisted into place for firing. Below—Observing temperature with optical pyrometer.

under pressure to the burners which extend into the furnace, the flame striking the Isolantite pieces directly—a process porcelain would not stand so soon in the process. place and the burners started. Gas is fed At about 1500 degrees Farenheit the material strikes the "B point" and some sort of chemical change takes place. Just what this change is, cannot be described in simple terms. The new material has very little hardness (about the same as graphite), it is not very strong electrically (only about 1000 volts for 1/8") but it can be rough-handled with regard to heat. It is perfectly possible to run water through the inside of a red-hot tube of the material without breakage. Whatever this change is—the material absorbed heat at the "B point."

The A Point

The "B point" material is not commercial Isolantite. From this stage the test is carried on up to the "A point," which is at about 2800 degrees Fahrenheit. Here the material suddenly gives off heat. It is held there for 60 seconds during which another change has taken place—a very great change. The soft material has suddenly become harder than any other substance except diamond, has become as strong as c..st iron and so tough that a dish of the material can be dropped 20 feet onto a concrete floor without chipping anything but the floor. If one cares for figures the hardness is 9.5 on a scale in which glass is 3,



ISOLANTITE TUBE BASES BEING MACHINED FROM THE RAW MATERIAL.

Case hardened steel 6.5, stellite 7-9.5 and agate 9.3.

As soon as the A point is passed the material can be taken out into the air with little delay—it does not tend to go to pieces from swift cooling.

Electrical Rating

Originally, Isolantite was intended for use in spark-plugs for airplanes. It has proved useful for other products in various ways. Its dielectric strength is over 30,000 volts per millimeter thickness. The dielectric losses are low, the phase angle being less than 1/100 of a degree. The dielectric constant is 3.6, and at 50% relative humidity the resistivities are—6 x 10^{14} ohms per C.C. and 5 x 10^{16} ohms per square Cm. The material (this is of real importance to the radio man) continues to insulate at high frequencies even when red-hot. The mechanical properties have been mentioned but figures can be given here as well. The crushing strength is 60,000 pounds per square inch, the tensile strength about the same.

Some curious uses for the material have been found. Perhaps the most unusual is that of the small anvils for automatic can making machines. Here it is required to meet acid flux, flame, melted solder, and hammering. A great variety of previous materials—glass, metal and stone had lasted a day or so at the most. The Isolantite anvils have an average performance of 100 days.

WWV and 6XBM Schedules

THE standard frequency signals from WWV, Washington, D C., and 6XBM Stanford University, California, for the months of April, May and June, are as follows:

Schedule of Frequencies in Kilocycles
(Approximate wavelengths in meters in parentheses)

Time*	April 5	April 20	May 5	May 20	June 5	June 21
10:00 to 10:08 pm	3000 (100)	125 (2400)	300 (1000)	550 (545)	1500 (200)	3000 (100)
10:12 to 10:20 pm	3300 (91)	133 (2254)	315 (953)	630 (476)	1650 (182)	3300 (91)
10:24 to 10:32 pm	3600 (83)	143 (2097)	345 (869)	730 (411)	1800 (167)	3600 (83)
10:36 to 10:44 pm	4000 (75)	155 (1934)	375 (800)	850 (353)	2000 (150)	4000 (75)
10:48 to 10:56 pm	4400 (68)	166.5 (1800)	425 (750)	980 (306)	2200 (136)	4400 (68)
11:00 to 11:08 pm	4900 (61)	205 (1463)	500 (600)	1130 (265)	2450 (122)	4900 (61)
11:12 to 11:20 pm	5400 (55)	260 (1153)	600 (500)	1300 (231)	2700 (111)	5400 (55)
11:24 to 11:32 pm	6000 (50)	315 (952)	666 (450)	1500 (200)	3000 (100)	6000 (50)

* Eastern standard time for WWV, Washington, D. C.
Pacific standard time for 6XBM, California.

Strays

The attic at 9ZT (in common with a lot of other ham attics) has a lot of coils of junk wire hanging around. Mrs. 9ZT in passing through the attic heard sparks among the coils and notified Wallace. The coils had to be separated and detuned to keep all of the 9ZT-juice from heating the house. Wallace now wonders what 9ZT's transmitter is doing to the Lizzie in the garage. He expects to see it come out automatically some night.

The Making of a Single-Control Receiver

By A. S. Blatterman, B. Sc., E. E.*

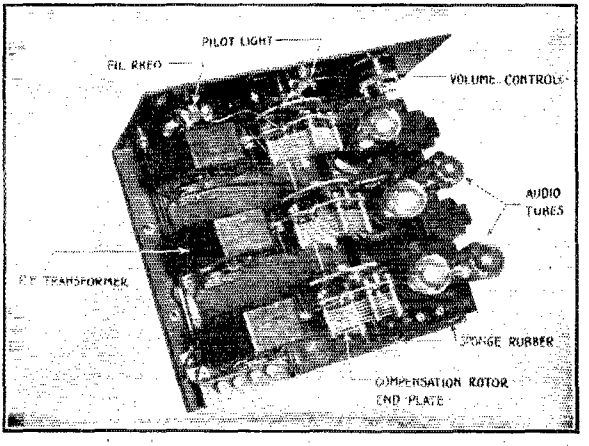
ALL of us have known for a good many years that the difficulties encountered in laying out a receiver with only one tuning control to manipulate several tuned circuits are not to be treated lightly, nor easily disposed of. The first obvious requirement is that the several inductances and capacities that are directly involved in the tuning, must not only *be* identical but must also *remain* identical as they are varied. If one sets out to build one or two receivers this is not especially difficult to accomplish. Nearly all of us can wind up half a dozen coils and have them come out pretty nearly of the same inductance. I suppose that every experimenter in the game has at some time spent a few half hours bending the plates of a variable condenser back and forth to make them run true. If enough patience is put into this work one can always make such a hand-made receiver operate satisfactorily, even at rather short wavelengths.

The thing is entirely different when one attempts to make *many* single-control receivers. All of the problems become much more intense. For that reason the single-control receiver will be discussed with particular reference to a successful commercial type. It must be remembered, however, that the same remedies which are used in this receiver will apply with the same force to receivers with other wavelength ranges.

When the single tuning control problem was definitely brought to our laboratory about a year and a half ago, our feeling was that it couldn't be done. We were by no means encouraged by the performance of the first few bread-board models that were built up on the basis of mathematical calculations. As time went on, however, and measurements and test data accumulated, the circuits began to get down to business, and finally the finished set emerged without any vernier take-ups or extra compensating devices. It was planned and built so that it could be manufactured in quantities, and with reproducable performance characteristics.

We were interested, of course, in the most commonly used broadcasting band of wavelengths i. e. 200 to 500 meters. Selectivity was important, tone quality or fidelity of reproduction equally so, and sensitivity or long range ability a requirement second only to these. The general circuit arrangement decided upon was the conventional two R. F. stages, transformer coupled, detector, and two audio transformer coupled stages. The details of the circuit layout are shown in Fig. 1.

There were several reasons for selecting this circuit. In the first place, it has been found that the sensitiveness secured through two properly designed cascade R.F. stages is sufficient with an average antenna to get down to the average winter static level. There is no use building up a sensitiveness beyond this point. In the second place, two R. F. stages call for three tuned circuits, which, if properly built, provide ample selectivity. We found it easily possible to get too much selectivity; that is, it was found that with certain arrangements the tuning could be made so sharp that desirable side frequencies of modulated broadcast transmissions began to be seriously depressed with resulting distortion of the reproduced signal. Another reason for avoiding excessive selectivity was that the completed receiver had to be a commercial piece of merchandise and economic factors also had to be kept in mind.[1]



THE CHASSIS OF A SINGLE-CONTROL RECEIVER

Mu-Rad type A receiver before enclosing in cabinet. At the left, somewhat below the R. F. transformers, may be seen a control rod which is operated by a small knob on the panel and serves to actuate the springs of the jack between the two nearest R. F. transformers. Across this jack is connected the small fixed antenna series condenser next to the terminal strip. The knob therefore serves to shift the natural period of the antenna without bringing the antenna near the panel. This idea should be very useful in short-wave sets.

*President—Mu-Rad Radio Corporation, Asbury Park, N. J.

The ratio of inductance to capacity in the tuned circuits of the receiver is somewhat higher than is commonly found. The maximum capacity of the condensers is 230 μμfd. The inductance of the R. F. transformer is 338 microhenries. The inductance was pushed to as high a value as possible without impairing the minimum wavelength. A special design of the condensers *when a smaller one is employed.* Better signal strength and selectivity are secured with smaller tuning condensers and correspondingly larger inductances provided their design is well carried out.

There has been a good deal of conjecture and some really good comment on the question of direct pickup on a receiver. Of course any energy getting into the receiver

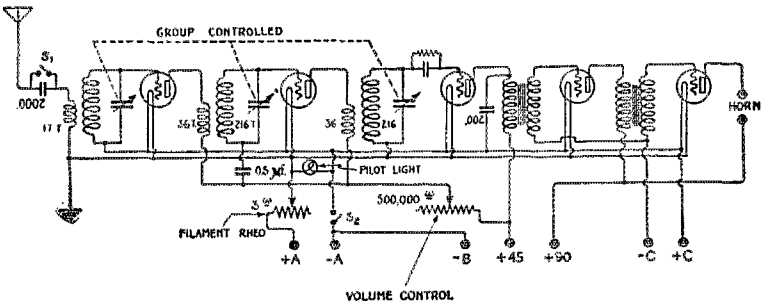


FIG. 1. CIRCUIT DIAGRAM OF THE SET

for low minimum capacity assisted in this direction. The figure of merit of the coils is $\frac{R}{X} = .0004$ which is seen to be very good despite the deviation from the straight solenoidal construction.[2] The resistance of the secondaries in their cases and mounted in the set is about 6.7 ohms at 400 meters. It should be stated here, that the argument frequently advanced against the use of small capacity tuning condensers, namely: that variations in tube capacities will upset the tuning (these being in parallel to the condenser) is not sound. The reason is that the tube capacity only begins to become important at the shorter wavelengths, that is, at the bottom of the condenser scale where the latter is nearly out of mesh. All good variable condensers whether they be of 500 μμfd. or 200 μμfd. capacity at maximum, have very roughly the same minimum capacities (something of the order of 15 μμfd.). Hence the tube affects the tuning at the low end of the scale *practically as much when a large condenser is used as* other than that arriving directly through the antenna is not subject to the filtering action of the successive tuned circuits, and will cause such interference that it may not be possible to handle it successfully. This is particularly true if one is located close to

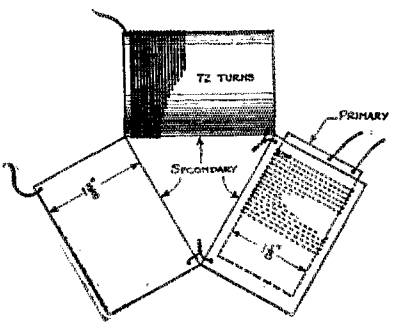


FIG. 2. THE ARRANGEMENT OF THE WINDINGS IN THE R. F. TRANSFORMERS

a modern broadcaster. This problem came in for considerable investigation as a result of which many of the claims for the so-called fieldless coils were well substantiated.[3] Such coils, however, do not completely circumvent the difficulty. Complete and proper metallic shielding seems to be the only way of preventing all direct pick-up.[4] Very good results, however, can be secured

1—There seems to be a pretty general failure to comprehend the fact that it is not possible to operate 534 radiophone stations in the present broadcast band of wavelengths without overlapping. Each station occupies a narrow "slice" in the prescribed band of wavelengths which s" e is roughly 10 K. C. cycles wide. Hence these "slices" overlap. It is utterly and absolutely impossible to retain the good quality of the music and also separate stations by making the receiver tune more sharply. If one attempts this the certain result is to prune off part of the frequency-band of each station listened to, with the result that the audio reproduction is very poor. The remedy is to get rid of several broadcasting stations, or at least to make sure that at all times they are operated 10 K. C. apart.—Tech. Ed.

2—See G. H. Browning on "Rating Circuit Resistance", p. 42, December 1925 issue of *QST*.

3—See F. J. Marco on "Toroids," p. 9, December 1925 issue of *QST*.

4—See leading article of March 1926, *QST*, also the article of note 3.

with restricted field coils. Of these, the twin cylinder or binocular door-bell[5] coil is one of the best. It has the advantage of rather high distributed capacity and high resistance at the shorter wavelengths. The old cross wound Navy doughnut[6] has similar disadvantages, plus the fact that it is hard to reproduce accurately in quantities. The toroidal coil is fairly good when properly proportioned, but must be constructed with solid wire and invariably seems to wind up with a rather high resistance.[7] Furthermore, it is anything but rugged and must be handled carefully. We were never able to subject it to the acid test of quantity production and have them come through with sufficiently uniform inductance.

The Mu-Rad R. F. Transformers

The coils developed for the receiver are shown in Fig. 2 and Fig. 3. Both the magnetic and static fields of these coils are quite restricted. They have a remarkably low self-capacity, are sturdy and rugged, and can be manufactured in quantities with such small variations in inductance, that special arrangements have to be utilized to detect any difference at all. When the windings are completed they are assembled in the moulded cases, Fig. 3, making a permanent inductance unit that can be handled with inpunity. The three series connected secondary coils are wound with "Litz",[8] a vitally important factor in its effect on resistance in all closed field coils.

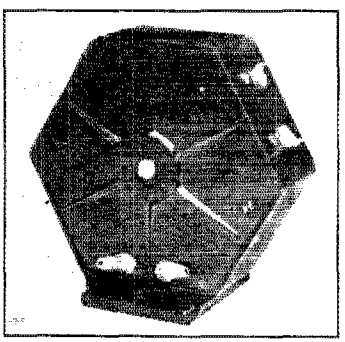


FIG. 3. THE COILS OF FIG. 2 IN THEIR BAKELITE HOUSING

The wire is wound on formica tubs 1⅝" in diameter and is wound on HOT. The heating of the wire as it is wound on, results in a tight winding when the wire cools down owing to the contraction of the copper, and the winding will not get loose on the spool after the set is put into service. This is worth-while insurance against a possible change in the inductance of the coil after it is built and tested.

The completed coils are tested in their cases for inductance and resistance. The inductance test is made by observing the zero beat note from a 300-meter oscillator on a second oscillating circuit whose inductance is that of the coil under test. This test circuit is provided with a small vernier condenser having a maximum ca-

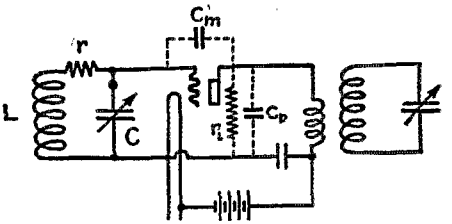


FIG. 4. DIAGRAMMATIC REPRESENTATION OF AN R. F. AMPLIFIER STAGE

pacity about ½ of 1 *percent of the total circuit capacity*. A standard coil is inserted in the test circuit and the zero beat note tuned in with the vernier at half its full capacity. The standard coil is then replaced by the coil to be tested and the latter, to be acceptable, must give zero beat note within the range of the vernier condenser.

The primary windings of the R. F. transformers in a single control circuit of this type must be proportioned with as much care as the secondaries. In the first place, a reasonably tight magnetic coupling between primary and secondary is required though the capacity between these two windings should be reduced as much as possible.[9] The proper magnetic coupling is a function of the tube characteristics, the frequency, the associated tuned secondary characteristics, and the sharpness of the resonance curve desired. It turns out that unity coupling not only gives broad tuning, but at the same time results in less amplification than is secured with a coupling considerably less than unity. As the coupling is reduced from unity, the selectivity improves and at first the amplification increases. With further reduction of coupling the amplification begins to fall off, and below a certain coupling value there is no improvement in selectivity.

In finally determining the proper coupling value and then the constructional details of producing this value, very careful consideration must be given to some other

5—That is, twin cylinders arranged side-by-side, like the windings of a doorbell.—Tech. Ed.

6—In other words, the "figure-8-coil".—Tech. Ed.

7—When considered outside of the set. There is some difference of opinion as to its goodness when inside the set.—Tech. Ed.

8—"Litzendraht" is not so much in vogue now as at one time, mainly because so very much of it was badly made and carelessly used. It is a wire in which each strand is separately enameled and then twisted or woven with the other strands in such a fashion as to bring all strands to the surface of the cable equally.—Tech. Ed.

9—See the various articles by Glenn H. Browning, in this and other publications.

factors. In a receiver with more than one tuning control these are not especially important, but in single control operation they spell success or failure. Coupling a primary coil to a secondary effects the tuning of the secondary because the characteristics of the circuit coupled to the

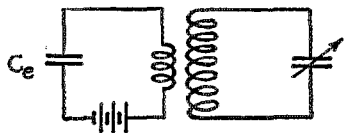


FIG. 5. EQUIVALENT OF CIRCUIT SHOWN IN FIG. 4

primary are reflected into the secondary through the coupling. In the second and third transformers of a two stage R. F. amplifier the primaries are connected to the output elements of a vacuum tube. In the first or input transformer, the primary is connected to an antenna. The antenna characteristics are obviously quite different from those of the tube, and the detuning effect of the coupled primary winding is therefore likely to be entirely different in the first transformer than in the second and third, and the single control idea is therefore a failure.

We found, however, that these differences could be compensated with a high order of precision provided we kept away from abnormally long antennas with natural periods up in the broadcast wave band. The problem was to keep the equivalent or reflected primary reactance into the secondary the same in the antenna stage, as in the tube stages.

Fig. 4 shows diagrammatically one of the tube stages. The network attached to the

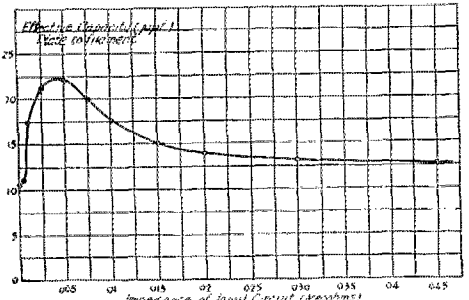


FIG 6

FIG. 6. EFFECT OF CAPACITY SHOWN IN FIG. 5

primary of the output transformer comprises the tube with its internal resistance R^i, its plate-filament capacity C^p, its grid-plate capacity C^m, and the preceding tuned input circuit LC^r. Under operating conditions this entire network presents an equivalent impedance which affects the tuning of the secondary of the output transformer exactly as though it, (the primary network) were replaced by a capacity C^e, Fig. 5. The value of this equivalent capacity obviously depends upon the internal tube resistance, the tube capacities, *and the constants of the preceding tuned circuit.* I do not believe the importance of the latter has been generally appreciated heretofore, but the magnitude of its effect is shown in Fig. 6 and is seen to be considerable. This particular curve was taken on a Signal Corps VT-1 tube (W. E. Type J). It shows the equivalent plate to filament capacity of the tube for different impedances of the input circuit connected between grid and filament of the tube. This impedance ($= \frac{L}{C^r}$ see Fig. 4) is not constant, but changes as the tuning is adjusted for the reception or different wavelengths. Hence the value of C^e, and therefore the effect on the tuning of the output secondary is different at different wavelengths.

In the antenna transformer the same sort of effect is present, but here the capacity associated with the primary is the effective capacity of the antenna which in general is different from the equivalent tube capacity C^e just discussed, and varies with wavelength as shown in a general way in Fig. 7.

It may now be seen that this part of the problem is solved when the effect of the antenna capacity on the tuning of the first resonant circuit is made to be the same as the effect of the equivalent tube capacities in the succeeding stages on the tuning of the second and third resonant circuits. As may be suspected, the solution of this problem was quite a job experimentally, but it was accomplished by adjusting the resistances, inductances, and capacities of the tuned circuits and properly proportioning and locating the primary coils of the transformers. The primary of the antenna transformer is wound with No. 32 D.S.C. wire, the turns being spaced with a pitch of 20 turns to the inch. The primaries of the second and third coupling transformers are wound with the same wire, but their turns are spaced 36 to the inch. All these windings are on 1-1/8" diameter formica tubes fitting snuggly inside the secondaries. The switch S, (Fig. 1) throws a shortening condenser in the antenna circuit, but is only needed when an antenna is used that has a natural period up near the higher broadcasting wavelengths.

The Tuning Condenser Arrangement

The group controlled variable condenser unit is shown in cross section in Fig. 8. The construction of these condensers and their method of assembly into a group con-

trolled unit is rather unique and entirely overcomes the usual difficulties encountered in gang condensers mounted on a single shaft. The condensers are separately mounted each on its own bakelite bracket support and each is provided with a large die cast gear. These gears mesh with small fibre pinion gears carried on the control shaft. The gear ratio is 6 to 1. The pinion shaft is pressed firmly upward by spiral springs. Such a spring being located in each of the molded condenser brackets. This construction eliminates back-lash entirely. It will also be noted that through the construction employed the

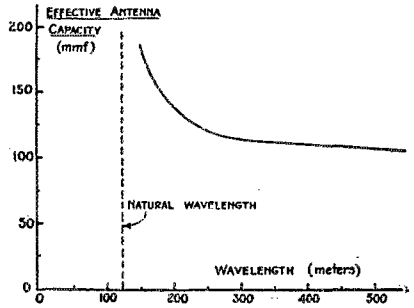


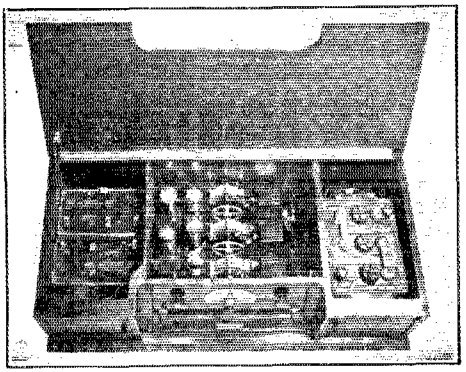
FIG. 7. EFFECT OF ANTENNA CAPACITY

capacities of the condensers cannot possibly be affected by expansion or contraction of the mountings, warping of the base board, slight misalignments in assembly, or through shocks in transportation. Such construction insures permanency in the tuning characteristics of each stage, a factor of vital importance in single control operation.

On the shaft of the condenser nearest the panel is mounted the pointer which moves over the calibrated dial. The dial and pointer are shown in Fig. 9. The dial is given a frosted gold finish on which it is possible to mark the call letters of various stations in lead pencil, writing through the windows of the pointer. It will be noted that the wavelengths are spaced in a nearly uniform manner which results from the use of parabolically shaped plates in the variable condensers. The wavelength calibration of the dials is etched in permanently and is the same on all receivers. This is made possible by the accuracy of coil and condenser construction, and by the provision of the "set and lock" compensating plates on each variable condenser. These plates are shown at "A" in Fig. 8. The rear end of each condenser shaft is squared off or flatted and carries a single loose rotor plate that can be moved back and forth along the shaft but turns with the rest of the rotor. By moving this plate horizontally toward or away from the outside end stator plate the capacity of the condenser can be changed by some 18 μμfd. when in its fully meshed position. These separate rotor plates therefore provide a means of bringing each stage exactly in tune and also adjusting the wavelength indications of the pointer to correct values. When the correct setting of the end plates is found they are locked in place by the set screws and are never changed thereafter. This adjustment, of course, is made at the factory.

Volume Control

It will be seen from Fig. 1 that the regulation of signal strength or volume control is secured by ajustment of the plate voltage delivered to the R. F. amplifier tubes, that is, by regulation of the radio frequency amplification. This applies to both the R. F. tubes because changing the plate voltage changes the internal tube impedance and if only one of the tubes was operated in this way, the tuning of the stage thus controlled would vary slightly from that of the other stage. The filaments of all tubes are controlled by a single rheostat for the same reason. At this point the writer wishes to state that in his opinion the only proper way of controlling signal strength is to



THE MU-RAD TYPE A RECEIVER COMPLETE

While the three-compartment arrangement is normal, certain features distinctive with the single-control type are notable. The wiring is relatively simple, the parts accessible and the panel both small and free from complexities. At the center is the scale and its indicator with the vernier control knob just below. The knob to the left is the R. F. grid potentiometer control or "sensitivity control." To the right is the rheostat knob. In the lower left and right corners respectively are the filament switch and the antenna jack-switch buttons.

control the sensitiveness of the receiver, that is to regulate the input to the detector.

Adjustment of the audio frequency amplification is distinctly less satisfactory. In the first place, strong signals which require reduction in volume are often overloading the detector tube and thereby distorted and in such cases reducing the audio amplification will not straighten things out. On the

other hand if the strength is reduced by reducing the radio amplification, or sensitiveness or detector input, the signals will be brought down to the required volume and the distortion caused by detector overloading will be corrected. In

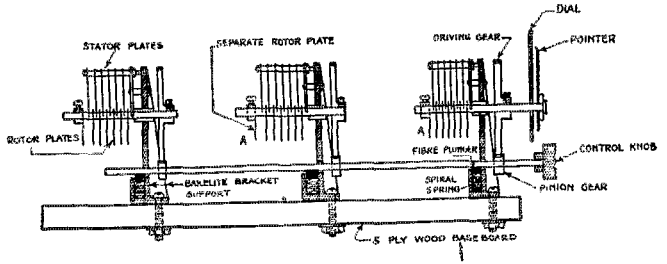


FIG. 8. GANG CONDENSER CONSTRUCTION

the second place, when one regulates volume by adjusting the amplification of the R. F. stages, he can *set* the receiver at any desired sensitiveness level. This is a big factor in the mitigation of back-ground noises, (static or otherwise). On some nights the noise level is high and there is no use trying to listen to distant or weak stations.[10] One must be content to listen to nearer and louder broadcasting, and this can be done with comfort if the sensitiveness of the set is reduced to a point where the back-ground noise disappears. The signal

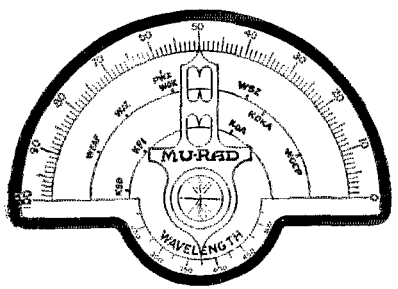


FIG. 9. DIAL OF THE MU-RAD RECEIVER. **All dials are alike and the tuning stages are adjusted to match them by means of the "set and lock" plates shown in Fig. 8**

is then left clean. If the set is always working at maximum sensitiveness and merely the audio amplification adjusted, the back-ground noise and the signal still bear the same relative strength, one to the other, regardless of what is done to the audio end to reduce the volume.

10—The Technical Editor is firmly convinced that the broadcast stations must reduce greatly in number, or else the sensitive receiver must be replaced by much simpler equipment of relatively low sensitivity with the intention of listening only to those stations which are close enough or powerful enough to be well above the interference level. Such a set can have a very good audio end and will be intended to produce music rather than lists of "calls heard." —Tech. Ed.

Audio Amplification

The audio amplifier end of the receiver is not visibly distinctive. It consists of two 3½ to 1 transformer coupled stages with C-battery. Well designed, flat characteristic transformers are no longer hypothetical affairs. As a matter of fact we believe that much of the criticism directed against transformer coupled audio amplifiers is not attributable to the transformers nearly so much as it is to the layout of the receiver. For instance, it is now known very definitely that capacity feedback in an audio amplifier tends to put a marked peak in the amplification-frequency curve at the higher frequencies (around 3000 to 5000 cycles). Microphonic regeneration due to tube element vibration is another very serious cause of distortion in an audio amplifier and is not easily recognized by the uninitiated. This usually occurs right in the middle of the frequency range and plays havoc with quality. Resistance in the B-battery leads or in the B batteries themselves (which is more often the case) causes regeneration (resistance coupling between stages) and often bad distortion in the audio circuits. It is surprising how hard it is to convince people whose B batteries read full 90 volts that it may be their batteries that are causing poor quality reproduction. The importance of this point, however, cannot be overlooked, and was brought home quite forcibly when we found that a resistance of only 15 ohms in the B-battery circuit of a certain amplifier caused a regenerated amplification peak at 200 cycles; nearly 3 times the amplification at 1000 cycles, whereas with this battery resistance removed, the amplification characteristic was practically flat.

In the development of the present receiver, capacitive feed-back in the audio stages, microphonic regeneration, and the common plate-circuit-resistance-effect was reduced so that the actual characteristics of the coupling transformers were approached very closely. The fidelity of reproduction seems to be very satisfactory and the measured characteristic is practically flat from 90 to 5000 cycles.

Strays

QTK—QTK!

A new "Q" signal—put it down on the list, OM. 9CAN was working the set with raw A. C. on the tube and a fellow told him his QSB was pure D. C. 9CAN came back with a "QTK—QTK, OM" which when translated means "Quit The Kidding"!

Condensers In Series

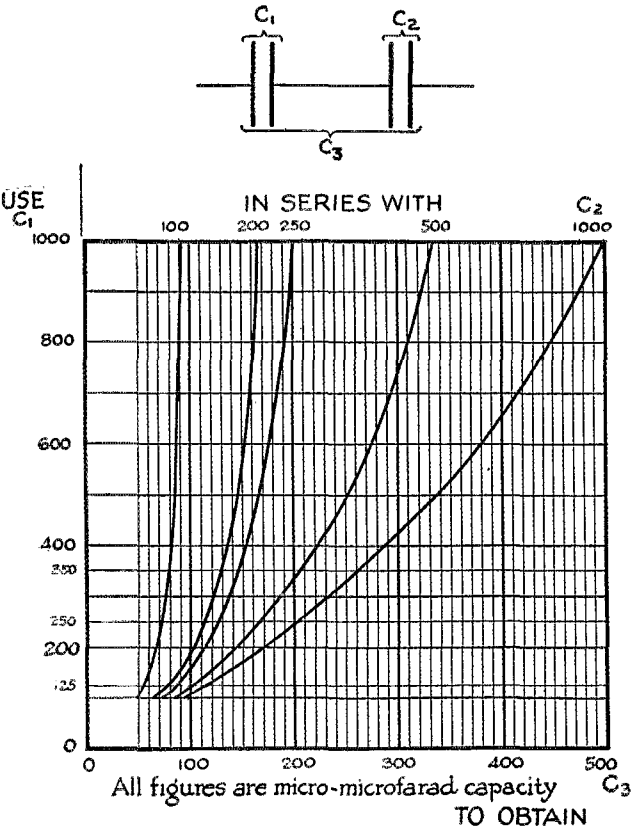
By R. C. Hitchcock*

BY using a given variable condenser in series with a fixed condenser of correct capacity, a variable combination can be made having nearly any desired maximum capacity. For example, if a variable condenser of .0005 microfarads is on hand and a value of .0001 microfarads is wanted (to tune over a shorter wavelength band) use a series condenser of .000125 microfarads. The formula to calculate this value is the regular reciprocal relation for series capacities, i. e. $\frac{1}{C_1} + \frac{1}{C_2} = \frac{1}{C_3}$. The condensers C_1 and C_2 being used in series to obtain C_3. This article includes a table and chart based on this formula, making easy the prompt finding of the proper series condensers to use throughout the present broadcast and lower wavelength bands. The numbers representing capacity are given in micromicrofarads (μμfd); to obtain microfarad (μfd.) divide the values given by one million.

Whatever is said about variable condensers in series with fixed condensers, applies as well to fixed condensers in series, the difference being that the chart and table give *maximum* values for the variable-fixed condenser combination, and *the only value* for the fixed-fixed condenser combination. Table 1 was calculated in order to find what series condenser to add to a given variable condenser to get a known capacity. The first column is the variable condenser C_1, the second column is the desired capacity C_3, which is obtained by using the condenser value C_2 in the third column. For instance, suppose we have a condenser of 500 μμfd., C_1, and want a capacity of 100 μμfd.. C_3, the third column shows the series capacity to use, C_2 equals 125 μμfd.

This table shows those values to be used in obtaining capacities ordinarily used. However this sometimes necessitates using series condensers that are not standard. For an example, fixed condensers of 125 μμfd. capacity cannot be purchased in the open market.

The more easily obtained capacity fixed condensers are, 100, 200, 250 μμfd., etc., and a chart was drawn for these capacities, to show the capacity to use in series with regulation size variable condensers up to 1000 μμfd., (.001 μfd.) On this chart there are the three separate units; C_1, C_2, and C_3 each having the same meaning as in the formula, and in Table 1. On the chart, C_1 is shown by the left vertical scale. C_2 is repesented by the curves, the capacity values of the curves being given at the upper end of each. C_3, the resulting over-all series capacity, is shown at the bottom of the chart. The use of the chart will be made clear by an illustration. Suppose we have a 600 μμfd. variable condenser to use in series with a 500 μμfd. fixed series condenser. At 600 at the left, C_1, move right until the 500 curve, C_2, is met and follow



* 121 Fountain St., New Haven, Ct.

this down to C_3, finding the approximate capacity to be 275 μμfd. The value by calculation is 273 μμfd., the error here due to using the chart being less than one per cent.

Consider another use of the chart. Suppose we have a 500 μμfd. condenser and want a capacity of 125 μμfd. From the table we can see that the capacity, 167 μμfd., is not one of the regular commercial sizes. By using the chart it will be possible to find what capacity would result if the nearest commercial value of condenser were used. Follow 500, C_1, from the left until it meets the line from 125, C_2, below—this intersection will be seen to lie between the curves of 100 and 200 of C_2, and nearer to 200 μμfd. The chart here shows more clearly than a table, that the nearest commercial size, 200 μμfd., will give a resulting capacity of 145 μμfd.

There is a phenomenon to be noted when a variable condenser is used in series with a fixed condenser. To tune to short waves, condensers should have a low minimum capacity, as the series connection does not reduce the minimum very much. As an example, suppose a variable condenser having a maximum capacity of 500 μμfd., and

Maximum Capacity of Variable Condenser in Micromicrofarads C_1	Desirable Capacity in Micromicrofarads C_2	Resulting Series Condenser C_3
1000	500	1000
1000	350	540
1000	250	333
1000	100	111
500	350	1167
500	250	500
500	125	167
500	100	125
350	250	875
350	125	195
350	100	140
250	125	250
250	100	167

a minimum of 52 μμfd., is to be used in series with a fixed condenser of 500 μμfd., giving 250 μμfd. maximum. The series capacity with the variable condenser set at its lowest point, is 47 μμfd. Given as a capacity ratio from maximum to minimum —a real indication of its tuning ability— the original variable condenser alone has a ratio of 9.6:1 (500/52). This ratio, when used in series with the condenser mentioned above, becomes 5.3:1 (250/47). This will make the relative tuning range of the series combination less than that of the original condenser. The great advantage, however, of a series connection when used for radio work, is the spreading of the tuning of the lower wavelengths over a greater section of the dial. As condensers of present day manufacture have quite low minimum capacities, the resulting series capacity is still low enough to allow tuning over a fairly good range.

IMPORTANT NOTICE

Increase in A.R.R.L. Dues

By action of the Board of Directors, the annual dues for membership in the American Radio Relay League have been raised, effective April 1, 1926, from $2.00 to $2.50.

Members residing outside the American Postal Union are required to remit 50 cents extra, as heretofore, to cover foreign postage on *QST*; making the amount to be remitted by such members $3.00.

This increase in dues will not affect memberships already paid. Commencing April 1, 1926, however, all remittances must be at the rate of $2.50 (foreign $3.00) per year.

—*Kenneth Bryant Warner.*

New England Division Convention, April 9th-10th, 1925 at Providence, Rhode Island

ALL "HAMS", OW's, YL's and their friends take due notice, that the Annual New England Division Convention is to be held at the Providence-Biltmore Hotel, under the auspices of the Providence Radio Association.

All roads lead to Providence, Rhode Island, and assurance has been given by the Committee that this year's convention will surpass any previous one.

The convention city is so near to Hartford that the whole of Headquarters Gang has promised to show up in a body Saturday afternoon and be with us for the Banquet. We also have it on good authority that our worthy President, Hiram Percy Maxim, will be with us on the last day.

By the time you read this, you will have received a personal invitation through the mails, and if your reservation has not yet been made, drop a line to H. Young, 1CAB, Chairman, 73 Clarence Street, Providence, R. I., and tell him you will be there. Fellows, let's make this a 100% attendance.

—*A. A. H.*

Strays

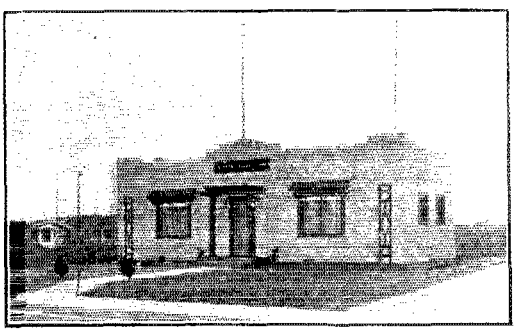
The Cardwell ad on page 88 of the February issue of *QST* refers to *transmitting* condensers only.

The Modesto Radio Club's Housewarming

By R. L. Brown, Jr.

IN modern phraseology, the Modesto Radio Club has "gone and done it again." Here is a club composed of twenty members, only four of them over twenty-one years of age, which seemingly, has more push and vigor than any other club we have heard about. That is a bold, but deserving statement; for the Modesto Radio Club has, in the five years of its active existence, done more for amateur radio, or rather has done more to put amateur radio *over* on the Pacific Coast, than any other one body.

As the story goes, in the fall of 1924 the officials of the League in the west, met in the Director's office to find someone to put over a Pacific Division Convention. It was going to be a big job—to do it right—as the ham spirit was surely on the skids and had been for some time. Someone—I believe he was from the R. I. office—suggested Modesto a hitherto unknown town, in a little-known section of the country. This came to the club right on top of, and on account of, their program of collecting burnt out tubes from all over the United States, the metal to be used in making a replica of the Wouff-Hong. This was to be awarded to the best all-around station in the Pacific Division.



THE CLUBHOUSE OF THE MODESTO RADIO CLUB.

With the members of the club busily engaged in their studies and engrossed over the idea of the Wouff-Hong, one would naturally suspect that the Convention, or the Wouff-Hong, or at least their studies, would suffer somewhat for inattention. However, none did—yes, they even made the grade in school. They put over the biggest convention the Pacific Division has even seen, which incidentally it was the means of rejuvenating ham radio on the Pacific Coast; and they had the Wouff-Hong at the convention to show to the fellows.

After that really big effort, the pendulum of interest fullfilled the old saying and took a decided swing in the opposite direction, only to swing back in the course of a year, with more force than ever before.

Since the organization of the club, it had been faced by the housing problem. It had met in officers' houses, until said officers' mothers have run it out; then it took up its abode in the shacks of the individual members.

In the late spring of 1925 someone lightly suggested going into the "Hot Dog" business as the means of raising revenue to enlarge the depleated treasury. Heh! Good joke! Nevertheless the idea stuck, and when it was announced that Modesto was to have a county fair the size of the State fair, somebody woke up! Being more or less of a community organization, the club was able to obtain two, and the only two, hot dog stands on the grounds. The trials and tribulations of a bunch of inexperienced "Hot Dawg" men were many. However, there was a certain amount of glamour and thrill in the work that "egged" the fellows on. The end of the week found them all tired and "hot dog sick", yet smiling through it all for in that one week they cleared something over $700.00.

What followed is now current history. Suffice it to say here, that with the $700.00 they bought a lot, borrowed $1700.00 with the lot as security, and have just completed their own home, which as far as we can determine, is the only one of its kind in the world. When they were all set to move in, they invited all the hams in California to another of their famous hamfests.

To say that it was a success does not do it justice. It was more than that, as anyone who was there will tell you. Over a hundred were present. A gang of the "old timers" came along; the kind who were going strong in the spark days, and who have since been to every continent on the globe, besides operating at KPH, NPL, NPS, etc. They got together after the banquet and started slinging the ol' oil. I left the party a little after midnight, and they were there, still going strong, with an audience of several score of wide-eyed "kids" who have yet to follow the trail of the setting sun. Mr. A. H. Babcock, our Pacific Division Director, was there, and with him the whole Sixth District R. I. forces. Jerry Best was there with flying colors, and on the other side of the table was Col. Foster, 6HM—Canadian 9CN—the ham

* 6CJJ, 3111 Eton Ave., Berkeley, Calif.

who works 'em with 5-watts input! Next to him was 6OI, the fellow who has worked every continent on the globe, with a lone fifty watter.

With all that talent we could have had speeches until daybreak but there was a raffle that had to come off, and—the inevitable M. R. C. stunt. That, as usual, was the spice of the program. In the raffle, 6FH came out on top winning the "H" tube, while 6CKV, president of the San Jose club, walked away with a year's subscription to "Radio".

The San Jose bunch gave the assembledge quite a treat, when they showed motion pictures of all the stations in their vicinity. They added to the reel, by taking pictures of all the Modesto gang the next day.

After the banquet was over, the rest of the evening, (and part of the morning) was spent at the clubhouse, where, as we said before, the gang engaged in the art of "slinging the oil". To express it mildly, we all had a whale of a good time; and that only means that the M. R. C. scored another big point in the ham spirit of the time.

The clubhouse, pictured above, is forty feet across, twenty feet deep, made of white stucco, with orange and black "trimmin's". The pole in the background is sixty feet high supporting a vertical one-wire antenna that is used in transmitting on the forty-meter band (call 6CB).

Some More Changes at Headquarters

BY the time this issue appears it will be generally known through amateur radio that Mr. Fred H. Schnell has resigned his post as A.R.R.L. Communications Manager, which fact it is our unpleasant duty to record in these pages.

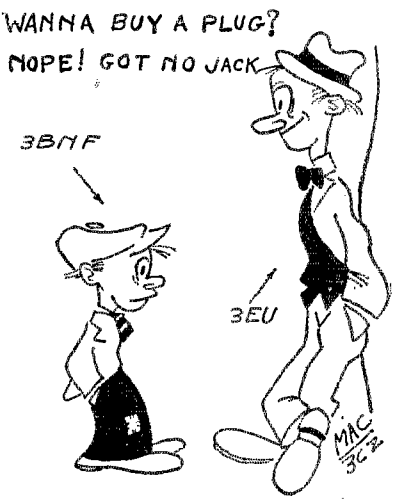
Mr. Schnell has now become associated with the C. F. Burgess Laboratories, of Madison, Wisconsin, in radio experimental work. He joined A.R.R.L. Headquarters in April, 1920, succeeding Mr. J. O. Smith, as Traffic Manager. Under his leadership our Traffic Department expanded into the huge machine it is today. With the possible exception of our Treasurer, Mr. Hebert, Mr. Schnell is probably personally known to more of the membership than any amateur in the country. He is an excellent operator; he was the first American amateur to work Europe; and his general qualities caused him to be selected by the U. S. Navy to operate their short-wave experimental equipment on the recent cruise of the U. S. Battle Fleet to Australasia on which mission he was phenominally successful. It was inevitable that his successes should open wider field of opportunity to him. We are sure that his many friends throughout the League join with us at Headquarters in wishing him every success in his new work.

Mr. F. E. Handy, of Augusta, Maine, formerly 1BDI-1XH at Orono, Me., has been appointed as the new Communications Manager. Mr. Handy is by no means a stranger to the department, having served as Acting Traffic Manager last summer during Mr. Schnell's absence with the Fleet. During that time Mr. Handy made an excellent name for himself and amply demonstrated his ability to manage the department with credit to himself and the League.

Mr. Clark C. Rodimon, 1BIZ-1SZ of Florence, Mass., joined our staff on February 23d as assistant to the Managing Editor, instead of Mr. Johnson, of 1HN as we reported in our last issue.

Miss Elizabeth C. Murphy, for some years the crack dictaphone operator of our editorial department, left us during February to become Mrs. C. A. Service, Jr. Mr. Service, until recently our Assistant Secretary-Treasurer, is now located at Sarasota, Fla., in the radio business. (Free ad.) This, then, is a Headquarters romance—but not the only one! Our Assistant Technical Editor married a young lady from our Circulation Department; so did Louis Hatry, until recently in charge of our Information Service; and to round out the story the engagement has recently been announced of Miss Winifred G. Richardson, formerly of A.R.R.L. Hdq., to our new Communications Manager!

—*K. B. W.*



The Board Meets

THE A. R. R. L. Board of Directors had its annual meeting in Hartford, on February 26th and 27th, with every Director and officer present in person. This is the first time in our history, since the present constitution was adopted, that every Director was actually present in person, able to speak authoritatively about what A. R. R. L. members want in the Division that elected him. It made a fine, representative meeting that went into the heart of all matters affecting the welfare of our League, receiving the annual reports of the officers, considering their recommendations, initiating new policies and outlining plans for the year. The highlights:

Hiram Percy Maxim, 1AW, was unanimously re-elected as our president for the years 1926-1927, the office he has held since the formation of the League in 1914. Charles H. Stewart, 3ZS, was unanimously re-elected vice-president. In re-electing Mr. Maxim the Board adopted the following resolution:

"Whereas we, the Board of Directors of the American Radio Relay League, are conscious of the universal sentiment of the members of the League throughout the country and concur with our constituents in the deep admiration and affection which they entertain for our beloved President, Hiram P. Maxim, and

"Whereas further, we are of the opinion that the leadership of Mr. Maxim is of such high character and of such an altruistic and thorough devotion to the ideals of our organization, that it is particularly valuable at this time when the League stands at the beginning of a greater usefulness and higher aspiration, now therefore

"BE IT RESOLVED, that in re-electing for two more years of leadership the beloved founder and inspiration of our League, we offer to him this unanimous expression of our appreciation for his efforts, our confidence in his ability and leadership, and of our deep affection."

The membership dues of the League were raised to $2.50 per year, effective upon the publication of the announcement. The Board made a careful study of the finances of the League and took this step only when it was apparent that our decreased income from other sources made it imperative, if we were to continue our normal activities. Considering that every member receives *QST*, and that the normal yearly subscription rate of a 25c magazine is alone $2.50, it was believed that the membership would be quite willing to support this small increase in the dues in order that our League may carry on. Although a very small addition from each member, this increase will produce a material increase in the League's annual revenue.

The name of our Traffic Department was changed to the Communications Department, a much better title for the department that handles so many other operating activities beside message traffic. The title of Traffic Manager similarly was changed to Communications Manager. Then a far-reaching change was made in the structure of the department and the old Division-Manager system, which has served us so well for these many years, was washed out in favor of a new plan. The new plan contemplates a larger number of operating regions, to be known as Sections, each in charge of a Sections Communications Manager who will work direct with the Communications Manager (or, in Canada, with the Canadian General Manager). This new plan will greatly reduce the delays in correspondence, reports and bulletins, will enable the publication of more up-to-the-minute field news in *QST*, and will reduce the maximum work required of any field official. The amended by-laws adopted to effect this change read as follows:

"5. For the activities of the Communications Department, the operating territory of the League shall be further divided into Sections. In each Section there shall be a Section Communications Manager, who, under the direction of the Communications Manager, shall have authority over the Communications Department within his Section. He shall be responsible to, and report to the Communications Manager. In this paragraph, as regards the Dominion of Canada or Newfoundland and Labrador, the words 'Communications Manager' shall be read as 'Canadian General Manager'.

"6. The operating territory of the League in the United States, its island possessions and territories, and the Republic of Cuba, shall be apportioned into Sections for the purposes of the Communications Department, by the Communications Manager with the advice and consent of the Division Director. Similarly, the operating territory of the League in the Dominion of Canada, Newfoundland and Labrador shall be apportioned into Sections by the Communications Manager with the advice and consent of the Canadian General Manager. The boundaries of any Sections may be changed by the same officials as from time to time may be desirable.

"6A. The Section Communications Managers shall be elected for a two-year term of office. Whenever a vacancy occurs in the position of Section Communications

Manager in any Section of the United States, its island possessions or territories, or the Republic of Cuba, the Communications Manager shall announce such vacancy and call for nominating petitions signed by five or more members of the Section in which the vacancy exists, and naming a member of the Section as candidate for Section Comunications Manager. The closing date for receipt of such petitions shall be announced. Immediately after the closing date the Communications Manager shall arrange for an election by mail. Ballots shall be sent to every member of the League residing within the section concerned. The candidates' names shall appear on the ballots in the order of the number of nominations received. The closing date for receipt of ballots shall be announced. Immediately after such closing date the Communications Manager shall count the ballots and the candidate receiving a plurality of the votes shall become the Section Communications Manager. The Canadian General Manger similarly shall manage such an election for a Section Communications Manager whenever a vacancy occurs in any section of the Dominion of Canada, Newfoundland or Labrador.

"6B. The office of any Section Communications Manager may be declared vacant by the Executive Committee upon recommendation of the Communications Manager, with the advice and consent of the Director, whenever it appears to them to be in the best interests of the membership so to act, and they may thereupon cause the election of a new Section Communications Manager as provided in the preceding paragraph, 6A."

No way could be found to finance the A. R. R. L. Laboratory and the Headquarters Station we have dreamed of so long, but the Board authorized the Executive Committee to prepare a plan for the establishment of a trust fund to which contributions could be solicited, so that there may come into existence a foundation for conducting experimental, research and development work in amateur two-way communication.

The name of the Vancouver Division was changed to the Vanalta, and that of the Winnipeg to the Prairie.

Standard radio "cable-count" was adopted as A. R. R. L. standard practice for message checks, instead of the wire-line check which has been our practice.

Considering "FS's" departure, the Board adopted the following resolution.

"RESOLVED, in view of the faithful, efficient and progresive manner in which Mr. Fred Schnell has carried on his work as an official of the League, that we, the Board of Directors of the League, appreciating these services, hereby extend a vote of appreciation and thanks to Mr. Schnell, and further assure him of our best wishes for success and happiness in any field of endeavor he may choose to enter."

The two-day meeting of the Board was held at The Hartford Club. Two days later the club was practically ruined by fire. We realized the discussion was pretty hot in spots but never thought—

K. B. W.

Financial Statement

BY order of the Board of Directors, the following statement of the income and disbursements of the American Radio Relay League for the last quarter of 1925 is published for the information of the membership.

K. B. WARNER, Secretary.

STATEMENT OF REVENUE AND EXPENSES FOR THE THREE MONTHS ENDED DEC. 31, 1925

REVENUE

Advertising sales	$22,274.54	
Newsdealer sales	20,940.53	
Newspaper syndicate sales	2,236.50	
Dues and subscriptions	9,104.85	
Back numbers, etc.,	611.02	
Emblems	358.00	
Interest earned	86.81	
Cash discounts earned	324.50	55,936.75
Deduct:		
Returns and allowances	7,481.90	
Provision for reserve for newsdealer returns	2,423.20	
Exchange and collection charges	91.88	
Discount 2% for cash	391.65	10,388.13
Net Revenue		45,548.62

EXPENSES

Publication expenses	16,915.14	
Salaries	14,393.02	
Syndicate expenses	663.84	
Forwarding expenses	477.18	
Telegraph, telephone and postage	1,747.99	
Office supplies and general expenses	1,927.26	
Rent, light and heat	866.59	
Traveling expenses	713.58	
Depreciation, furniture and equipment	145.67	
Bad debts written off	918.61	
Traffic Dept. field expenses	427.43	
News Bureau field expenses	34.32	
Total Expenses		39,230.63
Net Gain from Operations		$6,317.99

Strays

An unfortunate error in the Station Description of u6HM in the March issue of *QST* gives the impression that there are two operators at 6HM regularly. Not so —Harry Lyman constructed the outfit while Colonel Foster was in the East. The Colonel does the heavy brass-pounding.

Peaked Audio Amplifiers

By Robert S. Kruse, Technical Editor

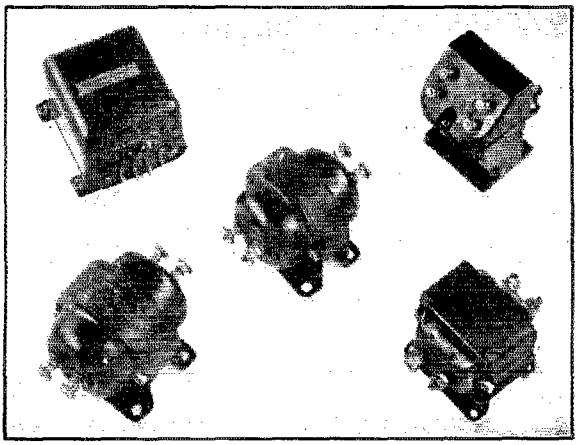
THE title isn't supposed to be a joke, although is may sound that way. It might have been more accurate to say, "Audio Amplifiers Having a Peaked Curve of Amplification Against Frequency," but that doesn't sound like a title — unless perhaps the title of one of these bulletins that the Government Printing Office is always out of.

Getting down to business—why does anyone want a peaked audio amplifier—an amplifier that does most of its work at one pitch—a "distortion amplifier" Such an amplifier does not always give a greater per-stage amplification, often the signal is not as loud as it would be with a good flat (broadcast) amplifier such as the General Radio 6/1 ratio transformer. Now if that is so why do we want a peaked transformer?

The Reason

To understand this one has to think over the almost universal preference of telegraph operators for *one* stage of audio amplification. Why only one stage? Simply because most folks find that the air is seldom clear enough of interference to permit using two stages of ordinary audio; it is of little advantage to amplify signal and interference together. Now if we had an audio amplifier that amplifiies one pitch only, and did *not* amplify the line leaks and static and off-tune signals we would be able to use one stage to better advantage and often could use two stages, bringing in signals that cannot be read with one stage. In other words we would be able to make the signal stand out from the noisy background.

To find out something of the sort of peaked amplifier that fits short-wave C.W. work, a great deal of cutting and trying has been done. The big advantage of this is that the ear and the nerves are not wearied by having to listen to a scrambled "background" for hours at a time. Copying becomes much less tiring.



FIVE PEAKED AUDIO TRANSFORMERS

Center, the well-known General Electric transformer sold by the Radio Corporation of America as type UV-712. The UV-712* looks the same but is meant for broadcast reception. Upper left, Western Electric type 201-A input transformer which makes a good peaked transformer when used in ordinary audio circuit. Upper right, Special 15/1 transformer made by Marie Engineering of Orange, N. J. Lower left, special form of UV-712 with more core and special primary. The curve is much sharper than the ordinary 712. Lower right, Very special audio transformers, even sharper than the special 712. This transformer and the special 712 were made thru the courtesy of Mr. E. A. Wagner of the Fort Wayne Works of the General Electric Co.

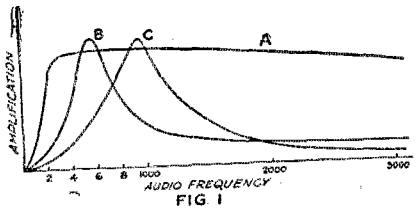


FIG 1

REVIEWING FAMILIAR CURVES

A—High-grade radiophone (broadcast receiver) transformer.

B—Peaked telegraphic transformer to cut off static as much as possible.

C—Transformer designed for 1000-cycle notes—i. e. 500-cycle sparks, C. W. with the beat note set to 1000 cycles etc.

What Sort of Peak

To find out what sort of a peak would best fit amateur C.W. work, a great deal of cutting and trying was done by the writer. During 10 months, different transformers were cut in and out with a cam-switch arrangement that made a split-second shift possible. It turned out to be a most confusing problem. The answer was not the same at all times, it depended on the steadiness of the wave of the sending station, the amount of static, the pitch that the operator preferred and finally the kind of plate supply the sending station used. In the end my own final choice is for an amplifier with adjustable sharpness, either by switching two transformers or

else by use of the Hatry scheme described later.

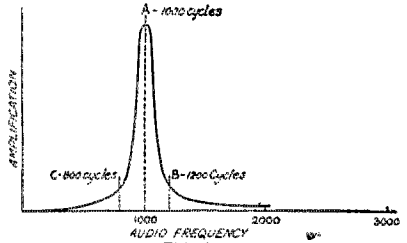


FIG 2

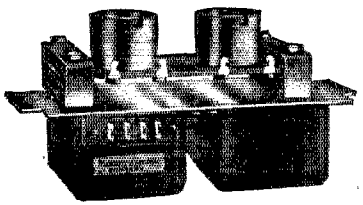
HOW AN AUDIO TRANSFORMER CAN BE TOO SHARP FOR EVEN C. W. RECEPTION WHEN THE WAVE IS UNSTEADY.

If the beat note is set at 1000 cycles and the received frequency changes only 200 cycles, the amplification will drop 9/10 as shown at B and C.

Let me tell the story and leave your own choice to you.

It seems off-hand that we certainly do not want the curve A of Fig. 1, which is a good radiophone transformer. For our C. W. work something like B or C in that figure is the correct thing.

It seems off-hand that the peak should be as sharp as possible but that isn't always so. To begin with, most C.W. signals are unsteady as the deuce and if the peak is very sharp they keep falling off and being



THE FAMOUS WESTERN ELECTRIC TWO-STAGE AMPLIFIER USED BY THE SIGNAL CORPS.

The unit shown is sold by the American Sales Company of 21 Warren St., New York City. The unit as shown will work very well, tho intended for VT-1 tubes with 1.1 ampere filaments. The performance can be improved by changing the grid returns or replacing the grid-bias resistances with others suited to ¼ ampere tubes.

lost. Thus, in Fig. 2 a signal at A will be amplified almost 10 times a smuch as at B or C. If the sending station has only a 200 cycle "wabble," it will sound like first rate fading. For wabbly signals a very sharp peak is not wanted.

But—even if one is working with a steady signal from 4XE, a sharp peak may mean trouble. A *very* sharp peak means a sharply tuned circuit—one that will oscilate easily. If it does not howl is still tends to "ring" when static splashes come along, and will also put "tails" on the dots and dashes as shown in Figure 3.

It is hard to decide just how sharp the amplifier peak should be. If it is too sharp we get into the troubles just mentioned, if it isn't sharp enough there's a lot of interference to tire the ears. Even that isn't all. A few of us (including myself) have ears that work best at about 480 cycles (the pitch of the spark from the old Marconi 240-cycle sets) but we hate the thin piping and wailing of a signal pitched to 800, or 1000, or 1200 cycles. For us the transformer would need a curve like that of Fig. 1B. Most ears are best at these very pitches we object to, and the owners of those ears deliberately tune signals to make 1000-cycle notes (the same pitch as that of a 500-cycle spark set). For them there must

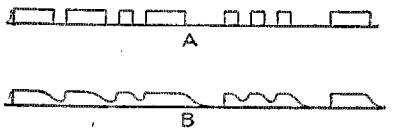


FIG 3

EFFECT OF AN AUDIO AMPLIFIER WHICH HAS TOO LOW A DECREMENT.

A—Dots and dashes as received.
B—Dots and dashes with "tails on them" caused by the almost-oscillating condition of the amplifier.

be a transformer like that of Fig. 1C. One very peculiar thing will be noticed about the use of these transformers; one like 1B will let through *less* static than one like 1C. This seems odd because we always think of static as low pitched. It isn't really odd at all because a great part of static noise is quite high pitched, which accounts for the effect.

Getting The Peak

Generally speaking, the easiest way to get a peak in a transformer curve is to use too few primary turns. This will drop the amplification at all places except that one where resonance occurs. At this place it will hold up pretty well. See Fig. 4 for an

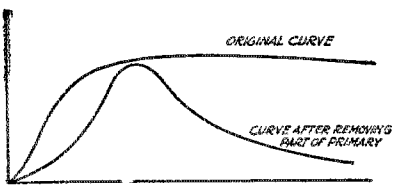


FIG. 4

EFFECT OF REDUCING PRIMARY TURNS OF AN AUDIO TRANSFORMER

illustration. Now it is not easy to tear turns off a transformer primary so the thing is usually up to the manufacturer unless one can invent another method. Several manufacturers have done the thing, using their own ideas as to the proper degree of sharpness. The best known exam-

ple is the OLD General Electric transformer sold by the Radio Corporation as the UV-712. This had a 9/1 ratio, in other words there was not a great deal of primary. It was meant to amplify 500-cycle spark signals (1000-cycle tone) and it did that in beautiful shape because resonance occurred in the neighborhood of 1000 cycles, but not sharply enough to result in ringing or "dragging." Later on this transformer was given more primary turns, bringing it down to 3½/1 ratio. This type is marked UV-712*.

One of our illustrations shows several special transformers made experimentally by the Fort Wayne (Indiana) works of the

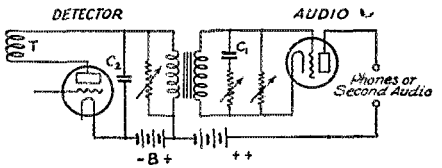


FIG. 5

DIFFERENT WAYS OF STOPPING THE EFFECT SHOWN IN FIG. 3.

The resistance should be used in only one of the places shown. C2 is an ordinary by-pass condenser. C1 is the tuning condenser of the transformer. In some cases this condenser may be connected across the primary of the transformer. Regardless of the position of the resistance, its effect will be to lower the peak amplification somewhat at the same time that it removes the "drag."

General Electric Co. These are of different degrees of sharpness, but all sharper than the UV712. The sharpness of them has a little more tendency to "hang onto the dots" than I like—sounds as if the sending station had the key ahead of the filter. This transformer is perfectly hopeless with a wabbly signal. All of these transformers go at the thing in the same way, adjusting the inductance and distributed capacity of the windings so that the peak is obtained by means of audio resonance.

Tunable Transformers

This naturally suggests using a condenser-tuned transformer so as to get a moveable peak that can be set where the operator pleases. This idea is used in the "Erla" (Electrical Research Laboratory) transformer shown in another picture. A fixed condenser is supplied which tunes the transformer to 1000-cycle response, but a variable condenser or a fixed condenser of different value may be used to get a peak at another point than 1000 cycles. An amplifier using lumped capacity (instead of distributed coil capacity) has more of a tendency to sound "hollow" and to "drag" the dots than one of a more usual design. This can be taken care of by adjusting the grid bias. It may also be taken care of by means of a "Centralab" variable high resistance connected in any ONE of the positions shown in Fig. 5.

Tubes To Use

In all of the foregoing schemes the peak was obtained by cutting down the primary turns. The reason this gives a peak is that the input impedance of the transformer is low except at the resonance point. Very obviously we can get the same sort of a result by running the plate impedance of the tube *up* instead of running the primary impedance of the transformer *down*. This means that we can make a peaked amplifier of an ordinary broadcast amplifier by simply putting in tubes with high plate impedance, such as the Daven "High-Mu" tube. When using a detector and two stages of audio amplification the detector may be left alone and the first audio tube exchanged

1000-CYCLE TRANSFORMER DEVELOPED AND MARKETED BY ELECTRICAL RESEARCH LABORATORIES OF CHICAGO AT THE SUGGESTION OF *QST*

The fixed condenser regularly supplied is shown in place but a variable condenser may be used to shift the peak.

for a high mu tube, leaving a normal tube (UX-201-A for instance) in the last audio socket so as to fit the impedance of the phones. Whenever the flat amplifier is wanted again one replaces the UX-201-A in the first amplifier socket where it was originally. With a detector and one stage of audio it is a little harder to get the same results. Depending on the receiver, a high-mu tube may — or may not — work in the detector socket. Depending on the phones, the tone at which best amplification occurs

may—or may not—be the same one at which the amplifier transformer is in resonance. It is best to replace one tube at a time and then try the fourth combination, i. e. with high-mu tubes in both sockets. This arrangement has no tendency to put tails on the dots and dashes and the amplification is often *greater* at the resonance frequency than it was with ordinary tubes. This idea was suggested by Mr. J. C. Warner, of the Research Laboratory of the General Electric Co.

Tuned Shunt Feed

Another scheme for getting a peak with ordinary equipment is shown in Fig. 6. Here the amplifier is shunt fed thru a tuned choke. Let us say that the system LC_1 is tuned to 600 cycles. When the beat note of a received signal is set at 600 cycles this LC circuit acts as a "rejector" (because of parallel resonance) and the 600 cycle A.C. is impressed on the transformer primary P, thence repeated thru the rest of the amplifier. If a 400-cycle tone comes thru, it will not encounter much reactance from LC as the tuning of that circuit is fairly sharp, therefore the 400-cycle frequency will mainly "fall thru the B-battery" and will not have much effect on the

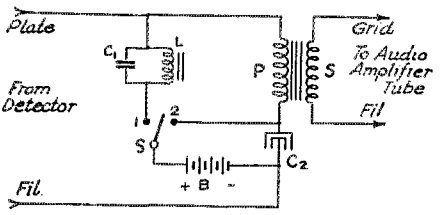


FIG. 6

SHUNT-FEED SCHEME FOR CONVERTING FLAT AMPLIFIER TO PEAKED AMPLIFIER.

The circuit CL1 is tuned to the pitch that is to be amplified. When switch S is on point 1 the amplifier is fed thru the tuned choke and operates with a peak. When the switch is on point 2 the amplifier operates in the usual way with a flat curve and the stopping condenser C2 becomes simply a B-battery by-pass.

C2 should be very large—at least 1 microfarad and as much larger as possible. 10 microfarads is not at all too much.

The LC1 circuit may be made up in various ways for instance; 1000 turn honeycomb coil shunted by a .5 microfarad condenser, 1500 turn honeycomb coil shunted by a .2 microfarad condenser. If the tuning is too sharp a small iron-core inductance may be used. The value is seldom known exactly and the correct shunt condenser must be found by trial.

amplifier transformer primary. The main advantage of this arrangement is that it can be applied to one stage of a flat amplifying system and can be cut out at any time by working a cam-switch or jack-switch, without even the delay of changing tubes. The tuning of LC_1 can be made of a sharpness that happens to suit the fancy of the user, but a fairly large portion of the energy will be lost unless the condenser C_1 is of good design. Ordinary paper telephone condensers are hardly good enough. It is hard to tell the good ones from the bad ones except by trial. Mica is the real thing—if you can afford it. This scheme was suggested by L. W. Hatry of the Hartford Times Radio department. Its operation is about the most pleasant of the plans suggested here because (at least to me) it is a very great advantage to be able to go *instantly* from one type of amplifier to the other. The use of the high-mu tube gives more amplification though—in fact it is evident that even the peak of the Hatry system must be a bit below the normal transformer curve while the Warner scheme puts the peak a bit above the normal curve.

Let us know what you make of these things and how well they seem to fit into short wave C.W. work.

Rules of the A.R.R.L. Information Service

1—Before writing, search your files of *QST*. You will probably find the answer there.

2—Do not ask for comparisons between advertised products.

3—Be reasonable in the number and kind of questions you ask.

4—Put questions in the following form:

A—A *standard business size* (not freak correspondence size) stamped, self-addressed envelope must be enclosed.

B—Write with typewriter or ink on one side of sheet only.

C—Make diagrams on separate sheet and fasten all sheets together.

D—Number each paragraph and put only one question in a paragraph.

E—Keep a copy of your letter and your diagrams.

F—Put your name and address on each sheet. *We cannot spend time digging your address out of the callbook.*

G—Address all questions to Information Service, American Radio Relay League, 1711 Park Street, Hartford, Connecticut.

Strays

The Great Lakes Naval Station NAJ has discontinued transmission with the 30-K. W. arc set on long waves. All traffic is now handled on a small tube set operating on 34 meters. This is the first of the Naval stations to rely solely on short waves for all communications.

One fellow hung a "jumbo" A. R. R. L. emblem on the top of his mast. The neighboring B. C. L.'s think it is a license to broadcast.

How Antennaz Shirk

The Most Amazing Revelation in Radio Chronicles, by the Former Secretary of the Berkshire Brasspounders

THE Berkshire Brasspounders met at 1CLN's combination chicken coop and radio station to discuss the question of "Antennaz", at the request of the Technical Editor. When that man wants to know something he comes to the right place.

Ray Boize of 1OM spoke while the pounders were getting comfortably buried in two feet of fresh straw. It was Ray's only chance.

"Well, boys, I spread out the wires in my sky hook and increased my radiation nearly an amp. If I don't get out better—"

"Hold on", interrupted Thomas Tomascus of 1XU, stuffing straw down 1OM's throat, "why didn't you make it like mine while you were at it and have it perfect? My counterpoise is the exact duplicate of the antenna. This perfect balance together—."

"Hey you birds", chirped Mite Needham of 1AXH, "can't any of you remember to say ANTENNA CURRENT instead of RADIATION? If antenna current represented power, some of you fellows would be putting 100 watts into the set and getting enough antenna power to run a Lincoln Light Four."

Several shifted uneasily in the straw but Red. I Snitch of 1AMS managed to open his mouth first. "I can prove," said Red, "that the less antenna current you have the better you get out. My current was 2 amps and after I raised the antenna 40 feet it dropped to 1½ amps, but just the same I get out better."

This puzzled the gang.

Lily White of 1ARF then gave an eloquent appeal for *no* antenna current, but has asked that we omit this because he has since found out that his meter was at the antinode.

(We will here omit most of Bub's paper for lack of space.—Tech. Ed.)

Then arose Professor Utell. M. Whichisvitch.

"These antenna current arguments," said the professor, "are getting us nowhere. Let us talk about the actual process of radiation. A series of 439 measurements of field strength at a distance of 6 wavelengths from my station has been made. During this time the antenna was changed, taken down or blown down, 136 times. I have now proved conclusively that the steepness of the wavefront at a given frequency is a function of the vertical dimension of the displaced dielectric, times the amount of dielectric displacement. This latter is affected by 47 variables of which 14 are under control."

The professor paused to see if this was soaking in. It wasn't but that made no difference.

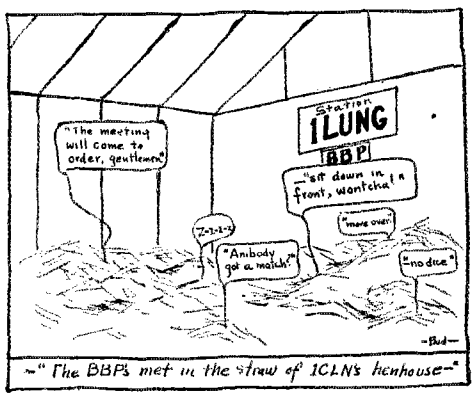
"Now then—these 14 factors are so related that when we have one right the others are all wrong. For instance we know that a high ratio of counterpoise capacity to antenna capacity tends toward the production of maximum voltage surge at the free end of the antenna. If we try to apply this principle in practice we will find the nodal point out under the crab-apple tree and the antenna current in the chandelier."

By this time three of the pounders were asleep, two were shooting craps on a hen's nest and 1CEK was trying to sell a fifty watter to 1VC for two dollars. 1VC was refusing obstinately for fear he might be getting one of his own back again.

"Gentlemen!" screamed the professor. "Listen to me! I am about to explain how 99% of this energy is wasted in a process of ether-shaking."

The three woke up, 1VC bought the tube in the excitement and the bones rolled down into the straw.

"The dielectric between the antenna and the ground contains countless electrons in



—"The BBP's met in the straw of 1CLN's henhouse—"

elastic suspension. When oscillations are present these electrons are all set into violent motion. Their number is countless—as I have said—let us count them. In a cubic centimeter of the atmosphere, during midnight in November, and at an elevation of 1000 feet above sea level, when the temperature is sevent—."

Here the professor reached into the feed box for a piece of charcoal to be used in

figuring on the whitewashed wall. His spectacles fell of and—

"They ought to stay on"—sneered a heavy voice—"your nose is big enough."

There in the door stood Poory Seever, the man who started that last petition to the Radio Supervisor. He looked back over his shoulder and yelled—

"All right! Let's goooo!"

The shanty rocked and groaned, the sides separated from the foundation and dozens of dusky forms swarmed in on us.

My memory is hazy from this point on. There was a struggling mass of cackling chickens and cursing humanity—fists and feathers flew. I was nearing the top of the hundred foot mast with Poory close behind when I caught my toe and dove off into space. With a wing-like motion of my arms I flew toward a nearby cloud where another angel lay basking in the sunlight.

"Maggie!" I cried in recognition.

Yes—it was Maggie my very first 5-watt bottle. As I gazed into her pale face I wished that we were starting all over again in this greatest home and health wrecking hobby of amateur radio. What a thrill when we had first raised 2BM less than 50 miles away. What another thrill when (with increased voltage) we first were QSA at Canadian 1EF. Then with ever increasing work on Maggie's part, we kept reaching out further and further until that glorious morning when, with Maggie's supreme effort (and 2000 volts) we woke British 6LJ from a sound sleep and Maggie became a martyr.

"Come back to me Maggie, I'll never treat you like that again."

"I gave my life for you willingly," she said, "but I hadn't been dead an hour before you married a fifty watter."

"Maggie—come back to me and together we will smash every bottle in the shack. Can't you believe in me?"

Then she melted. Throwing her arms around me she said, "Yes Bub, I believe in you but I cannot go back—but cheer up. At your present sleepless pace it will not be long until there will be another black rectangle in *QST* and you will be with me where there are no fading signals, no bad fists, and no complaining neighbors. You will be in the Ham's paradise."

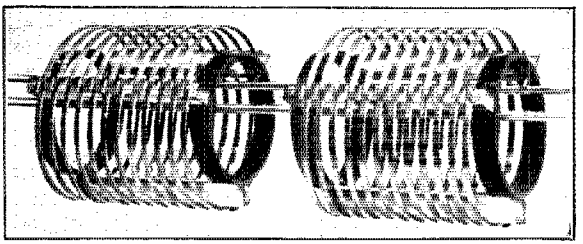
Someone else can be Secretary of the Berkshire Brasspounders after this. I'm through.

—*Bub McGut, 1ARE.*

Lower-Loss Inductances

THE flatwise wound inductance is becoming more and more popular both in commercial and amateur circles, and there *is* a reason. The main point of apparent superiority of the flatwise inductance over the edgewise wound type lies in the fact that the former has a much lower distributed capacity. This in turn makes it much easier to change clips to get the best efficiency without knocking the wavelength helter-skelter. It also allows one to use a shunt capacity across a portion of the coil for all wavelengths, making the shunt capacity lumped instead of having to rely upon the distributed capacity to furnish coil tube, and lead capacity to furnish the necessary circuit capacity.

The pretty coils shown in the illustration are wound on *glass* spacers with strip a quarter of an inch wide, spaced a quarter of an inch. The end rings are of bakelite. The primary and secondary coils are furnished with glass "coupling rods" provided with mounting ends. Primary and secondary coils have the same number of turns.



The coils are supplied for 20-meter operation and even on this wave the shunt condenser can still be used. The 20-meter coils are 3 inches in diameter and contain 11 turns. For 40 and 80-meter work the coils are 5 inches in diameter, 40 meters being hit with a small shunt capacity across part of the coil and 80 meters with a larger capacity. When it comes to the 150 to 200-meter band two primary coils are provided. These should be connected in series. If one desires to go up to 200 meters with the same coil that is used for 80-meter work, a shunt condenser around 1,000 μμfd. will turn the trick.

The primary coils are supplied with five clips that are easily attached and that stay *put*. The secondary has two. Altogether one of the prettiest jobs we have seen in a long time. The Radio Engineering Labs. of New York City make 'em.

—*J. M. C.*

Amateur Wavechangers

By J. K. Clapp*

The band system of amateur wavelengths assignment calls for a transmitter that can jump rapidly from one band to another and still be sure where it will light.
With such a transmitter one can make full use of the duplex reception system described last month. Tech Ed.

THE problem of developing a satisfactory wavechanging arrangement for amateur transmitters is a difficult one, involving, as it does, the maintenance of high transmitter efficiency at all of the wavelengths used, accompanied by the demand for a minimum of equipment and consequent expense. None of the methods here discussed can be considered as a wholly workable solution of the problem: it is hoped, however, that other experimenters may expand and develop them to a point where it will be possible for

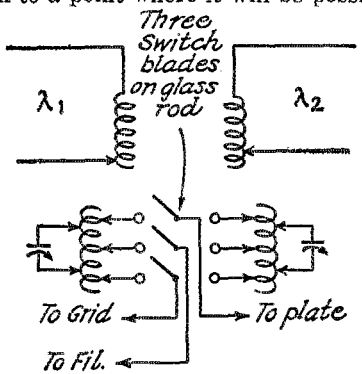


FIG. 1

Two primary circuits and two antennas, but the same tube. Antenna series condensers may be used, of course.

every up-to-date amateur to install wavechanging equipment for operation in at least two of the amateur bands.

The Possibilities

In a general way, the subject may be divided into three main parts as follows: the classification is based upon the amount of equipment which is duplicated in providing for transmission on additional wavelengths:

I. Separate transmitters, complete.

II. a. Separate antennas and primary circuits but same tube.

b. Separate antennas but same primary circuit and tube.

III. a. Same set all thru, returning each time wave is changed.

b. Ditto, applied to loop transmitters.

Now before considering the actual circuit arrangements, let us briefly go over the factors concerning each of these classifications: In the case I: the cost of equipment is prohibitive. Separate transmitters can only be maintained by the fortunate amateur or by reasonably well-equipped laboratories. Under IIa we find a possible solution, since the cost of antenna circuit, tuning coils and tuning condensers, even for transmitters, is not so far out of the reach of the average transmitting amateur. Here, the same tube and power supply is used for transmission on each wavelength. By a suitable arrangement of switching, it should be possible to cut over from one wavelength to another, carrying along the proper operating adjustments for the tube, and the proper tuning for the wavelength desired and for the best output, without the necessity of making any adjustments whatever other than throwing the change-over switch. This represents a highly desirable condition, in that the station will be heard at either one of two wavelengths (or more if desired) but always at the same ones.

Under IIb we have a fair possibility, but one which does not give the positive operation of IIa. We provide separate antenna circuits for each wavelength, as well as

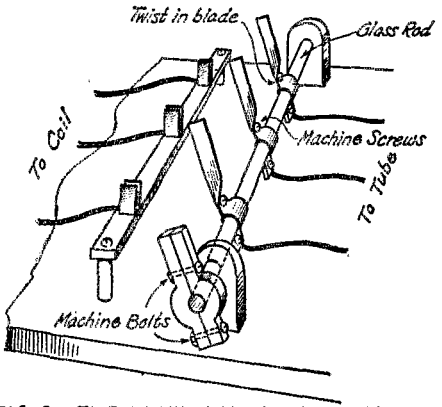


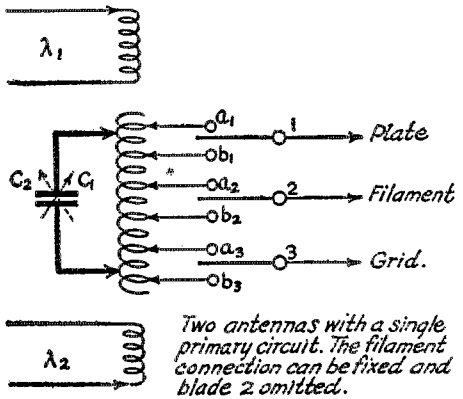
FIG. 2 THE WAVE-CHANGING SWITCH

suitable tube adjustments, but have to readjust the primary circuit condenser in changing from one wavelength to another. Even with a vernier dial, careful setting to a scale mark will not land the transmitter

* Instructor in Communications, Electrical Engineering Dept., 4-209, Mass. Inst. of Technology, Cambridge, Mass.

at the same operating wavelength for each change to that wavelength. True, with careful adjustment, the variations will be small, so that the variability of transmitter frequency may become an unimportant factor; but the change takes more time than with the arrangement IIa.

Finally we come to the last classification, part (a) of which is now used by practically every amateur station. The same equipment, throughout, is used on each wavelength; the time required to change wavelength varies between half a minute and *three weeks*, depending upon the skill of the operator and upon his satisfaction concerning the results obtained on the new wavelength as compared with the last. The inpracticability of adjusting to the same wavelength two times running, the time required to make a shift even is one wavelength band, let alone from one band to another, and the eternal tendency to "fiddle" for the last and final adjustment, make this



Two antennas with a single primary circuit. The filament connection can be fixed and blade 2 omitted.

FIG. 3

method unsatisfactory in actual operation, save in a very few and exceptional cases.

Loop transmitters appear to be used but little by amateurs, though they are eminently suitable for certain types of work. It is possible in the case of a loop transmitter to change wavelength by means of a single pole single throw switch, and an additional tuning condenser, all other adjustments remaining fixed. Operation in any adjacent bands, from twenty meters upward is thus easily handled.

Two Primaries and Two Antennas

In Figure 1 is shown the hook-up for two wavelengths, utilizing an inductively coupled Hartley circuit transmitter. Details of the filament and plate supplies are omitted. Separate antenna circuits are provided, each with its tuning coil; separate main tuning coils are used, with separate tuning condensers, L1, C1 and L2, C2. Between the coils L2 and L1 is mounted a three pole double throw switch, which may easily be rigged up by the amateur. The switch (Fig. 2) is a "five-and-ten" glass towel rod, on which are clamped three switch arms approximately two inches long made of light brass or copper straps, about ⅜ by 1/16 inch. The stationary switch contacts may be of the usual spring type, mounted on individual pillar insulators, or carried on a single strip of hard rubber. The distances between the switch arms should be several inches, three to five inches seem satisfactory. The arrangement of apparatus indicated in the figure may well be used where the equipment is mounted "breadboard" fashion. Each station owner has his own ideas on this question, so that details will here be omitted.

In arranging the equipment for operation say at 20 and 40 meters, place the switch in such a position that the length of the leads on the twenty meter side is as small as it is possible to make it; an inch or so on the leads to the tube on the 40 meter side will have but little effect. If desired, the vacuum tube may be elevated from the baseboard, the switch rod placed vertically, parallel with the axis of the tube, and very close to the tube, with the result that the length of the leads with the wavechange switch in position may be no more than when no switch is used.

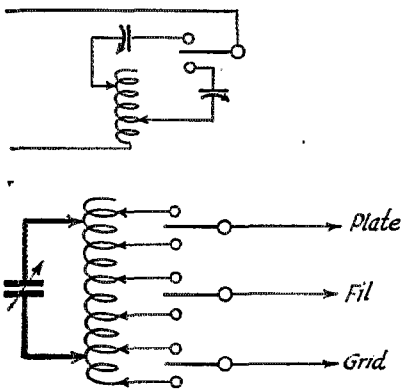
With the switch in one position we proceed to tune the circuit as we normally do, —spending anywhere from an hour to several weeks in getting it "just right." Having once attained that final and most wonderful adjustment, we may throw the wavechange switch to the opposite side, and proceed to do the adjusting all over again, but on another wavelength. In the meantime, if it is desired to use the transmitter on the first wavelength, throwing the switch back again puts everything into A-1 shape for the first wavelength. As long as operation is contemplated in different wave bands there will be little likelihood of much interaction between the two tuned circuits. There is no reason why a careful check with an idle receiver cannot be made to keep from adjusting one of the wavelengths to an exact multiple of the other, so that the second harmonic of the 40 meter side, for example, will not fall on the fundamental of the 20 meter side. In allowing for, or hunting for, reaction between the circuits, it must be remembered that the wavelength of the idle side is much less without the tube connected than when the tube is connected.

One Primary and Two Antennas

Now as to the possibilities under IIb. Here a double pole double throw switch may be used, for the coupling between the tuned circuits caused by a common filament lead will not bother us,—as we have only one primary

circuit. The antenna coils may be placed at either end of the primary inductance as shown in Fig. 3. One of the antennas is to be used for one wavelength, the other for the second wavelength. The problem now reducess to that of so tuning the primary oscillating circuit, with regard for the position of the tube clips, that the two wavelength desired may be obtained *without changing the position of the condenser clips.* It has been found unsatisfactory to provide switching contacts in the main primary oscillating circuit (indicated by the heavy lines) because of the introduction of a relatively high variable resistance. For operation on two wavelengths within a given band, the adjustments are easily arrived at; but for operation in adjacent wave bands much "cut and try" will be necessary. A ratio of approximately two-to-one in wavelength may be obtained, with good output from the tube, if one is patient enough. It is somewhat easier to start with the shorter wavelength and adjust so that the tuning condenser is at approximately one quarter of its maximum capacity. With the switch on the a contacts adjust the position of the clips until satisfactory operation is obtained on this wavelength.

Having adjusted for the shorter wavelength, throw the switch to the b contacts and bring the primary condenser to approximately full capacity. The range of adjust-



SAME SET CLEAR THRU
FIG. 4

ments is now limited to the positions of the clips "b-1" and "b-3," with only slight variations, relatively, in the value of the tuning condenser capacity. To change wavelength it is now necessary to change the position of the switch and to place the tuning condenser on one of two definite settings. There will be little likelihood of reaction of the idle antenna system on the active one, unless it happens to be tuned to a multiple of the wavelength in use. At the short wavelengths now commonly used such a condition would be reached only by chance, and is easily prevented by tuning either of the systems to a very slightly different wavelength.

From the viewpoint of time required to make the shift, and also as regards the accuracy with which it is possible to return to a given wavelength, this method is not as good as the one described above. However, it requires but little equipment, and would bring a great improvement into amateur operating if it were widely used.

Case IIIa only requires the addition of switch contact in the antenna circuit is in

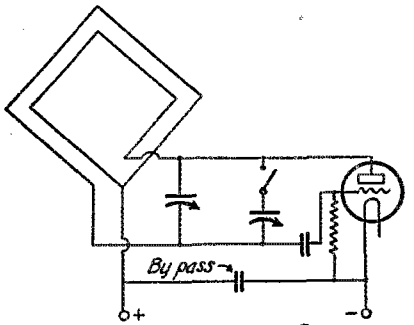


FIG. 5

Fig. 4. This practice meets with the same objections as were mentioned for placing the contact in the main primary oscillatory circuit, but has the advantage that the effect of the contact resistance is less pronounced, owing to the relatively higher resistance of the antenna circuit.

This arrangement does not give very good efficiency, for if the antenna system is made as large as possible for operation on the shorter wavelength (fundamental operation only is considered) then it is necessary to use a relatively large number of turns in the antenna coil for operation at approximately double the wavelength, which will be the condition for operation in adjacent bands, 20 meters and above.[1]

The method of Fig. 3, utilizing separate antenna systems makes it possible to use large structures, with minimum loading for each of the wavelengths.

Loops

A special case of wave changing is found when a loop transmitter is employed. By placing the tuning condenser in the position to give the shorter wavelength desired, the longer wavelength may be obtained by adding a second tuning condenser in parallel to the first by means of a single pole, single throw switch, as shown in Figure 5.

1—A way out of this difficulty is suggested in a short article appearing in an early issue (possibly this one) under the title "Choosing the Transmitting Antenna."—Tech Ed.

Experimenters' Section Report

BY the time this reaches the hands of the members a number of the new outlines will have been mailed. It is now possible to put some time into the work of this section and the first job has been to go through the card files in detail, weeding out the problems that have become "dead wood". We are now, for the first time, in a position to go ahead actively and to make some of our ancient plans turn into facts.

Each member of the Section has received a form to be used in bringing his enrollment up to date. Accompanying this is a "membership increase" form to be used in adding more men. We have been unable to do this previously because we were unable to serve the existing membership well enough.

Our Aims

Again—we do not pretend that this Section will undertake large problems; our purpose is mainly to provide contact with men working on the same problem, so that all may work more effectively and with more pleasure and profit. This end may be secured by following the tabulated list below.

A—Lists of members and problems they are working on.
The list is revised at intervals and goes to all members. This enables members to establish radio or correspondence touch with others working at the same problem.

B—Correspondence from this office supplementing the list.

C—Information on problems given by letter from this office, wherever we are able to supply it directly or indirectly.

D—Outlines suggesting the way of attacking problems.
These are furnished only on the problems for which the member is enrolled. Otherwise the cost would be excessive.

E—Publication of results in the shape of *QST* articles.
Much of this has been done the past 18 months.

The Micromicrofarad Again

The discussion of the possible improvement of the awkward term "mircomicrofarad" has taken a humorus quirk. It has been suggested by several people that *QST* is in danger of revising electrical terms on its own account. This is rather funny, we couldn't do it if we tried—and we have not the least intention of trying. The making and changing of electrical terms is in the hands of the national engineering societies and the inter-society committee on standardization. Such a complex arrangement moves very slowly. It can be helped by suggestions and information—and that is what *QST* is collecting. Nothing has been said, done, or thought, to suggest that we are in any way inclined to usurp the position of the A.I.E.E. and the I.R.E., of which organization several of us at H.Q. are members. The present writer is, in fact, working on the membership committee of I.R.E. and has the profoundest respect for A.I.E.E.

—*R. S. K.*

An Excellent Tuner Chart

Mr. R. H. Barclay, to be addressed at 194 Crafts St., Newtonville, Mass. has devised a particularly convenient curve-sheet for the design of tuners covering the range of wavelengths from 25 to 1800 meters. The chart considers coil diameter, spacing of turns, etc., completely. All "calculations" are made by the use of a straight-edge. Standard V.C. sizes are shown directly and others can be inserted easily. Inductances can be read directly and by a little extra arithmetic distributed capacities can be found from the coil chart and wavemeter readings. The chart is well printed, on good paper, on a good scale and sells for 50c. It is a labor-saver.

—*R. S. K.*

The South Schenectady Tests

By C. J. Young*

WITH the active co-operation of amateur radio experimenters in this country and abroad, the radio engineers of the General Electric Company are conducting a comprehensive and exhaustive investigation of transmission phenomena.

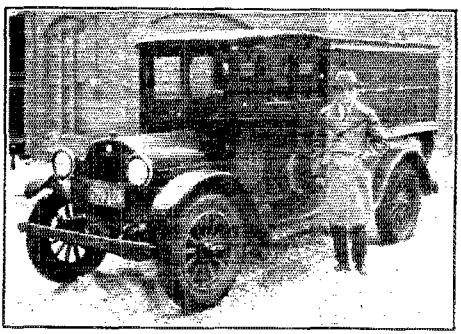
For several months a great volume of data has been accumulated on radio transmission, both code and broadcast, on a variety of wavelengths, on variable amounts of power and under widely different conditions. Much work remains to be done but it is confidently believed that an analysis of this data will lead to a solution of much that is now unknown, confirm or disprove some things now accepted as theory and enable the engineer to forecast transmission under all conditions.

Experimental transmitter work, except in field of observation, is beyond the scope of the amateur and the average individual experimenter, because of the space and equipment required and the almost prohibitive cost of establishing and maintaining a great laboratory. The General Electric Company, with its existing facilities for

* Radio Engineering Labs., General Electric Co., Schenectady, N. Y.

research has already appropriated a great deal for thorough investigation of radio transmission.

As part of this investigation the company has equipped a 54-acre laboratory on which several transmitters and a variety of antenna structures have been erected. Hand in hand with the men who are working on the design and testing of transmitters and antenna systems are the field observers who are collecting data on transmission. Associated with those working out of Schenectady are many volunteer observers located throughout the United States and in countries abroad. The assistance of these men is enlisted solely because they are interested in radio and because they recognize in the research of the General



THE SPECIALLY EQUIPPED REO SPEED WAGON USED TO CARRY THE FIELD APPARATUS AND TWO OBSERVERS.

Special light springs and snubbers were used.

Electric Company a great forward-looking work which must advance the science.

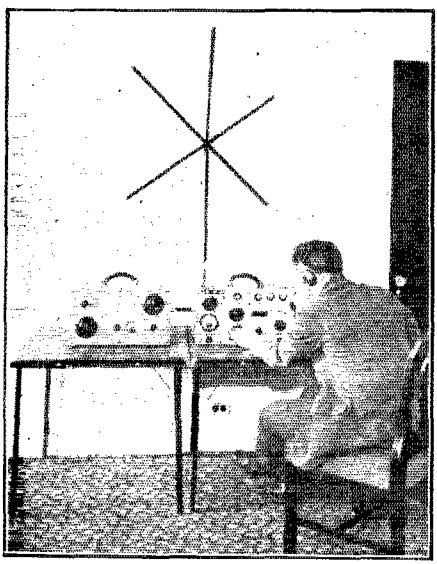
Over a period of several months a crew of two engineers has worked out of Schenectady in four directions, north, east, south and west and as they traveled with receiving and measuring instruments installed on a truck, they recorded observations on the propogation of radio waves on the following wavelengths and power: 15 meters, 600 watts; 20 meters, 600 watts; 41.9 meters, 1000 watts; 80 meters, 3000 watts; 109 meters, 5000 watts, 214 meters, 5000 watts; 379.5 meters, 5000 watts and 1560 meters, 20,000 watts. The western trip took the crew to Buffalo, 235 miles. The men traveled north as far as Canton, N. Y., a distance of 135 miles. The third journey to the east was made to Boston, approximately 153 miles from Schenectady. The last trip, recently concluded, took them to Jacksonville, Fla., a distance of 1000 miles south, and the return trip was made via boat. Transmitters working on 15, 20, 80, and 214 meters were used on code only. The observers were M. L. Prescott and L. M. Grow.

In addition to the work of Messrs. Prescott and Grow, special observations were made by A. H. Turner, of the General Engineering Laboratory of the General Electric Company. Mr. Turner made a trip to Panama and returned on a Grace Company vessel. He carried the same equipment used by the land observers.

A great many independent investigators and radio experimenters have volunteered their assistance to the General Electric Company and they have already contributed much to the increasingly large mass of information. KGO and KOA, the Oakland, California and Denver, Colo., stations respectively, have made frequent measurements on the signals of the Schenectady transmitters, and stations of the Radio Corporation of America in this country, France, Buenos Aires and Hawaii have been heard from, as well as listeners in New Zealand.

The thoroughness with which the General Electric Company's investigation of wave propogation is being made is illustrated in the equipment carried by the roving observers.

On the first three trips, that is; those to Buffalo,. Canton and Boston, transmis-

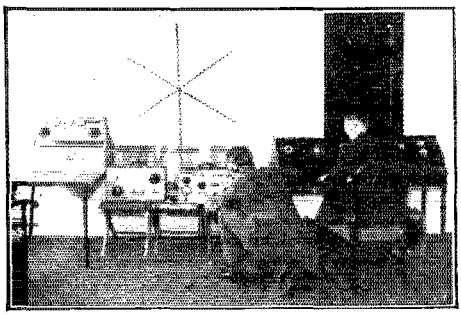


THE 220 TO 550 METER FIELD SET IN OPERATION.

This set-up is typical of those made in various hotels along the Atlantic seaboard.

sion schedules were maintained only on 41.9, 109, 379.5 and 1560 meters. For observing these frequencies it was found advantageous to employ an individual receiver for each band, as this permitted the making of simultaneous observations on two or more frequencies. With this objective in view, and since a portable field strength meter

capable of covering the necessary range was available, four receivers were constructed so as to make one adaptable to each wavelength range. These were superheterodynes of the Radiola 28 type, specially modified for portable usage by being built in small cabinets. An external battery box, connected to the receiver by a three foot length of flexible cable, contained the necessary A. B. and C- battery supply. Loop reception was used exclusively. These arrangements facilitated the making of quick set-ups when necessity demanded; in fact, it was demonstrated on several occa-



THE UNIVERSAL FIELD INTENSITY SET IN A HOTEL ROOM.

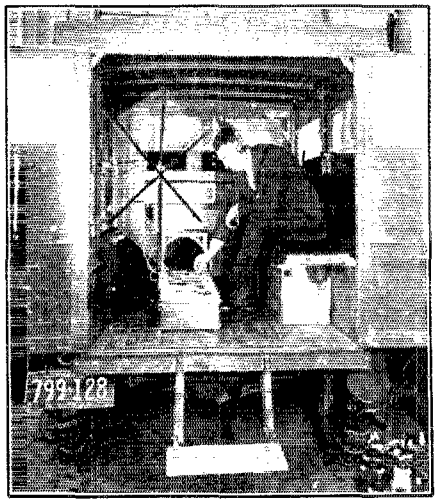
At the right is the Universal superheterodyne, next to the left is the field intensity set and at the left is the 50 watt transmitter used to keep in touch with South Schenectady.

sions that a receiver could be unpacked and put in operation within five or six minutes.

A fifty watt transmitter provided a means of communicating with the South Schenectady plant. No unusual features are incorporated in its construction. An "X" license permitted the observers to use any desired wavelength but certain factors made it necessary to stay within the limit of 35 to 90 meters. In order to insure against difficulties that might arise due to "skip distance," 80 meters was used for short distance work. When it was desired to work greater distances 37 meters was employed with very satisfactory results during the daytime and the early evening hours. After about 9 p. m. the signal usually became too weak to be copied through the heavy QRM that is ever present at the South Schenectady plant. In this way it was possible to keep informed from day to day of any changes made in the transmission schedule and of special tests that were to be run. At the beginning of the third trip some additional apparatus was included and, in order to make room for this equipment, it was found that the transmitter would have to be left behind. Later, it was found that a QST sent out each day served nearly as well in keeping the men posted regarding changes in schedules.

As these road trips extended over a period of almost four months, when the General Engineering Laboratory was constantly developing and improving equipment, the observer found it essential at the beginning of the fourth trip to replace the old equipment with new and more suitable apparatus. Accordingly, the four super heterodynes were discarded and a universal super heterodyne capable of tuning from 14.7 to 1650 meters was used. This receiver, known as the Type Y-1 was designed for the sole purpose of receiving signals transmitted by the developmental stations of the General Electric Company at South Schenectady. It consists of two separate and distinct units, each self-contained in a mahogany cabinet. The tuning unit contains interchangeable tuning coils (six antenna and five oscillator) the signal frequency oscillator, and the intermediate frequency oscillator which is used for producing a beat note for the reception of C. W. signals. A battery operated "clicker" device also contained in this cabinet provides a means for checking the over-all sensitivity of the receiver so that possible errors arising from this source can either be compensated for or entirely overcome. A ground connection and a short indoor antenna provide sufficient pickup for "DX" reception. The modified Radiola 28 shown on the right and connected to the tuning unit by flexible leads serves only as an amplifier of intermediate and audio frequencies.

It may seem that this arrangement is somewhat complicated and difficult to op-



EMERGENCY RECEIVING TEST IN THE TRUCK WHEN NO OTHER LOCATION COULD BE FOUND.

erate, but in reality operation is quite simple. For example, assume that it is

desired to measure the field strength of a 41.9 meter signal. Phones are inserted in the second stage jack of the modified Radiola 28, two tuning coils covering the desired wavelength are placed in their respective sockets and the wavelength chart consulted to determine the dial settings at this particular frequency. The filaments are then adjusted to their correct values by means of voltmeters. Before tuning in the signal the sensitivity of the set should be checked by means of the clicker in order to insure operation at normal conditions. After the signal has been brought in satisfactorily, the output or volume contral tube voltage is then lowered until the threshold audibility (when the signal is just audible) is reached. This voltage is then recorded and from it a definite inverse relation to field intensity can be obtained.

Most of the field strength measurements on WGY were made with the field intensity meter. With this rather elaborate piece of apparatus quite accurate measurements are possible over the band from 220 to 550 meters. A collapsible loop, snap-on panel covers, and leather carrying handles made this set particularly adapted for portable use.

Investigations evidenced many of the same puzzling phenomena surrounding high frequency transmission, that other experimenters have noticed during the past two years. The considerable amount of data has not been thoroughly analyzed, but in general it appears to confirm recent theories that have been advanced after making certain reasonable assumptions as to the number and distribution of the free electrons in the upper atmosphere, from which a calculation of the path taken by the radio wave has been made. In this way "skip-distances" and the ability of a low powered transmitter to send over enormous distances can be accounted for and perhaps predetermined to a first approximation.

As an example of the peculiarities of short wave transmission, the experience obtained with a 20 meter 500 watt transmitter may be described. Here the signal rapidly decreased as the observers left the transmitter and reached its lower useful limit at 9 miles. The men now continued from the transmitter and the signal remained out until 400 miles was reached, when it came in strong again. Continuing to a greater distance a gradual falling off in intensity was recorded but this was so slight that the signal was still quite strong at 2500 miles. This case applies to the reception made during a winter day along a north and south direction. In this instance a skip distance of 400 miles was noted. Meager experimental data seems to point out that this distance is a minimum in the middle of the day and a maximum on a winter night, the summer night value being somewhat less than the winter night skip. The data seems to verify the statement that the skip distance for a given time of day or night decreases with increasing wavelength.

Severe fading on all of the shorter wave lengths may be expected. It has not been definitely determined if this phenomenon is a function of the frequency, but observations indicate that such may be the case. Below about 60 meters fading will invariably be present during both day and night transmission unless the observer is within a few miles of the transmitter. Such factors as the power used, ground absorption, and the degree of ionization of the upper atmosphere probably play quite an important part in regulating the fading characteristics of a signal, but before any definite conclusions along this line can be made it will likely be necessary to secure additional experimental data.

This brief summary has not dealt with the wavelengths observed in the broadcast band and above. These were purposely omitted because it is believed that their characteristics are not of such great interest to the average amateur or experimenter.

SCHEDULES FOR QST

During the month of April the General Electric Company is conducting another series of short wave propagation tests and they are anxious to obtain the cooperation of a large number of the amateurs. To this end, log sheets will be distributed to those who feel they can assist fairly regularly and who will so notify the Radio Engineering Department of the General Electric Company at Schenectady.

The special transmissions will begin April 3 and end April 29. Two 24 hour schedules will be run each week: from Wednesday to Thursday noon, and from Saturday to Sunday noon. The first four schedules are as follows:

April 3-4 Sat. and Sun.

2XAW	600 Watts	15	meters or 20000 KC Self Excited
2XAD	1 KW	26.4	meters or 11370 KC Crystal Controlled
2XAF	10 KW	32.79	meters or 9150 KC Crystal Controlled
2XAC	10 KW	50.2	meters or 5970 KC Self Excited
2XK	10 KW	65.5	meters or 4580 KC Crystal Controlled

April 7-8 Wed. and Thur.

Same as for April 3-4.

April 10-11 Sat. and Sun.

Same as above except that 2XK will

operate on 109 meters or 2750 KC instead of 65.5 meters or 4580 KC.

There will also be changes in the types of antennas used which will be announced during the transmissions.

April 14-15 Wed. and Thurs.

Exactly the same as for April 10-11.

During the transmissions, the WGY programs will be broadcast during the times when they are regularly on the air on all waves except 15 and 50.2 meters, which are adapted for C. W. only. At other times I. C. W. will be used on 26.4, 32.79, and 65.5 meters. Transmission will be continuous, or during the first 20 minutes of each half hour when comparative tests are desired. Announcements of the details of each schedule and of further schedules during the month will be made on each wavelength every six hours beginning at 12:00, 6:00, etc.

Standard Frequency Schedules

THE frequencies in kilocycles indicated below (corresponding approximate wavelengths in parentheses) will be transmitted Friday nights from u1XM, the experimental station of the Massachusetts Institute of Technology Radio Society acting in co-operation with the M. I. T. Communications Laboratory.

We have received so many complaints of QRM that we will have to request all stations to QRX while we are sending the frequencies nearest to that on which they are working; it's only a few minutes, om, and if your meter is OK perhaps the other fellow's isn't.

All transmissions will be by unmodulated continuous wave telegraphy. This service will probably be discontinued for the summer May 28th The seven minutes of each transmission will be divided as follows:

3 minutes—QST QST QST u 1XM 1XM, 1XM, etc.

3 minutes—half-minute dashes broken by "1XM".

1 minute—Announcement of frequency being sent.

Since schedules will appear in *QST* the announcement of the "approximate next frequency to be sent" will hereafter be omitted.

Reports will be appreciated from all stations using this service whether the distance is large or small. Regular reports every week showing approximate audibility on each frequency are especially solicited, and after being entered on our records will be forwarded to the Experimenter's Section of the A.R.R.L. Drop your card to Standard Frequency Committee of u1XM, M.I.T. Radio Society, Cambridge, Mass., U. S. A.

u1XM Standard Frequency Schedules

TIME: Eastern Standard

Time (PM)	Schedule No. A	Schedule No. B	Schedule No. C
9:00— 9:07	16000 (18.7)	9000 (33.3)	16000 (18.7)
9:11— 9:18	15000 (20.0)	8750 (34.3)	15500 (19.3)
9:22— 9:29	14000 (21.4)	8500 (35.3)	15000 (20.0)
9:33— 9:40	8500 (35.3)	8250 (36.3)	14500 (20.7)
9:44— 9:51	8000 (37.5)	8000 (37.5)	14000 (21.4)
9:55—10:02	7500 (40.0)	7750 (38.7)	*5710* (52.5)
10:06—10:13	7000 (42.8)	7500 (40.0)	4000 (75.0)
10:17—10:24	6500 (46.1)	7250 (41.3)	*3900* (76.9)
10:28—10:35	4000 (75.0)	7000 (42.8)	3750 (80.0)
10:39—10:46	3750 (80.0)	6750 (44.4)	*3600* (83.3)
10:50—10:56	3500 (85.7)	6500 (46.1)	3500 (85.7)
11:05	A.R.R.L. OFFICIAL BROADCAST AT 7500 KC (40.0)		

Dates

Friday night, April 2nd, Schedule No. A
Friday night, April 9th, Schedule No. B
Friday night, April 16th, Schedule No. A
Friday night, April 23rd, Schedule No. C
Friday night, April 30th, Schedule No. A
Friday night, May 7th, Schedule No. B

u1XM To Transmit Standard Frequency Schedules For Australia and New Zealand

On three Sundays, April 18th and 25th and May 2nd, station u1XM will transmit Standard Frequency signals especially for points beyond the International Date Line from the United States where our usual weekly Friday night Standard Frequency schedules are probably inaudible on account of the intervening daylight. Through arrangements with *Radio* (Australia) and *New Zealand Wireless and Broadcast News* these schedules will be published in Australia and New Zealand, but are here given for the benefit of any others who may wish to use them.

Time— E.S.T.	G.M.T.	Time Sidney	Frequency	Characteristic Wave	Letter
5:30 AM	10:30 AM	8:30 PM	6500	46.1	A
5:45 AM	10:45 AM	8:45 PM	7000	42.6	B
6:00 AM	11:00 AM	9:00 PM	7500	40.0	C
6:15 AM	11:15 AM	9:15 PM	8000	37.5	D
6:30 AM	11:30 AM	9:30 PM	8500	35.3	F
6:45 AM	11:45 AM	9:45 PM	9000	33.3	G
7:00 AM	12:00 M	10:00 PM	12000	25.0	J
7:15 AM	12:15 PM	10:15 PM	14000	21.4	K
7:30 AM	12:30 PM	10:30 PM	16000	18.7	L

Each transmission will last for ten minutes, and then five minutes will intervene while the transmitter is being adjusted to the next frequency. Each ten-minute transmission period will be divided as follows:

3 minutes—QST QST QST u 1XM 1XM 1XM, etc.

7 minutes—Repetition of "characteristic letter" broken occasionally by "u1XM" and statement of frequency.

1XM apologizes for missing the Standard Frequency schedule of March 12th due to the simultaneous breakdown of three condensers on the Standard Frequency transmitter.

Some Low-Power Records

WINDOM of 8GZ-8ZG read the story of Colonel Foster's c9CK low power work, told in the January number of *QST*, and decided to go out and break a few of 9CK's records. He did—and although we haven't the slightest desire to start a scrap and we do not want to spend the rest of our days trying to figure up "miles per watt" we believe that he has set a few records that are hard to beat. He has done a lot of "high power miles per watt" over comparatively great distances, while most of the other fellows have been talking of miles per watt records where the communication was over a much shorter distance. It is comparatively simple to set up a small laboratory oscillator and accomplish a miles per watt record from one room to the next that is hard to beat. Do it over four or five thousand miles, and it is a horse of another color.

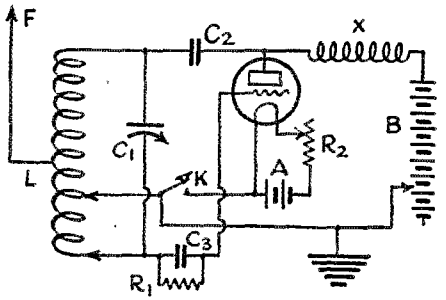


FIG. 1 THE LOW POWER CIRCUIT

L—8 turns of No. 5 wire, 4 inches in diameter.
C1—Homemade variable condenser, 23 plates, about 250 uufd.
C2—Plate blocking condenser, 2000 uufd.
C3—Grid condenser, 250 uufd.
R1—Two megohms.
R2—30 ohms.
X—Radio Frequency choke, 100 turns No. 26 d.c.c., 2½ inches in diameter.
B—Four small Burgess B battery blocks, 25 to 105 volts.
A—6 volt A battery.
F—R.F. feeder wire to antenna.

8GZ-ZG started out on low power with a UV-201-A tube operating in the circuit shown in Fig. 1 With 75 volts on the plate of the 201-A and 4 milliamperes plate current he had no trouble in working bz1AB,

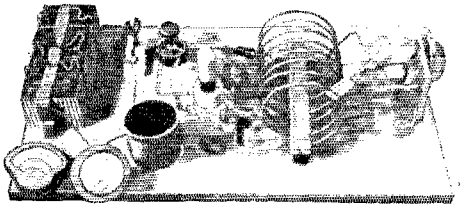


FIG. 2—THE TRANSMITTER, UV-199 IN PLACE

a5BG, oA4Z, KFUH, oA6N, a2CG, z2XA and all the U. S. Districts. Next, a WD-12 was substituted for the 201-A and with an input of .15 watt (half of what was normally used with the 201-A) the set continued to work in fine style, 9AVJ, 9ADO, 8ALY, 2CTQ, 9DTK, 8PL, and others closer being communicated with easily. Windom decided that it was too easy to work the gang with so much power, so a UV-199 was placed in the transmitter. With the 199 tube the DX work continued. With 75 volts on the plate, and a plate current of 5 milliamperes a number of "U" stations were worked and communication was carried on with a5BG, oA6N, and a2CG! *Ohio to Australia and South Africa on a UV-199!!*

The low power set is mounted on a maple base 24 x 14 inches. The inductance consists of 8 turns of No. 5 wire, the turns being 4 inches in diameter. The grid and plate leads are short and are of heavy brass strip. A 2,000 μμfd. blocking condenser and a 250 μμfd. grid condenser are used. The tuning condenser is a 23 plate, single bearing affair, insulated by means of a glass end-plate.

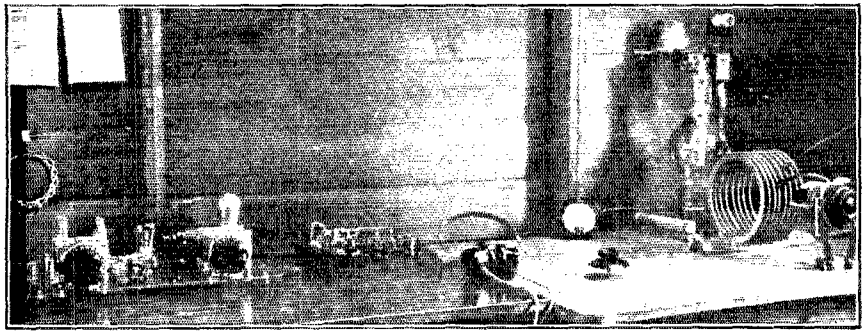


FIG.3—COMPLETE LAYOUT AT 8GZ-8ZG. BIG TRANSMITTER AT RIGHT

The R.F.C. consists of a 100 turn coil of No. 26 D.C.C. wire on a 2½ inch tube. Plate voltage is supplied by four small and ancient Burgess 22½ volt blocks, giving voltages from 25 to 105. Windom finds that the UV-199 has proven the best low power tube, giving a much better signal with less input. Every station who has worked "low power" 8GZ thinks the set crystal controlled. While some of the low-power work at 8GZ has been done after preliminary contact was secured by means of the 204 transmitter, much DX has been done with the UV199 alone.

The antenna at 8GZ is a Hertzian affair supported between two 70-foot drain-pipe masts. The masts are guyed by wires broken every 20 feet by porcelain egg in-

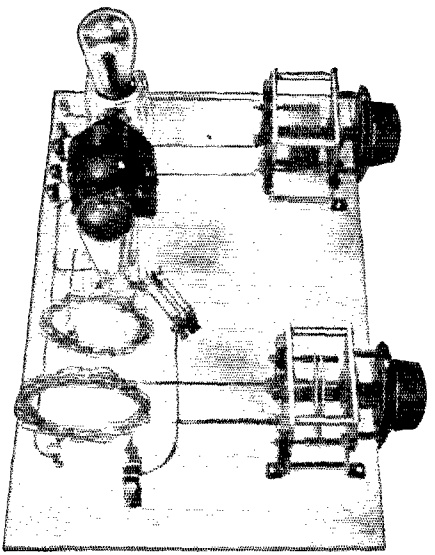


FIG. 4—THE 9 TO 125 METER RECEIVER

sulators. The mast at the station end is insulated from the ground and used as a receiving antenna.

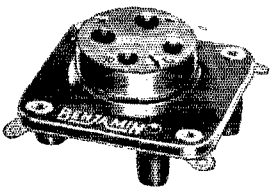
The activities of 8GZ are not confined to UV-199 transmission as a lot of us know. The big set (at the right of Fig. 3) uses a three year old UV-204 normally operated with an input of 550 watts. Most of the high power work has been in the 40-meter band, although 20 and 80 have been used occasionally. On 40 meters 464 out of a possible 514 foreign stations were worked during 1925. On 20 meters two-way daylight communication has been carried on with Brazil, England, France, Italy and Mexico while the 20-meter signals have been heard in Europe, Africa, South America, Asia, New Zealand, Hawaii and Australia.

The receiver at 8GZ is the "standard Schnell" type. The set is mounted on a glass base and the coils are of the "plug-in" type. The detector's base has been removed and the tube is mounted on four small binding posts which serve as terminals. The receiver covers all waves between 9 and 125 meters.

—*J. M. C.*

A Non-Microphonic Socket

IN oscillating receivers it is almost a necessity to use some form of socket that is spring-supported, and in non-oscillating receivers it is highly desirable to use this form of socket. Usually receiving sets become very noisy when the socket is bolted tightly to the sub-base. To obviate this difficulty the Benjamin Electric Company of Chicago has, for some time, had a spring-supported socket on the mar-



ket. The latest form of Benjamin socket is designed for use with *all* types of receiving tubes, both old and new, with the exception of the UV-199. Four springs support the socket, floating it above the sub-base. The springs make a side wiping contact with the tube pins. The contact springs, the "floating springs" and the soldering terminals are all in one piece, thereby eliminating any chance of a high resistance joint between these connections, and obviating the usual trouble of having the terminal binding post turn and work loose after a while. The socket is of moulded black bakelite and the metallic parts are heavily nickeled. A thoroughly satisfactory job.

Strays

8ZO's 100-watt fone pushes heart sobs to his Toledo Y. L. nearly every night. The local B. C. L.'s love to listen to it!

One fellow writing to us about Calls Heard says it is the *only* part of *QST* he reads. Honestly, gang, *QST* isn't that bad, is it?

9CAN also says that 9CXC holds the distinction of being the only ham to work Australia when the shack was full of visiting hams.

Communications Department Elections

AT the meeting of the Board of Directors of the A.R.R.L., held in Hartford, February 26-27, the Constitution and By-Laws of the League were amended. (Amendment 15, By-Laws 5, 6, 6A, 6B). A complete reorganization of the Traffic Department was authorized. On February 27, this Department became known as the Communications Department with a Communications Manager at League Headquarters, appointed by the Board.

The amendment provides changes that will somewhat reduce the time required for handling reports. Reports printed in *QST* will be more up-to-date. Fewer field officers will make possible better contact between the individual stations and Headquarters. The amendment provides that the operating territory of the League shall be apportioned into sections. The sectionalizing shall be determined by the Communications Manager and Director of each Division working together.

Section Communications Managers shall be elected by the members residing within each section. Their office shall be for a term of two years. These Section Communications Managers shall have authority over the Communications Department in their section. They shall be responsible to, and report to, the Communications Manager except in Canada where their report shall be sent to the Canadian General Manager.

Whenever a vacancy occurs in the position of Section Communications Manager, in any section of the United States, its island possessions or territories, or the Republic of Cuba, the Communications Manager shall announce such vacancy and call for nominating petitions signed by five or more members of the Section in which the vacancy exists, and naming a member of the Section as candidate for Section Communications Manager. The closing date for the receipt of such petitions shall be announced. After the closing date, the Communications Manager shall arrange for an election by mail. Ballots shall be sent to every member of the League residing in the Section concerned, listing the nominees in the order of the nominations received. The closing date for receiving ballots shall be announced. Immediately after this, the Communications Manager shall count the votes. The candidate receiving a plurality of votes shall become Section Communications Manager. The Canadian General Manager similarly shall manage such an election for a Section Communications Manager whenever a vacancy occurs in any section of the Dominion of Canada, Newfoundland or Labrador.

NOTICE

All A.R.R.L. members of the Atlantic, Central, Delta, Midwest, New England, Pacific (including Hawaii), Roanoke, Southeastern, (including Cuba, Porto Rico and the Isle of Pines) and West Gulf Division:

1. You are hereby notified that an election for A.R.R.L. Section Communications Managers for a two-year term of office is about to be held in each of the above Divisions in accordance with the Constitution.

2. The election will take place during the month of May and June on ballots which will be mailed from A.R.R.L. Headquarters. The ballots for each Section will list the names of all eligible candidates nominated for the position by A.R.R.L. members residing in the Section.

3. Nominating petitions are hereby solicited. Five or more members living in any Section have the privilege of nominating any member of the League in their Section as a candidate for Section Communications Manager. The following form for nomination is suggested:

Place
Date

Communications Manager,
A.R.R.L. Headquarters,
1711 Park St.,
Hartford, Conn.

We, the undersigned members of the A.R.R.L. residing in the .....Section of the ..... Division, hereby nominate ..... of ..... as candidate for Section Communications Manager for this Section for two years from the date of the close of the election.

(Signatures)

The signers must be League members in good standing. The nominee must be a League member in good standing. His complete name and address should be given. All such petitions must be filed at League Headquarters, Hartford, Conn., by noon of the 15th day of May, 1926. There is no limit on the number of petitions that may be filed, but no member shall sign more than one such petition.

4. The Sectionalizing of territory in the Divisions named is as follows: Atlantic Division (four sections):

Western New York—comprising St. Lawrence, Lewis, Oneida, Madison, Chenango, Broome counties and all counties in New York west of these.

Eastern Pennsylvania—comprising Tioga, Lycoming, Union, Snyder, Juniata, Perry,

Cumberland, Adams counties and all counties in Pennsylvania east of these.

Western Pennsylvania — comprising Potter, Clinton, Center, Mifflin, Huntingdon, Franklin counties and all counties in Pennsylvania west of these.

Delaware, Maryland, District of Columbia.

Southern New Jersey — comprising Burlington and Ocean counties and all counties in New Jersey south of these.

Central Division (six sections):
Illinois, Indiana, Kentucky, Michigan, Ohio, Wisconsin.

Delta Division (three sections):
Louisiana, Mississippi, Tennessee.

Midwest Division (four sections):
Iowa, Kansas, Missouri, Nebraska.

New England Division (seven sections):
Connecticut, Maine, New Hampshire, Rhode Island, Vermont.

Eastern Massachusetts — comprising Essex, Middlesex, Suffolk, Norfolk, Plymouth, Bristol and Barnstable counties.

Western Massachusetts—comprising Worcester, Franklin, Hampshire, Hampden and Berkshire counties.

Pacific Division (three sections):
Southern Section — comprising San Luis Obispo, Kern, Tulare, Fresno, Madera, Mariposa, Tuolumne, Alpine counties and all other counties in Southern California, including Catalina Island and the state of Arizona.

Northern Section — comprising Montery, San Benito, Merced, Amador, Stanislaus, San Joquin, Calaveras, Eldorado counties and all the rest of Northern California, including the state of Nevada.

Roanoke Division (three sections):
North Carolina, Virginia, West Virginia.

Southeastern Division (three sections):
Georgia, South Carolina, Porto Rico, Cuba, Isle of Pines, Florida, Alabama.

West Gulf Division (four sections):
Northern Texas—comprising Shelby, Nacogdoches, Cherokee, Anderson, Freestone, Limestone, Falls, Bell, Coryell, Lampasas, Mills, Brown, Coleman, Runnels, Coke, Mitchell, Howard, Martin and Andrews counties and all other counties in Texas north of this boundary.

Southern Texas—comprising Sabine, San Augustine, Angelina, Houston, Leon, Robertson, Milam, Williamson, Burnet, San Saba, McCulloch, Concho, Tom Green, Sterling, Glasscock, Midland, Ector, Winkler, Loving, Culberson, Hudspeth, Elpaso counties and all other counties in Texas south of this boundary. Oklahoma, New Mexico.

In other Divisions nominating petitions will be solicited later when the Sectionalizing work has been finished.

5. The established organization will continue to function until superseded by the new arrangement.

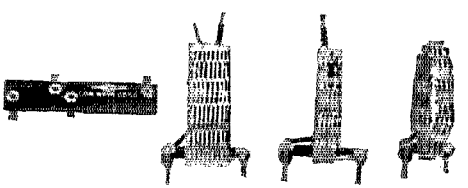
6. This is your opportunity to put the man of your choice in office to handle your Section. Where there are particular officers already serving you faithfully in the field, there will be little difficulty in making a choice. Members are urged to take the initiative and to file nominating petitions immediately.

—*F. E. Handy, Communications Manager.*

Plug-In-Coil Tuners

WE believe that almost everyone is sold on the idea of interchangeable coils in a short wave receiver, and we hope that almost everyone will use the "plug-in" method of changing coils.

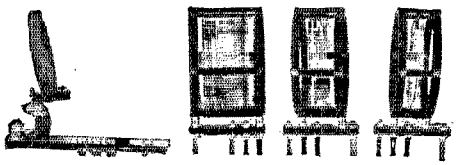
For short wave reception several manufacturers have brought out very good plug-in-coil tuners designed to cover a variety of wavelengths with comparatively small tuning condensers. The coils and mountings shown in the first illustration are being made by the Radio Engineering Laboratories of New York City. The coils are the familiar Lorenz or basket-weave type mounted on bakelite strips to which are attached one piece plugs. The plugs fit the mounting block shown at the left. This block is of bakelite and is mounted high and clear of the baseboard by means of brass collars provided with the coils. The coils come in two types; one is the antenna



inductance which is not tapped and the other the combined secondary-tickler in one coil with taps taken out for the Reinartz circuit in which the tuning condenser is connected across only a portion of the secondary. With a shunt condenser having a maximum capacity of 100 μμfd. the coils will tune from 9 to 590 meters, fourteen coils being needed to cover this band of wavelengths. If a larger shunt condenser is used (in the broadcasting band) the upper

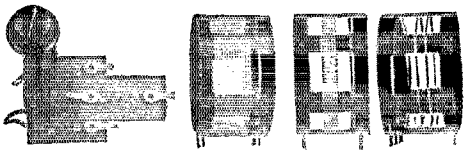
wavelength limit will be higher. With a 250 μμfd. condenser and a 125 turn coil the maximum wavelength that can be reached is 861 meters. The R.E.L. coils were designed with the idea of using a separate antenna coil when the wavelength of the secondary is changed materially.

The next group of coils are those of the Aero Products of Chicago. The coils are wound on narrow bakelite strips bolted together. The wire is bare in the case of the secondary and very small insulated magnet



wire is used in the tickler. Secondary and tickler coils are assembled in one unit, equipped with four General Radio plugs. The primary is wound self-supporting and is mounted on a bakelite rig in such a manner that its position with respect to the secondary can be changed. This allows one to use one size primary coil for all of the amateur bands, it being only necessary to change the angle of the primary in case the coupling is too close. With a S.F.L. condenser having a maximum capacity of 140 μμfd. the three coils shown in the illustration will tune from 15 to 133 meters.

Shown in the third photo are the Bremer Tully Company's coils and mounting. There are four coils of which three are illustrated, covering a waveband of 12 to 200 meters with a 125 μμfd. variable condenser across the secondaries. The coils are wound on cutaway bakelite tubes, secondary and tickler being on the same tube. The secondaries (for short waves) are wound with bare wire wound in very shallow notches in the



bakelite and the ticklers are of insulated wire held in place with some binding material. The largest coil (not shown in the illustration) is wound with green insulated wire. The "baseboard" is of clear bakelite. The primary is wound on a bakelite tube and is arranged to rotate so that the coupling can be changed Only one primary coil is used for all wavebands.

—*J. M. C.*

Signal Corps Training in Citizens' Military Training Camp

MANY readers of *QST* are doubtless familiar with the Citizens' Military Training Camps which are conducted every summer in all parts of our country. It is desired to invite attention to the signal Corps camp which will be held at Fort Monmouth, New Jersey, from August 6 to September 4, 1926. Instruction at this camp is progressive, four courses being offered each year, known as the Basic, Red, White and Blue. The Basic Course is open to men between the ages of 17 and 24 years who have had no previous military training, but who have had some technical training in radio, telephone or telegraph communications. Men who pass the Basic Course successfully may return in following years to the more advanced camps. The Blue Course is for specially selected men who are considered proper material for commissions in the Signal Reserve Corps of the United States Army.

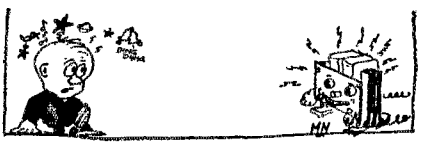
Men attending this camp receive no pay but are reimbursed for traveling expenses from their homes to the camp and return. While at the camp they are fed and clothed by the Government.

Fort Monmouth is the center of radio development for the army. The central station of the army amateur radio net (2CXL) is located there. This camp should appeal to any young man who is interested in radio or other forms of communication and who also wants to do his part towards preparation for national defense. There is plenty of time for recreation—the ocean beaches of Long Branch and vicinity are only a few miles distant.

Attendance at the Fort Monmouth C.M.T.C. is limited to men living in the following states:

New York, New Jersey, Delaware, (apply through C.M.T.C. Officer, 2nd Corps Area, Governors Island, N. Y.).
Pennsylvania Maryland, Virginia, District of Columbia (apply through C.M.T.C. Officer, 3d Corps Area, Baltimore, Md.).

—*TOM C. RIVES*
Captain, Signal Corps
(Station 2CXL)



TRANSMITTING HINTS

Concerning Electrolytic Rectifiers

The following is quoted from a letter of Mr. Clayton Tanner of 9DCR at Champaign, Illinois:

"While at the convention I talked to a number of the fellows about electrolytic rectifiers, and was surprised to find about all of them were still using borax. At 9DCR it caused so much trouble, and ate up so much aluminum, that I threatened to get 'S' tubes or Kenotrons. Thought I would try all the solutions mentioned in QST, and Ammonium Phosphate proved great. All the stations here use it now. The only way to get it is to have the druggist or radio store order some, because chemical houses don't sell retail. The pure Ammonium Phosphate costs about $1.25 a pound. This is too much, so we get the commercial product, which is 40c a pound and works just as well. Found out from a University of Illinois instructor that the impurities in the commercial product are helpful. Some are phospheric acid combined, etc.,—all good stuff. Anyway it works.

"Advantages:

¾ lb. Amm. Phos. to a gallon of water.

Any kind of water can be used from tap (city water) to distilled. Plates stay white and do not eat full of holes as with borax.

"The plates 'form' on the first shot.

"Antenna current doesn't drop off after the key is pressed a few seconds (like borax).

"Black oxide does not form where the aluminum plates come out of solution.

"All plates glow all the time. In borax some glow and sparkle one nite and others another nite.

"Bridge circuit works best in my station.

"Have used a set of aluminum plates here for 7 month and they are as white as the day I put them in. Change solution about every 2 months as it wears out."

Sulphur as an Insulator

Mr. Harrison Brown, of Laplata, New Mexico, calls attention to the fact that sulphur is an excellent insulator at radio frequencies and has the advantage that it can be cast to any desired shape and will hold metal inserts. The casting had better be done while the family is away, for the atmospheric effects remind one of a Kansas lead smeltery. The insulation is absolutely permanent, can be machined, has a dielectric constant around 4 and remarkably low losses, both inside and over the surface.

These Rough Notes

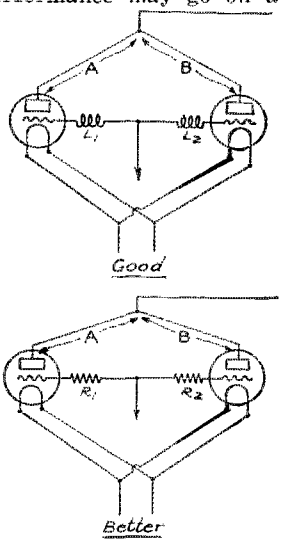
Most amateur transmitters these days are of the variety in which there is a tuned primary circuit inductively coupled to the antenna. If such a transmitter is adjusted for the largest antenna current it is almost sure to be unsteady. The unsteadiness may consist of having the wave jump around so that the note is uncertain at the receiving end or else the thing may wabble between two wavelengths at such a high speed as to put a buzz or growl on the transmitted wave.

Most difficulties can be gotten rid of (unless there is some other cause) by tuning the primary off wave until the antenna current drops 10 or 15 per cent. Don't let the smaller ammeter reading worry you; the thing will transmit better just the same.

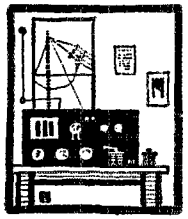
Tubes in Parallel

When several tubes are used in parallel it is often hard to make them run cool. The reason may be in unequal lengths of wire to the different filaments, grids and plates. The way to do this thing right was shown in 1GV's article on page 37 of the February, 1924, *QST*.

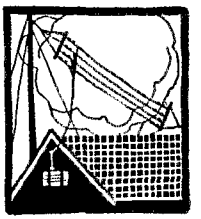
Sometimes the trouble is in very high frequency oscillation between the tubes. Such a performance may go on at 10 or 15 meters while the main frequency is around 150 or higher. The very short wavelength does not represent any output but it does take power and it does heat the tubes, especially the grids. This may be cured in the fashion shown in the sketch.



Wire A exactly as long as B
L_1 and L_2 exactly alike, about 12 turns of No 20 or so wound on a lead pencil.
R_1 and R_2 exactly alike. Value depends entirely on the tubes; increase until tubes run properly. Anything from 20 to 200 ohms may be needed.



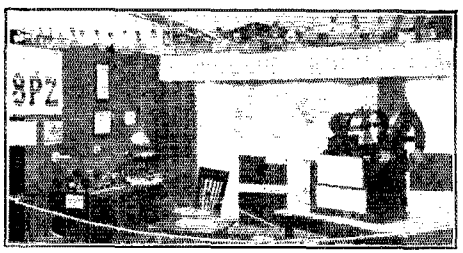
Amateur Radio Stations



Rochester, N. Y.

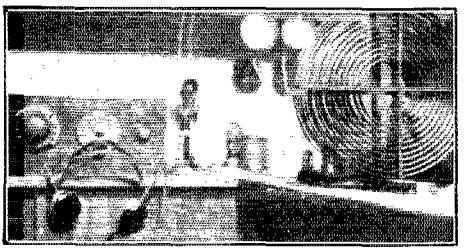
THERE are 86 licensed amateur stations in Rochester. Of this number, half are on the air occasionally, and 20 consistently. Most of the stations use one 50-watt tube, two use 250-watters and the balance 5 watts. Many of the stations are using gutter-pipe antennas; a 30 to 35-foot length of common galvanized iron conductor pipe, mounted vertically on the roof on a heavy bottle which serves as an insulator. The guys are made of paraffined rope and are broken by 18-inch glass towel bars. The capacity at the top is increased by soldering on a wire about 18 inches in diameter. Total cost—$5.00, and they *do* work. The following countries have been *worked* from Rochester: Canada, Mexico, Porto Rico, Cuba, Canal Zone, Hawaii, Brazil, Argentina, Chile, New Zealand, Australia, Japan, Tasmania, Samoa, Egypt, Morocco, Czechoslovakia, Bermuda, Finland, Holland, Switzerland, Sweden, Scotland, India, So. Africa, Italy, England, France, Belgium, Spain, Denmark, Cape Verde Islands, WNP, WJS, KFUH, NRRL, etc. All of the operating amateurs belong to the Radio Club of Rochester. This club has been going strong for twelve years!! The officers are E. Handler, 8KT, President; R. Ruscke, 8AFN, vice-president; R. Lucia, 8BEN, Secretary; H. Judd, Ass't. Secretary, and C. Sage, 8CHR, Treasurer.

8PZ, Radio Club of Rochester



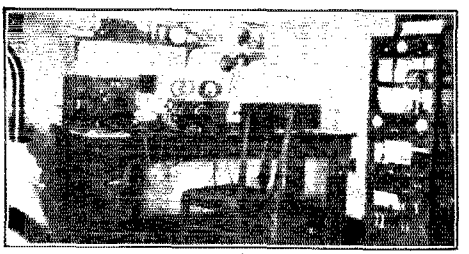
NOW a 50-watt transmitter, using Exide B-battery supply is employed. The photo shows the set (at the left), as it was in the Rochester Exposition. No QRM at all caused to many BCL receivers all around set. Receiver is a Reinartz and one stage audio. The relic at the right is a 1-KW rock-crusher, and bears the following placard, "Discarded by Amateurs to Reduce Interference". F.B. While at the Exposition the set performed splendidly on an indoor cage 30 feet long. Over 125 messages were handled.

8DQA, 9 Diamond Place



THE transmitter by Ray Jobes consists of a UX-210 in the Hartley circuit. Inputs from 15 to *150* watts are used! The high voltage is chemically rectified and well filtered, giving a good D. C. note. The wavelengths are 40 and 80 meters. The receiver at the left is a low loss 3 circuit tuner, covering all the amateur bands. Phone is often used and 8DQA is fast becoming a rival of the local B.C. stations.

8BGN, 1593 N. Clinton Avenue



OWNED and operated by K. J. Gardner. The transmitter uses a single 203-A with 200 watts input on 37.5 meters. Inductances are self-spacing copper tubing.

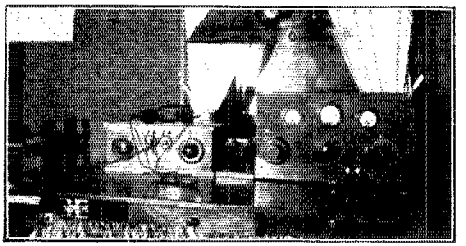
All leads are as short as possible. The combination of "S" tubes and a large brute force filter results in a good D. C. note. The whole transmitter is mounted on valve springs to eliminate vibration. In the photo from left to right are battery charger for Edison A and B batteries, honeycomb coil set with detector and two stages of amplification, (the set tuning from 150 to 25,000 meters), battery switch for different receivers, short wave Reinartz and 1 step using C-199 tubes, Browning-Drake B-C receiver, and a wavemeter on the shelf. Antenna is a 30 foot gutter-pipe, with a 15 foot lead-in. Counterpoise is a single 15 foot wire, 10 feet high. Receiving antenna is a single 75-foot wire, 30 feet high. Break-in is used. DX—worked all continents. Much traffic is handled by this station.

8CYI, Clay & Dewey Avenues

THIS outfit is manned by the Hertzberg Brothers. The receiver is a 3-tube Reinartz with tuned primary. The condenser on top of the cabinet does the tuning (with the help of the operator). Usually only 1-stage of amplification is used for traffic handling. The transmitter is a coupled Hartley using two 203-A tubes. A 500-watt, 1,000-volt, Esco M.G. furnishes the plate supply. The normal input is 450 watts. A spiral pancake coil is used in the primary circuit, and a solenoid type in the secondary. The antenna is a 40-foot gutter-pipe on top of the gas station in which the radio apparatus is located. The counterpoise is 10 feet high, and 40 feet long. The key is an old time "Boston". For fast traffic work the bug is resorted to.

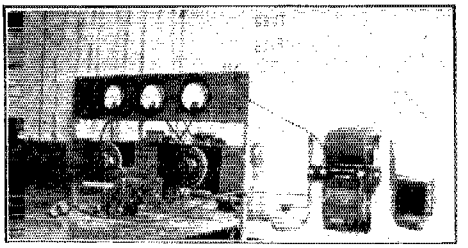
POUNDING BRASS

8BRD, 356 Seneca Parkway



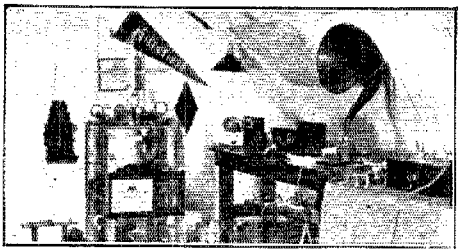
THIS station has been in operation for the past three years. It is run by Paul and Homer DeWitt. When first on the air 300 volts of Tom Edison's B-battery were used, then a motor generator, and finally R.A.C. The present power is 5 watts (??) in a Hartley circuit, inductively coupled of course. The transmitter operates on 40 and 80 meters. The aerials are, a single wire 40 feet high for 40-meter work, and a 60-foot one for 80 meters. The counterpoise is a two wire fan. The DX includes all the U.S. districts and three Canadian districts. The transmitter has been heard in Mexico and Scotland.

8BEN, 109 West Chestnut Street



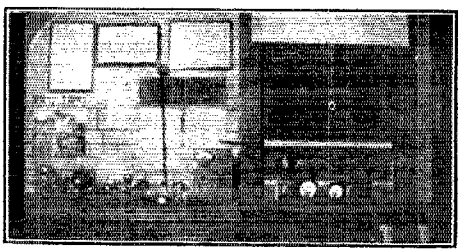
R H. LUCIA is responsible for this nice looking transmitter. It uses one UV 203-A with an input of 185 watts in a L. C. Hartley circuit. Normally two wavelengths are used for transmission, 38 and 42 meters. Plate supply comes from an R.C.A. transformer through a 60-jar chemical rectifier and lastly through a filter consisting of a 30-henry choke with a 4 μfd. condenser. The inductances are the old style R.C.A., with the wooden base removed and the remains mounted on glass towel bars. Left of the transmitter is an accurate wavemeter with a 25 to 50-meter range. The receiver is a copy of Schnell's NRRL tuner and uses two C-299 tubes. The antenna is a vertical gutter-pipe 35 feet high. Counterpoise is 1 wire 20 feet long, 15 feet high. Lucia is the Secretary of the Rochester Radio Club and has turned in some nice DX.

8KS, 20 Arklow Street



THIS outfit was built and is operated by C. E. Dengler. From left to right in the photo, can be seen the transmitter whose normal input is 150 watts. A single 203-A is used. Inductances are pancake type. Under the operating table is the primary rheostat which consists of a Dim-a-lite and a 50-watt lamp. Next to the right, on the table, is a honeycomb coil receiver covering waves from 150 to 30,000 meters. The short wave receiver is a Bremer-Tully, low loss coil detector, and two stages of audio frequency amplification. The set tunes from 20 to 200 meters. On the right is a Western Electric power amplifier and Magnavox to make all the sigs R-9! The aerial is a cage supported by a gutter-pipe mast A-La *QST*. A single wire counterpoise is used.

8ALY, 1625 Clinton Avenue, North



WE wish the photo had been better. It would have let you, too, see the nice layout A. Balling, has at his station. The receiver is a Reinartz with one stage of audio. Next to it is a homemade battery charger, and next to that the transmitter. One UV-203-A with an input of 175 to 200 watts is used. The circuit is the loosely coupled Hartley. High Voltage comes from a H.V. transformer, through a brute force, consisting of a 30-henry choke and lots of μfds. The change-over switch is a strictly low loss affair, and has a two foot "handle" on it so that the operator does not have to get up from his seat every time he switches over, hi! Another 30-foot gutter-pipe antenna is used here. The transmitter operates on either 20, 40 or 80 meters; although 40 is used most often. Balling is a past president of the Radio Club.

8DSI, 478 Maplewood Avenue

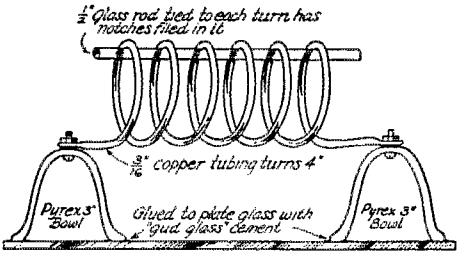
BERNARD C. O'BRIEN was licensed in June, 1924, to operate a one inch spark coil on 178-200 meters. This was quickly junked in favor of a C.W. set. The present transmitter uses a lone 5 watter with plate supply from a 200-watt, 550-volt, Acme plate transformer. The supply is rectified through a 28-jar chemical rectifier. The transmitting inductances are homemade from No. 12 D.C.C. wire. The coils are 4 inches in diameter. The transmitter covers all bands used by amateurs except the 150-220-meter one. The 40-meter wave is used mainly. The antenna is a single wire 25 feet long, and 30 feet high. The antenna extends in the opposite direction and is a single wire 18 feet long and 30 feet high. The latest receiver is a detector and 1 stage of audio, modeled after 1ARE's in October, *QST*.

We are deeply indebted to Mr. Lucia for the photographs and descriptions of the above stations. This form of "Amateur Stations" is new in *QST*. Don't you like it?

Strays

The *Radio Broadcast* $500—prize receiver contest, described in our February issue, has been extended to close on April first instead of March first.

8DMZ concocted the sturdy low-loss idea shown in the illustration. No comments



needed save that if the copper tubing is heavy enoug the glass rod at the top is not required.

NOTICE

To Members of the I.A.R.U. Residing in Argentina and Italy

Nominations Solicited for National Presidents

The members of the International Amateur Radio Union residing in Argentina and Italy are hereby advised that the minimum required number of members has been received from the countries and that national sections of the Union in each of these countries are hereby declared existent.

In accordance with Article III Section 3, of the Constitution, a National President is now to be elected in each of these countries, to serve for a term of two years. His powers and duties are outlined in the Constitution. You are invited to nominate a member of the Union from your country to become your National President. Article V, Section 10 specifies that in order to be eligible the nominee must not be commercially identified with the radio industry and that he must be a member of the Union. All nominations must be received by May 15, 1926, immediately after which ballots will be prepared, listing all the eligible names placed in nomination, and mailed to you for the actual voting. Address your nominations to International Amateur Radio Union, 1711 Park St., Hartford, Conn., U. S. A.

—K. B. Warner, International Secretary-Treas.
March 3, 1926.

The Other Way 'Round!

THE ultimate in DX communication does not lie in the mere *working* of a station at our antipodes. We used to think, in the days long gone by, that when we pulled off this antipodes stuff we were ready to close the books and say that the world's record had been made—and that's that. We know different now.

By virtue of their signals travelling the "long way around" and taking the dark path in preference to the shorter daylight one, a goodly number of hams all over the world have exceeded our old idea of what the world's record really could be. Wentworth of 6OI is the latest fellow to pull down some super-hot DX. We say Wentworth, but we certainly are not neglecting the other end of the link, our friend Mayer of g2LZ. On the morning of January 3rd, at 7:40, P.S.T., these two stations were QSO. Contact was held for about a half an hour. Figure this up: Stanford University, California to England, signals travelling not across the U. S., but over the Pacific and Asia! *Some DX!*

Later a message was received from England by Mr. Maxim, our A.R.R.L. President, via g2LZ and pi1HR, to 6BJX. After this many other messages came "the long way around". Fine business OM's.

British Section

"We have recently passed through a spell of unusually bad DX conditions, and consequently there is not a great deal of important work to report. At the time of writing, conditions have improved greatly, but the gang do not seem to have realized the fact, judging by the small number of stations on the air. Our friend Goyder, g2SZ, is now on the air with a very useful crystal-controlled transmitter on 45 meters. This is probably the first successful crystal-controlled set in regular operation in Europe. It certainly puts out a note which is a pleasure to hear, and it must be a revelation to some of the gang who used to think their QSB was D.C.C.W. The signals from this outfit are reaching out very well, most of the world having been worked already, on both key and fone. Some parts of Canada say it is the first British signal ever heard. For the last three months g5QV has been running a test schedule with c4GT in order to try to get the G's QSO Canadian 4's. No contact at all has ever been established, though one morning g2SZ heard c4GT calling g5QV, and took a message for him but could not QSO. These difficulties are curious as the stations concerned put out good hefty signals and can easily work the Zedders. Western U. S. A., Central and West Canada, are the most difficult places in the world for a British station to work. g6LJ does not seem to be on the air much now, but he has worked fi8QQ in Indo-China and has been heard in Calcutta. Two of our low power hams, g2GO and g6QB, are now on the air often and are reaching out splendidly. The

star Irish station, 5NJ, cannot find time to work except at week-ends, but when he does operate he is QSO a, z, o and various places south of Panama. g5BV complains of so much "QRM work," that he hasn't been on the air for some time. He has just received some "S-toobs" so will probably manage to come on some day to see what they sound like. Hi! g2LZ works a daily schedule with pi1HR. g2OD has worked oA6N and oA4Z, besides QSO on phone to GFUP in China, and NADJ at Manila, Philippine Islands."—*Hugh N. Ryan g5BV, Acting Secretary.*

Our friend Lewer, of g6LJ sends in the following notes regarding British communication: "Hams in Canada seem to be waking up again now. This is the first we Britishers have heard of them since the 100 meter days. Reid, c8AR of Newfoundland, makes a big noise over here. pr4JE seems to have worked every station on the air. cz99X in the Canal Zone recently was QSO g2KW. NOSN at the same place is often heard very QSA in Great Britain. A new Philippine Islander recently heard piNBN. In Palestine, pe6ZK is doing heaps of DX work. fi8QQ at Saigon, Indo-China, has been working a large number of G's. In Egypt, e1DH and eGEM, are both working DX now. e1DH is ex m1DH-GHH-GHH1. A ham at Tomsk, Siberia, has a transmitter operating on 17 and 27 meters, using the call TUK. He can be QSL'd via g6LJ. A good call book containing calls of all Europeans, South Americans, South Africans, Indians, Australians, Zedders, etc. is published by '*The Wireless World*, Tliffe & Sons, Ltd., Dorset House, Tudor Street, London, E. C. 4, England'."

New Zealand

Through 5ZAI and 9ZT we have received the following dope from New Zealand, via z2XA: "z2BX has been QSO i1RM and i1ER with normal input to a 5 watter and was reported R-4. This is after z2BX has been trying for months to get QSO the U. S. Zedders are still maintaining daily QSO with Europe in spite of the fact that this is the mid-summer season in New Zealand, and QRN has been very bad. z4AA, our old time friend Bell, has recently married, and all the Zedders are in deep mourning at the loss of the pioneer amateur operator in New Zealand. Mr. and Mrs. Bell have left for a tour of Europe. The senior op at z2XA, Mr. E. A. Shrimpton, is Chief Engineer of the N. Z. Posts and Telegraphs, and Supervisor of Radio. Shrimpton retires from the latter position in March. 2XA will still go on as usual and it is hoped that the power will be increased in the near future. The time has come for the A. R. R. L. Headquarters to collect data for around the world, and international, relay routes. Since there is no organization at all, messages for all sorts of foreign places are handed to Zedders. z2XA has handled messages from "hu" stations for Cuba. Many hams appear ignorant of the geography of New Zealand and often have the idea that it is a part of Australia. New Zealand is a separate self-governing country of one and a half million people; more than 90 per cent are of English descent. There are no cannibals, as some of the U. S. hams are want to think!! We have street cars, telephones, autos, soda fountains, speed cops, and everything *except prohibition.* We are four days journey by fast boat from Australia. AQE, the whaling ship, *Sir James Ross*, will be leaving soon. Those who desire to work both poles should get busy and connect with AQE. She is out of the ice barrier and expects to arrive at their first port of call, Bluff, N. Z., early in March. If you want to address QSL cards to this ship write the operator, Leif Jensen, care the *Sir James Ross*, care Radio Awarua, Bluff, N. Z. To which Syd Strong adds that z2AC has been raised to the peerage, and should now be addressed *Sir* Ivan O'Meara. Despite this 2AC is reaching out in fine shape and has been doing some splendid DX lately. He kept a 100% perfect nightly schedule with SGC, the m.s. *San Francisco* during the last trip of SGC between Beunos Aires and Sweden."—*z2XA.*

Australia

Via radio through 5ZAI we received the following data from a2YI: "For the last few weeks QRN has been very bad and DX hard. Most sigs are weaker than during last months of 1925, and weather has been too warm for staying indoors. a2YI has been QSO three British Warships in Asiatic waters. The QRA's are *h.m.s. Concord* GEFT, *h.m.s. Hermes* GECQ, and *h.m.s. Durban* GFUP. At least two Australians are trying voice on 37 meters. a6AG and a2BL are broadcasting from Sydney. 6AG tests at 9:20 p. m., Sydney time and 2BL goes on at about midnight each night with 1 K. W. input. Australian radio amateurs are delighted to hear of Schnell's promotion. The Wireless Institute sends official greetings. The A.R.R.L. and Schnell have set a splendid example to amateurs the world over. Little 20 meter activity has been accomplished in recent months. It is hoped that a2YI's tests will revive interest on this wavelength. 5 and 10 meter tests are still in progress. Great interest is being shown in forthcoming tests. The Pacific test is being organized by the Wireless Institute (Note —see I.A.R.U. News for March for complete dope, and cooperate with 'em OM—J.M.C.). Complaints have been received from many Australian hams that the U. S. gang is sneaking down into Australian wave bands. This is proving a *decided handicap to international work.*"—*a2YI.*

A NEW INTERNATIONAL BRASS POUNDER'S CLUB

One of the most famous DX men in the country has proposed the formation of the W. A. C. Club—a club primarily international in its purpose and mode of operation; a club composed of brass pounding ether burners; an aggregation of key punchers collected from all parts of this old world. The Worked All Continents Club, hereafter known as the WAC Club, will serve to furnish some more adequate means of recognition for the gang of International DX hounds. The requirements for membership are few and brief. To become a member the applicant must have carried on two-way communication with at least one station in all six of the continents; Australia, Africa, Asia, Europe, South America and North America. In addition to having done the work a letter or card should be sent to A.R.R.L. headquarters from each continent showing the date of QSO. Merely send in QSL card from these countries. The cards will be returned together with the Official WAC certificate endorsed by the Grand High Wacker himself. Until the WAC members get as thick as hen's teeth, the list of members of the club will appear in the I.A.R.U. News section each month. Hop to it, gang. Here is some *high class* wallpaper! Address The WAC CLUB, care A.R.R.L. Headquarters, Hartford, Conn.

Brazilian Section

"Brazilian amateurs are licensed for transmission on 80 to 85, 40 to 45, 18 to 24, and 4 to 6 meters. At present the only useful band is the 40 meter one. The 80-meter band is good only for South American work, one Brazilian station being the only one in this country to QSO America, and he is bz1AC. The general level of U. S. sigs on 80 meters is R-2, while on 40 meters it is R-4, varying of course on individual receivers. On the 20 meter band not enough work has been done to determine conditions, but it may be mentioned that during summer in the U. S., the 20 meter signals come in here much better. bz1AB maintained a schedule with u1CMX on 19 meters. Sunday schedules with amateurs in all parts of the world to determine the best daylight wavelength below 25 meters are welcomed. The "bz" stations are actually on 33 to 36 meters with very few exceptions. By this practice we avoid QRMing European and American stations *who keep in their bands.* Licenses are granted only to Brazilians, but foreigners may *have* and *operate* a station, if a Brazilian is responsible for the operation of the station. A ten word per minute code examination has to be passed in order to obtain a license, and a written examination covering a half dozen elementary principles is also given. Power input up to 500 watts is allowed. Spark and I.C.W. is not permitted, but fone work is allowed. Fortunately little work has been done on fone in the 40-meter band and we hope that the fone friends will stay on a separate band. There is an unconditional silent hour from 7 to 11 P. M., local time. Up to the present writing, this silent hour has not been enforced. There are about 50 licensed stations and plenty more coming on. Powers range from receiving tubes to 50 watters, with some 204-A's. We have found, however, that a 203-A puts a readable signal in any part of the world at the proper time of day. General reception is as follows: 20 to 22 G.M.T. Europe, Palestine, South Africa and the Far East (Antipodes, Philippines, China and French Indo China); 21 to 07 G.M.T. U.S.A. and Canadians; 4 to 6 G.M.T. Italy; 6 to 8 G.M.T. France and England; 7 to 11 G.M.T. Japan, Phillipines and New Zealand. Australia has been heard only twice in Brazil. The antipodes are heard and worked frequently by bz1AB, bz1AF, and bz1AC. One of the events of December, was the working of the Seventh U. S. District by bz1AC, bz1AB, bz2AB, and bz2AF. This district has been heard here only once before. u7DF turned the trick"—*C. G. Lacombe, bz1AC, President Brazilian* Section. The above was transmitted to us via bz1AC and u4SI—4NT. Over 500 words! F.B. OM's. 5ZAI informs us that bz1AB's call has been changed to bz1IB.

C. G. Lacombe, bz1AC, President, Brazilian Section, I.A.R.U.

Correction

On page 52 of the March I.A.R.U. News Section we published the British Section report and through an error signed it by Marcuse as President of the Section. Simmonds of 2OD is President of the British Section and Marcuse is vice-president of the Union.

Singapore

A new country has been worked! Colonel Foster u6HM connected with a station signing ss2SE (QTA *ss2SE*) on January 24th. There followed two hours and forty minutes of perfect rag-chewing. This station is run by Colonel Earle, R.E., Harbour Board, Singapore. This is the first contact with this country. F. B. and welcome to the ham ranks 2SE.

The first message come through from x2BG was addressed to A.R.R.L. Headquarters and was handled by 6OI.

North Borneo

Wentworth of 6OI connected with GECQ, giving his QRA as in North Borneo, on the morning of February 7th. He reports 6OI's sigs as R-7. Complete QRA unknown but will follow shortly.

French Section

"The licensed French stations are going back to the old 200 meter band which is not so bad for interior work. f8BP, f8DU, f8FC, f8GH, f8GQ, f8HM, f8ID, f8IM, and others are operating regularly in this band, and they are being encouraged by the *Journal des 8* and R.E.F. Everywhere, tests are being made in an effort to learn more about wave propagation. It is hoped that before summer we will have some useful information on this subject. The great difficulty has been in finding a sufficiently large number of listeners. Finally, contacts are being formed in the Colonies. In Morocco we have station MAJO (the first "yl" in this country) and also TZ at Morocco. fi8JL and fi8LBT are in Saigon, Indo-China. f8DP has added a new country to his list in working BER in Bermuda. He has accomplished 51 two-way communications with "u" stations during the month. The new amateurs in Saigon are QSOing France, first via pi1HR and z2AC, then directly by f8YOR. The Military station, fOCMV located near Paris, is making transmitting tests on short waves from 20 to 45 meters and will be very glad to receive QSL's, also to get in communication with foreign amateurs. Audreau, of f8CA is at the station. All communications or QSL's should be addressed to, Chef du poste OCMV, 2 Bataillon du 8 Genie, Mt. Valerien par Sursene, France."—*R. Schlumberger.*

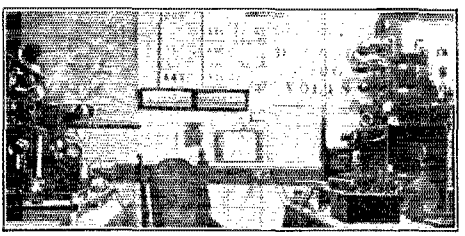
Hawaii

Via radio from hu6AFF and u9ZT, we have the following: "Hawaiian hams here have been having good results with this high frequency dope on 40 meters. All hams here who have a moderate power input have been QSO as far east as the east coast of the U. S., as far as Alaska and the end of China, part of the Philippines, Australia, New Zealand, South America, and of course all over the United States. We are always ready for traffic. We have been mighty lucky to have a place out in the ocean, and can form one of the main relay points for messages to the East and South. I believe that Hawaii is justly deserving of the name, "cross roads of the Pacific". Being located in the middle of the Pacific, we are in a position to be of immense value to the hams all over the world in QSRing in all directions."—*hu6AFF.*

The WAC Club Certificate. When do you get yours, OM?

Africa

We are showing a photo of oA4L manned by R. Oxenham of Cape Town, South Africa. Mr. Oxenham is one of the pioneer short wave men in S. Africa and has one a lot of international DX. The apparatus at the left of the photograph includes a number of broadcast and long wave receivers using honeycomb coils. At the right is the short wave transmitter, short



oA4L, Cape Town

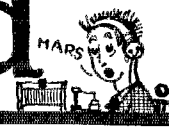
wave receiver and a 200 meter fone outfit, rarely used. A4L normally operates on a wavelength around 40 meters. He is editor of the S.R.R.L. News which is found in the *South African Weekly.* The S.R.R.L. is the beginnings of the A.R.R.L. of South Africa. oA4L has been QSO six Argentine stations, four in Brazil, ch2LD and several "u's".

Austria

All communications to Austrian amateurs should be addressed to Oesterreichischer Versuchssenderverband, Klubsaal des Hotel de France, Schittenring 3, Vienna, Austria. The Austrian amateurs are using two letter calls with the intermediate o (— — — .)

W. R. Burne of the well-known g2KW has been appointed Editor of the Irish Radio Journal. Ham radio in Ireland is not at a very flourishing state at present and we believe that Burne can and will do lots to help it along.

Calls Heard



HERE IT IS, GANG!

All right, fellows, you win! The Calls Heard Department is back after a brief rest of one month. It comes back with the same DX rating as formerly—1,500 miles. No calls should be sent in unless they are at least 1,500 miles from you. The lists *must* be prepared correctly or they cannot be used. Improperly prepared lists have to be re-typed and rearranged. The rules are few and simple. Read and heed them!

1. Use typewriter or pen and ink.
2. Use double spacing between lines.
3. Write on ONE SIDE of the page only.
4. If hand-written for the luv 'o μ make 'em readable. (PRINT THEM)
5. The calls should be in CAPITAL letters, and in alphabetical order.
6. Outside of the U. S. calls the intermediate of the country should be put in small letters, followed by the call in *capital* letters: c4AB z4AA pi1HR.
7. Do *not* put a comma after each call; merely leave a space.
8. Have your list at Headquarters before the first of the month.
9. Again, list calls only 1,500 miles or further from you.
10. Cut this out and stick it in the shack. Here is a sample of a correctly prepared list:

1ZZA, I. Makem Wright, 122 South Street, Cambridge, Mass.
40 meter band
1AA 1AX 2AG 2HX 3CC 4AG 5ZAI 6OI 7AY 8ZC 9ZAC a2YI b4YZ c9CK d7EC f8CA g2JL hu6AFF i1ER j1PP kY5 m1AA nPCII q2BK rAE5 x2BG NKF NPL WAP.

3ZO Parksburg, Pennsylvania.

a2em a2tm a2yi a4an beber bz1ab bz1ap bz1an bzsqi ch2ld f8dk f8dp f8ee f8eu f8go f8hu f8ix f8tok f8yor f8xp g2ao g2cc g1lz g2wj g5qv g5yk g6rm gcs h9ad hu6dbl i1bd i1gw i1rm k4lv m1af mix npb3 npb7 pr4je pr4rl q2by radi raf1 z2ac z2xa z4ag z4as z4av nar1 ntt nkf nis cz99x rbm.

Radio 4RJ, Santurce, Porto Rico

1dl 1cx 1aw 1ahv 1sw 1epu 1hj 1nar 1aci 1bad 1bsd 1aae 1hn 1or 1ahb 1yd 1bdq 1blf 1yb 1apz 1rd 1qb 1are 1ga 1si 1lw 1an 1cri 1ii 1atj 1dq 1bgq 1ala 1apv 1aff 1ayl 1bef 1ja 1aao 1aof 1kl 1aiu 1ue 1adi 1biv 1se 1bkp 1cd 1buo 1od 1bdp 1cal 1cnp 1bhs 1ana 1xu 1sz 1afy 1adh 1bbd 1ahc 1cjc 1ben 1bzc 1vy 1fh 1bal 1jr 1epq 1yc 1aid 1aww 1akz 1cre 1adm 1aap 1bxh 1aal 1ccx 1cmx 1biz 1dl 1bhm 1bdx 1adp 1abm 1ams 1bsg 1bwn 1afo 2ach 2nw 2cvj 2cv 2cxl 2bpb 2cyx 2hs 2aug 2mu 2bg 2aew 2aop 2bbx 2bir 2gc 2ol 2ll 2bkr 2aco 2bsc 2nj 2aks 2rv 2clg 2auh 2box 2cft 2evu 2uk 2arg 2eaz 2mk 2wh 2beo 2ke 2cy 2ag 2bl 2aev 2az 2bnl 2ahm 2nz 2arl 2xac 2ama 2opk 2afv 2cty 2dx 2ahg 2be 2crb 2afn 2id 2aqq 2cvl 2fc 2ahk 2big 2amj 2akv 2bw 2ajt 2gy 2cjj 2oc 2apv 2ajx 2aim 2agt 2aft 2cg 2va 2aky 2tz 2fa 2gp 2ale 2pb 2jb 2acf 2czy 2agq 2arh 2ku 2asq 2adm 2bwa 2aef 2bvg 2arm 2gv 2fn 2mp 2gk 2aje 2bsl 2va 2afo 2agb 2jz 3jw 3nf 3cey 3afw 3ld 3bmc 3aig 3cel 3mv 3aib 3adm 3ahl 3aen 3pf 3auv 3ph 3ckh 3ahp 3bwt 3eq 3xq 3ajr 3bf 3ot 3hu 3qt 3bms 3bta 3btj 3ckj 3chg 3xav 3bd 3cah 3bne 3cgc 3abj 3qf 3kj 3gt 3bvu 3brw 3aha 3avk 4it 4av 4vm 4by 4bu 4cu 4oa 4bx 4xe 4mv 4kn 4ob 4tr 4gy 4we 4si 4rm 4fn 4aae 4fa 4md 4fh 4eh 4tr 4xx 4dk 4fw 4rz 1lt 4aad 4pz 4da 4vq 4ask 4aah 5acl 5atx 5he 5hv 5yd 5zai 5atp 5xau 5oc 5abs 5apq 5atv 5mn 5akl 5ame 5fc 5ain 5oq 5ahr 5rg 5yb 5alm 5jd 5ax 5kc 5att 5sp 5alz 5ms 5arf 5asz 5ajg 5akn 5ce 5ahg 5ad 5aab 6cgw 5aps 6wi 6cej 6aqp 6crs 6cuw 6awt 6nx 6aoa 6eb 6jy 6bhz 7jf (Hi !) 8akk 8hp 8bsf 8zai 8exh 8bhm 8vx 8aig 8fl 8uu 8sk 8alr 8aul 8bpm 8ame 8bpn 8ccr 8bzx 8aks 8ul 8dsm 8bpl 8kw 8atv 8avl 8zu 8ah 8dqt 8rj 8dme 8cep 8axx 8fp 8bsw 8cqs 8cog 8axa 8brd 8jq 8chk 8djp 8aol 8dki 8dia 8ayy 8acy 8cnx 8sy 8bin 8bds 8cau 8mc 8dfo 8lo 8eje 8afq 8dqb 8brc 8bce 8amu 8axf 8cmd 8cbr 8dlu 8dpa 8ze 8avo 8gk 8bgn 8atx 8ben 8amd 8btv 8aly 8dno 8ded 8dto 8agq 8wo 8cdv 8dae 8aj 8dko 8sf 8xe 8bth 8dsy 8oq 8ks 8cjm 8se 8cu 8by 8ada 8vg 8cau 8cqh 8blb 8bfe 8ety 8hk 8cbi 8dgo 8zae 8pi 8dnk 8aii 8byv 8avd 8bzu 8cca 8dx 9adk 9bpb 9aio 9bxz 9dud 9eez 9ph 9bnk 9bme 9ajj 8dyn 9es 9cfn 9cur 9cyi 9wg 9dmt 9esc 9ebp 9bmd 9bwv 9cfi 9ua 9wo 9nv 9dot 9cn 9drs 9cyq 9gl 9bca 9og 9dtk 9eji 9tg 9eag 9cjw 9eg 9aot 9fa 9aj 9che 9afu 9apn 9civ 9bqa 9nk 9aeb 9ek 9dke 9bjw 9bht 9bjz 9dwr 9adg 9cto 9dmz 9cyr 9acl 9bxg 9xe 9abi 9duc 9dpj 9adr 9bta 9dkc 9pn 9ckm 9hzx 9bj 9fj 9axd 9fl 9xi 9bna 9clk 9djz 9cyw 9ck 9dqu 9aci 9dbj 9cca 9dcg 9egh 9brx c3xi c3ml c1ar c3ad c2do bz1ab bz2ab bz5aa q2jt q2by ch2ar npell g6ox ob2 o3an o2ld.

pr4KD, E. W. Mayer, care U S Naval Radio Station San Juan, Porto Rico.

40 meter band

1aap 1aci 1acx 1adp 1aee 1aep 1af 1afv 1agc 1ahb 1ahl 1ajg 1ajq 1akz 1anz 1aof 1apv 1ary 1as 1asi 1avl 1aw 1axn 1ayn 1bad 1ban 1bdh 1ber 1beh 1bgo 1bhm 1bke 1bq 1bqe 1bqk 1bs 1bxh 1cak 1ch 1cmp 1epj 1ere 1eri 1dd 1dn 1ga 1gr 1ii 1jr 1km 1nt 1od 1rd 1se 1sz 1vc 1wd 1wk 2abg 2aes 2aeq 2adp 2ae 2aev 2asq 2agt 2agz 2ahe 2ahk 2ahm 2ajw 2amd 2aof 2apv 2aqi 2bbb 2bhf 2bkr 2bl 2box 2bqb 2bsl 2bul 2bxj 2byj 2cab 2eds 2chk 2ejd 2cns 2crb 2es 2cso 2ctq

2ctf 2cvj 2cvn 2cyw 2czr 2ev 2gk 2kg 2ld 2mu 2nz 2pd 2pf 2rv 2tp 2we 2xq 2xaf 2zv 3ab 3ahl 3ahp 3aie 3aih 3as 2auv 2bhv 3blp 3bo 3bup 3bwj 3bwt 3cco 3cdq 3cdv 3cel 3ckj 3jo 3ju 3ko 3ll 3mo 3mv 3nf 3pl 3qv 3rx 3te 3wa 3wj 3wz 4aah 4ay 4bu 4ch 4cv 4fl 4fm 4fs 4gu 4ib 4iz 4rm 4rr 4sb 4sl 4sy 4tv 4vq 4vs 4za 5acl 5acz 5ahr 5arx 5atz 5aup 5aw 5ax 5ez 5ha 5ic 5jd 5nq 5ow 5pb 5zai 6adj 6en 7cs 7el 7gy 8aak 8ada 8ago 8aig 8aks 8aly 8aul 8bf 8bgn 8bhm 8bko 8bkq 8bon 8bp 8bpl 8bq 8bqi 8bt 8btr 8bvj 8bww 8bzu 8cau 8ceq 8cer 8ces 8cjm 8daa 8dae 8fdo 8dfr 8dia 8dme 8dog 8dps 8er 8gz 8ld 8rk 8se 8vx 8zu 9aau 9ado 9aot 9asj 9bco 9beq 9bht 9bkr 9bm 9bmd 9bnq 9bpb 9bqe 9bwp 9bza 9eby 9ecl 9eur 9cxx 9czz 9daj 9dfk 9dks 9dmz 9dng 9drr 9dwz 9ebj 9eel 9ef 9eiz 9eji 9eky 9elr 9jr 9og 9ox numm nosm nisr nism ndf g2cg g2fk g2mm g2oj g2qb g2rb g2si g2un g2wj g2yq f8gi f8tok f8yor maroc cldq c2be c2bg c2jt c3aa c3ka c3ml b2b b2oj b4rs b4ru b4yz bp2 norm z4as a4ree d7ec i1jw beber Palestine 6zk mut dks robl rkfn prjh wse.

8DDS, Tony Mony, 182 Graves Avenue, Battle Creek, Michigan.

1afd 1afy 1ahb 1bad 1bz 1bzc 1caw 1cmf 1gm 1xf 1yb 2acp 2ahm 2alq 2bg 2cjj 2fc 2ff 2ks 3bss 3cjn 4bu 4cu 4dk 4fl 4fp 4jv 4rr 4rz 4sc 4sx 4tn 5ahg 5aig 5ajk 5aky 5amw 5aop 5att 5ce 5dq 5maj 5nw 5ph 5qi 5rg 5se 5sp 5tiq 5uk 5ux 5vl 5yh 5yd 5zai 6adw 6ann 6atu 6awt 6bcn 6bhz 6bgv 6bq 6clp 6cqa 6ct 6dag 6hm 6oi 6rm 7adm 7af 7fq 7pj 7uj 7vq z2aq bzlab c3ni c3vh pr4je pr4ur aldi wir wiz narl naw nba nkf npg fw 7v9civ?

Radioroom U.S.S. Worden (288) care Postmaster, New York City 40 meter band in Cuba and Canal Zone.

1aao 1ads 1aep 1ahb 1ajx 1akz 1ald 1apz 1bdx 1bhm 1bkp 1bqd 1ckp 1cmf 1cmp 1cmx 1hj 1ii 1rd 1se 1si 1sz 1uw 1vc 1yd 2aco 2acp 2aes 2agm 2agq 2ahm 2akb 2alm 2arm 2box 2cth 2cvj 2cxl 2cyx 2gk 2nz 2ol 2xa 2xbb 3abj 3acm 3afw 3ahl 3as 3auv 3bms 3bmz 3bne 3bod 3cau 3cel 3ckh 3ckl 3ft 3qt 4aah 4av 4es 4da 4it 4jm 4jv 4kj 4km 4lt 4ou 4rm 4rz 4si 4ua 5aa 5acf 5ajw 5alz 5aop 5atp 5att 5hlp 5hp 5hy 5ms 5rg 5sp 5vl 5xaa 5yb 5yd 5zai 6ahp 6ay 6bhz 6buc 6chy 6cto 6dcf 6sg 7dc 7df 8adh 8aks 8aly 8avd 8ayj 8bau 8bfk 8bjp 8bpl 8bt 8bth 8bzx 8cau 8cdv 8dfo 8dga 8dia 8dmz 8dop 8eq 8ge 8pl 8rt 8ul 8vx 8xe 8za 8ze 8zu 9adk 9ado 9adr 9ax 9bxg 9bzi 9ck 9cn 9csf 9cvn 9cwn 9cxc 9cyi 9cyw 9djz 9dxr 9dzu 9ebp 9egh 9ei 9eky 8fj 8hp 8og 8ui 8xik 9zk wva naw naj nkf npg wiz wir kfuh xda xam fw afe.

b4RS, Rue Tranchee, Verviers, Belgium 40 meter band

1aao 1aci 1ack 1aff 1ahl 1aid 1aiu 1ana 1arh 1atj 1axa 1atv 1azd 1bgk 1byx 1bzp 1cab 1caw 1ch 1cmf 1cmp 1cmx 1ef 1ez 1hn 1kmz 1or 1se 1tv 1yb 1za 1zb 2aes 2ahm 2apv 2apy 2bkr 2bl 2bxj 2cs 2cte 2ctf 2cv 2cva 2cyw 2czr 2gp 2mm 2nd 2qg 2uk 2zv 3ab 3afq 3ar 3bva 3bwt 3cjn 3jo 3lw 3mv 3mz 4fm 4io 4rr 4we 5ahp 5alz 5oq 5gw 5yd 8aly 8bdc 8bpl 8bvj 8bww 8ccq 8cyi 8daa 8dnf 8es 8ex 8gz 8jq 8xe 9aav 9abo 9akf 9bht 9civ 9ecp 9eji kfuh nfv nisf nos nkf woo a2cm a3bq a6ag bzlab bzlac bzlad bzlav bzlai clak c2ax c3fc c3ni f8qq mlm pi 1hr neqq nuqg Palestine 6yx and 6zk rfh4 rbal beber npp oa3e oa4z oa6n pse qrk b4rs on 43 meters?

c5AW, Lyle Geary, Whitehorse, Yukon, Alaska.

1aao 1ahl 1air 1aiu 1beq 1bhs 1bux 1pl 2agq 2amj 2cel 2cxl 2gy 2nz 2xaf 2zl 3bit 4bu 4cu 4de 4fl 4kn 4pz 4rr 4si 5aci 5ado 5aen 5agn 5ahr 5ail 5alz 5atp 5att 5atv 5aua 5em 5fc 5fg 5he 5hf 5if 5mh 5mi 5oq 5ov 5sg 5tg 5uk 5vd 5zai 6aak 6abg 6ahp 6ahw 6aiu 6aje 6aji 6aij 6akm 6akw 6akx 6alw 6ani 6ank 6anw 6aoc 6aoi 6apk 6aps 6apw 6aqp 6arl 6aso 6atd 6auf 6aus 6avi 6awt 6av 6bcm 6bcv 6bgo 6bgu 6bhz 6bis 6bix 6bkh 6bmw 6bol 6bon 6boo 6bpg 6bpq 6bsc 6bsf 6btb 6bur 6bvj 6bx 6cae 6cax 6cbb 6cbj 6cco 6cet 6cfj 6cgw 6che 6chl 6cin 6cix 6ckv 6clp 6cmg 6cnd 6cnm 6cno 6coa 6cqa 6crs 6csv 6csw 6ct 6ctd 6cto 6cwu 6dab 6dag 6dah 6dan 6dat 6ea 6eb 6ec 6fa 6fd 6fz 6ge 6hf 6hm 6im 6kb 6kg 6km 6kw 6li 6no 6ob 6oi 6pl 6rj 6rm 6rw 6rv 6ts 6uf 6ur 6uj 6vr 6vz 6ws 6zd 6zr 7aaj 7ahf 7adm 7ado 7adq 7aek 7aip 7aiu 7ay 7cw 7dd 7df 7dj 7ef 7ek 7en 7eo 7fb 7fe 7fl 7fq 7gr 7gw 7hb 7hd 7ho 7it 7jm 7ki 7ky 7lq 7lu 7ne 7ni 7no 7oy 7ps 7rl 7ru 7sp 7tm 7uj 7uq 7vh 7wb 7wj 8adg 8alr 8aly 8am 8ayu 8bau 8bds 8ben 8bf 8bgn 8bjz 8bok 8bt 8buu 8bww 8cty 8cvq 8cwr 8dea 8dgl 8dgp 8eq 8ex 8gz 8jq 8kc 8se 8xe 8xk 8ze 8zu 9aaw 9adk 9aim 9anz 9aot 9apa 9apm 9ayp 9bal 9beq 9bht 9biz 9bos 9bpx 9bpy 9bzi 9cet 9cip 9cms 9cow 9cps 9cto 9cvn 9cxg 9dac 9dbb 9de 9dge 9dkc 9dmz 9dng 9dpx 9dqu 9dte 9eby 9ecl 9egf 9egh 9eji 9elt 9nv 9og 9sz 9xax 9xi 9za 9zt c3aa c3nc c4ah c4cc c4fv c4gt c5ba c5cr c5ct c5gf c5go c9 hu6aff hu6als hu6buc hu6cmh hu6cst hu6db hu6dbl hu6dcf hu6oa hu6tq hu37c hufx1 npm wyi jlaa jlpp jilhr pineqq pinpo mlaa mlaf m5c (pse qra?)rrp 6zac npu ilrm bzlab bzlac bzlia bz2ab ch9tc cz99x nba a2ad a2bd a2nj a2ya a2yi a2tm a3bq a3qh a3tm a3yx zlao zlaf z1fq z2ac z2xa z3al z3af z4ac z4ag z4ak z4al z4ar gdvb kfuh.

ch2LD, ch3AG Luis Desmares, Casilla 50 D, Santiago

1aao 1aiu 1ga 1rd 2cxl 3cc 3chg 4cu 4rm 4tv 5acl 5gj 5oq 5sd 5sp 5xa 5yd 5zai 6aiv 6aqp 6asd 6bhz 6cgw 6cix 6dag 6ha 6hm 6vr 7df 8bce 8bpl 8gz 9adk 9ado 9aio 9cip 9cvn 9cxx 9dbh 9dte 9eky 9xi 9za 9zt raa8 rad1 rae2 raf1 ras7 rba1 rbm2 rcb8 rdb2 rdd7 rde2 rdg1 rdg2 rdh5 rdx1 rfa3 rfb5 rfb9 rfc6 rfh4 rmb1 rpa2 ramf rap bzlab bzlac bzlaf bzlah bzlai bzlan bzlbc bzlbd bzlia bz2ab bz2af bz2aj bzaabz bzrgt bzsni bzsqi yckw yfwx yjcp mlaa m1b mlj m5o z2ac z2ae z2aq z2gj z2xa z3ad z4ac z4af z4ar c4gt c5go f8xn smzs ilgw oa3e oa4l oa4z oa6n a2yi a4an pilhr hu6aff hu6buc hufx1.

ch9TC, Major R. Raven-Hart, Los Andes, Chile

1bgi 1cmp 1cmx 1sw 1yb 1za 2afd 2bj 2bab 2brb 2clg 2gk 4io 4rm 4sa 4tv 4we 5aav 5acl 5aid 5ajg 5amw 5ani 5asv 5kw 5ok 5ph 5pi 5qk 5sd 5va 5wp 5zai 6afh 6ake 6bav 6bhz 6bsc 6buc 6cbu 6cgw 6chl 6cda 6css 6ct 6cto 6cv 6dat 6dbl 6dfc 6eb 6ec 6fa 6gk 6hm 6oi 6qe 6sb 6vc 6vg 6vr 6xag 6zaf 8bpl 8dpa 9abk 9adk 9ado 9ayp 9bed 9cfy 9che 9cjw 9cn 9cvn 9dac 9dbb 9dng 9eji 9ek 9eky 9hp 9zk 9zv hufx1 kfuh nell nkf npm nve oa3e aa3x oa4z a2yi zlax z2ac z2br z3af z4ac bzlab bzlac bzlah bzlam bzlan bzlap bzlav bzlbd bzlia bz2af c4gt m9a.

J. R. Nelis, 155 Radio Holland, Tandjong Priok, Dutch East Indies

4bu 6bq 6oi 8bau 9ua huwyi a3qh a4an a4hm z2xa pilar pilat pilau fi8qq oa3xa jab kfuh hza hva c5g nnb ngy najd. All cards qsl'd.

S. K. Lewer, G6LJ, 32 Gascony Ave., London N. W. 6, England.

1aao 1aci 1adi 1aej 1aer 1aff 1aha 1ahg 1ahl 1aid 1air 1aiu 1akz 1al 1all 1amf 1aof 1aos 1aou 1au 1avl 1awd 1axa 1bdh 1bke 1cab 1ck 1ckp 1ch 1cmf 1cmp 1cmx 1coe 1crn 1ga 1hj 1ii 1ik 1kl 1rd 1rr 1sw 1vc 1yb 1yd 1za 2aes 2ahm 2ag 2agt 2agq 2aim 2aky 2amj 2anm 2apm 2apu 2bl 2bql 2bw 2bxj 2cje 2cns 2crb 2crp 2cvj 2cxl 2cxy 2cyu 2cyx 2fl 2gp 2gx 2hh 2ku 2mk 2rm 2sz 2wk 2zb 3ab 3auj 3auv 3bhv 3bqz 3bnt 3cjn 3dh 3hg 3hl 3ld 3lw 3ps 3uh 3sk 3wb 3zm 4dm 4es 4jk 4pz 5acl 5ahp 5att 5aix 5ux 5zai 6cix 6ga 6oi 8ada 8ade 8adg 8adm 8aly 8avl 8avj 8hjw 8jl 8bqi 8buw 8bww 8bvn 8bzu 8cau 8ceq 8cfq 8coo 8daa 8djf 8dqa 8es 8fi 8jj 8jq 8rv 8qb 9ado 9aio 9akf 9bag 9bht 9bna 9bpt 9bvh 9bzs 9cj 9cjw 9dkc 9dng 9egu 9eji 9xe 9zt clar c2ax c2bg v3xi c3yp c8ar pr4je pr4kt pr4sa pr4ur bzlab bzlac bzlae bzlaf bzlap bzlax bz1bd bz1ia bz2ab bz5ab bzsq1 bzsq2 rba1 rfa3 rfb5 ch2ld s2by q2mk a2kg a3bd a3bm a3bq a8ef a3hl a3kb a3xo a4am z1af z1ao z2ac z2aq z2cq z2xa z3ad z3af *z4aa* z4ac z4af z4xa pilhr pineqq pinajd pinbn cz99x fi8qq fi8ug oa4z oa6n hu6buc j1pp yhbk ngy nsn nosm nrpn kfuh xam. All cards qsl'd. Pse qrk my 45 meter sigs?

i1ER, Santangeli Mario, Via Eufamia No. 19, Milan, Italy. New Calls

1aag 1abx 1adi 1aes 1ahb 1air 1ahv 1axa 1bay 1bdw 1bqt 1cal 1coe 1cpb 1ia 1jr 1or 2arm 2ate 2cfa 2ek 2kg 2mk 3avk 3bcm 3btq 3cdk 3ld 3qt 5bk 5fc 7nn 7nq 8awa 8cwk 8dgj 8kc 8rh 8zae 9aio

9cca 9gx bz1ai bz1ah bz1ap bz1sq bz2af bz5aa bzrgt e3ad e3kj cz99x e9m nari nism nnos nbm crp wra paz.

pi3AA, F. Johnson Elser, Baguio, P. I.

oa3b oa3e oa3x oa4l oa4z oa5z a2cs a2ua a2yh a2yi a3ad a3bd a3bm a3ef a3jr a3kb a3lp a3tp a3yx a5da rcb8 bz1ab bz1ac bz1af bz1at bz1av bz2af bz5ab bz6qa bzrgt bzql ffw g6zk hu6abl hu6aje hu6buc hu6cmh hu6est hufx1 huwyi npcll fi8blt fi8qq i1bo i1gn j1aa j1pp j3aa j3bb jls z2ac z2dx z2xa z4av pilar pilau pilcw pilfn pilhr piff4 pr4ur 1aao 1ch 1rd 1yb 2yb 3au 4an 4ay 4dm 5yd 5za 5zai 6avj 6awt 6abg 6bcs 6bq 6bsc 6bon 6cqa 6ctd 6dai 6dag 6zac 6dbe 6ob 6qu 8er 8gz 8zw 9alt.

z3AF, L. F. Ball, 90 Gursery Road, Christchurch, N. Z.

1yb 1da 2cty 2blm 3bhv 3ckl 4io 5eew 5zai 5atp 6rn 6hm 6ake 6ot 6bih 6aff 6cix 6bhz 6kg 6bim 7ya 7df 8aly 8aj 8bau 8bby 8eji 9zt 9zk 9dng 9evn 9ado 9xi 9dxr hu6ajl hu6asr hu6oa hu6cst hu6aff hu37c hufx1 g2kf f8tok i1as i1gw fi8qq c3ni c5hp c5ba kfuh nism.

yFWX, J. Henderson, San Eugenio 1156 Montevideo, Uruguay. 40 meter band

2amj 2bw 2mm 8es 9eky hu6aji hufx1 j1pp oa3e z1ao z1ax z2ac z2xa upl npu 2xs (15 meters).

G-6CJ, F Charman, 76 Salisbury St., Bedford, England.

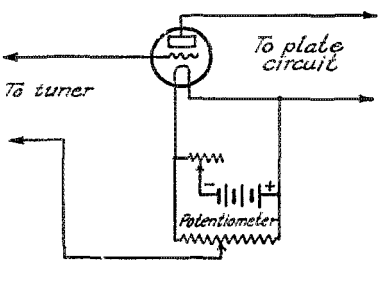
U. S. A.:—1aae 1aaj 1aao 1aay 1abg 1abn 1abp 1abx 1acb 1aci 1acl 1aco 1ad 1adi 1adm 1adw 1aep 1af 1aff 1afh 1afo 1ah 1ahb 1ahg 1ahl 1ahs 1ahv 1ai 1aid 1aim 1ain 1air 1aiu 1ajg 1ajo 1akz 1ala 1all 1alp 1alr 1ama 1amf 1ami 1ams 1amu 1ana 1anq 1anw 1aof 1aos 1apl 1apv 1apz 1aql 1are 1arf 1arh 1as 1atv 1atz 1au 1auc 1auj 1auk 1avf 1avk 1avl 1avw 1awe 1aww 1awy 1axa 1axn 1axo 1ay 1aye 1ayf 1ayg 1ayl 1azg 1azd 1azw 1ba 1bad 1bae 1bay 1bbr 1bc 1bec 1bdp 1bdx 1bfz 1bg 1bgc 1bgq 1bgt 1bhm 1bit 1biz 1bke 1bl 1blf 1blu 1bom 1bqi 1bqk 1bqp 1bs 1bsd 1byl 1bwj 1bxh 1bxl 1byx 1bz 1bze 1bzp 1cab 1cak 1cal 1cay 1caw 1cb 1cbb 1ccx 1ch 1ci 1ck 1ckk 1ckp 1cln 1cmf 1cmp 1cmy 1cn 1cnp 1cde 1coi 1cot 1cpa 1cpi 1cre 1ctl 1cu 1cvu 1cw 1cx 1czr 1da 1dcg 1dl 1ef 1ej 1er 1fu 1ga 1gu 1hj 1hn 1hr 1ii 1jc 1jf 1jr 1kl 1kq 1kw 1lw 1mk 1my 1nn 1no 1or 1ou 1ow 1pl 1py 1qb 1qm 1rd 1rf 1rn 1rr 1sa 1si 1sj 1sk 1so 1sw 1sz 1ts 1uc 1uk 1ur 1uu 1uw 1vc 1we 1wl 1wp 1xa 1xg 1xj 1xm 1xo 1xu 1xz 1yb 1za 1zao 1zep 1zl 1zt 2aan 2ach 2aci 2aco 2acs 2adm 2aes 2af 2afg 2afm 2afn 2afp 2ag 2agb 2ago 2agq 2ahk 2ahm 2ai 2aim 2ais 2ajd 2ajq 2ajw 2akb 2akp 2aku 2aky 2alh 2alp 2alv 2alw 2amh 2amj 2anm 2aof 2aou 2api 2apv 2aqd 2ar 2ard 2asj 2atr 2auf 2awf 2ax 2bbx 2bby 2bd 2be 2bee 2bff 2bir 2bj 2bjx 2bkr 2bl 2blm 2bm 2biv 2bnl 2bnr 2bo 2bpb 2bq 2bqb 2bqq 2br 2brb 2bsc 2bsl 2btu 2bui 2bum 2bur 2buy 2bva 2bw 2bwa 2bwc 2bvj 2by 2byp 2cab 2cbg 2cc 2ccx 2cd 2cdc 2cdh 2cei 2cfp 2cg 2cgi 2cgj 2cgk 2ch 2chk 2cje 2cjj 2cla 2cns 2co 2cpa 2cpd 2cqz 2cr 2crb 2cs 2ctf 2cth 2ctq 2cty 2cuj 2cv 2cvj 2cvl 2cvs 2cvu 2cwj 2cxl 2cy 2cyu 2cyw 2cyx 2czn 2czr 2ds 2dz 2em 2ev 2fj 2fo 2fr 2gk 2gp 2gx 2gy 2ha 2hh 2hj 2hu 2ih 2ip 2jb 2jn 2jq 2ju 2jw 2kr 2ku 2kx 2ls 2lu 2lx 2lz 2mm 2mu 2nf 2nj 2nn 2nw 2nz 2oc 2ol 2pc 2qb 2qh 2rb 2rd 2rk 2rm 2rs 2sz 2ud 2uk 2wb 2wc 2wr 2xaf 2xar 2xbb 2xbf 2xbg 2xi 2xm 2xz 2za 2zb 2zv 3ab 3ach 3aci 3adv 3aev 3aew 3afo 3afq 3agg 3aha 3ahl 3aib 3ao 3apv 3as 3aji 3auq 3auv 3avk 3bck 3bct 3bf 3bg 3bhv 3bit 3bmk 3bmz 3bne 3bnu 3bof 3bqz 3bss 3bta 3bu 3buv 3bva 3bwa 3bwj 3bwl 3cbl 3cdv 3cel 3cgo 3cgv 3chg 3cis 3cj 3cjn 3cka 3ckj 3ckj 3ckp 3clw 3dh 3gb 3hg 3hw 3ih 3im 3io 3ja 3jn 3jw 3kq 3kt 3ld 3ll 3lw 3lu 3mk 3mv 3mw 3pf 3ps 3py 3ql 3sf 3sk 3te 3tn 3uv 3vx 3wb 3wo 3xav 3xp 3xv 3zo 3zw 4aae 4aah 4aaj 4ac 4aj 4an 4ask 4au 4ax 4ch 4cj 4cu 4du 4eq 4er 4fh 4fj 4fl 4fm 4fx 4io 4iv 4iz 4je 4jk 4jr 4js 4kj 4km 4kn 5kt 4-4oy 4pi 4pz 4rm 4rr 4sa 4si 4sk 4te 4tf 4ua 4uk 4um 4ur 4vk 4vl 4vv 5aav 5ac 5acl 5acq 5agn 5ahn 5ahp 5aid 5ain 5akn 5aky 5aiz 5aom 5asv 5att 5atv 5atx 5aur 5bd 5bk 5da 5er 5fb 5he 5jf 5ka 5kc 5ms 5nj 5nq 5nu 5oq 5ox 5ph 5qk 5qw 5rd 5rf 5sk 5sw 5uk 5va 5vv 5wb 5yd 5zai 6amy 6awt 6bjv 6bvh 6cgw 6cnc 6cto 6dac 6hm 6is 6na 6os 6uz 7aaj 7alk 7ak 7bf 7df 7ga 7gr 7ne 7nx 7ok 7st 7uz 7vx 7zi 7mz 7sk 8aay 8ada 8ade 8adg 8adm 8afn 8ajn 8alf 8alo 8aly 8amd 8ame 8apo 8ar 8aub 8auk 8avi 8aw 8awa 8awe 8awu 8axn 8axo 8az 8azu 8baf 8bch 8bdc 8bdh 8bds 8bf 8bgn 8bkw 8blc 8boa 8boy 8bpb 8bpl 8bpo 8bpn 8bq 8bqi 8br 8bre 8brd 8bso 8bt 8bu 8uk 8uy 8bv 8bvj 8bwr 8bww 8byc 8byt 8cau 8caz 8cbi 8cbr 8cc 8ccq 8cer 8cet 8cds 8ced 8ces 8cgj 8cgr 8chk 8cq 8cyi 8czr 8daa 8dac 8dae 8dfr 8dfv 8dgj 8dgo 8di 8din 8djp 8dls 8dme 8dno 8doi 8don 8dpa 8dqv 8drs 8dw 8ea 8eb 8eg 8eq 8er 8es 8eu 8ex 8gn 8gz 8jl 8jj 8jm 8jq 8jy 8ks 8kw 8ly 8mc 8nb 8nx 8ol 8pk 8pz 8rf 8rh 8rr 8rv 8ry 8se 8sf 8si 8sy 8tx 8uk 8wl 8xe 8zf 8zg 8zq 8zz 9aai 9aap 9adk 9ado 9afe 9akf 9al 9alf 9aot 9aps 9ar 9ark 9atq 9att 9ayb 9bbj 9bcj 9bf 9bfp 9bh 9bht 9bhy 9bkc 9bmd 9bmf 9bmv 9bmx 9bop 9bpb 9bvh 9bvz 9bxg 9bxj 9cap 9cbc 9cca 9ccx 9ef 9cip 9civ 9cji 9cna 9ctg 9ctr 9cul 9cxx 9dfb 9dfv 9dib 9dmj 9dng 9dpj 9dpl 9dpx 9dqz 9ds 9dte 9dvh 9dwk 9dyy 9ebo 9ebx 9ee 9ees 9egu 9ehs 9eje 9eji 9ejy 9ek 9eky 9es 9ex 9ff 9gx 9im 9mn 9nk 9nu 9og 9qr 9sg 9sr 9st 9ua 9uq 9wo 9xax 9xi 9za 9zb 9zt.

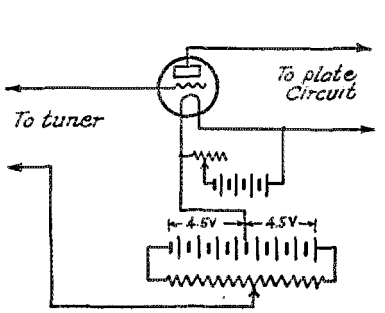
Strays

Corrections

In our March issue a very regrettable and stupid error was made in Figures 21, 22 and 23 on pages 19 and 20 of Mr. D. R. Clemons' article on shielding. The inductances of the coils in these figures were given in millihenrys. Since they are ordinary receiving coils this is obviously foolish—the correct values being in microhenrys using the same figures. The fault is not that of Mr. Clemons.

The diagram shown below should have appeared in the upper left hand corner of page 47 last month. Take a look at it—it's interesting.





Correspondence

Stay Where You Belong, Gang!

Icarahy-Nictheroy,
E do Rio,
Brazil

Editor, *QST*:

It is surprising to note that a great number of U. S. amateurs are operating out of their legal so-called 40-meter band, thereby causing unavoidable QRM to our working the U. S. A. Brazilian amateurs, and most South American stations, operate on a band comprised of the wavelengths between 32 and 37 meters. Despite this, our QSO's with the U. S. are often spoiled by the U. S. hams working right in our band, totally disregarding the 37.5 meter termination of their 40-meter band.

Our two way communications with the U. S. are getting to be a tiresome job under such conditions, and we frankly are getting very disgusted hearing the other fellow come back and say "Nd QRM QTA" or the like, whenever we attempt to chew the rag with him for a while. If the U. S. amateurs persist in QRMing us, we will have to quit working with them and shall look to Europe and other foreign countries for our contacts. We stand much better chances of holding QSO's with these amateurs, who stay on their assigned wavelengths, and who do not come back "Nd QRM, etc".

We have been told by a number of U. S. hams that those who get down below their regular band think their signals will get out better on the lower wave; others say the reason is the lack of properly calibrated wavemeters, or no wavemeter at all. Either reason is inexcusable inasmuch as the 35 and 40 meter signals come in just the same down here, and also there are a number of O. W. L.'s from whom points can be taken for wavemeter calibration or checking.

By the way, the poor fellow who happens to fall within our 32-37 meter band will have a hard time to QSO South America for his signals will be lost in our own QRM. So, go back to your own band, Om, hi!

As you know, the legal band for Brazilian amateurs is 40-45 meters, but we are camping on the lower band of 32-37 and expect to alter the allotted band to conform to this practice. You will seldom hear a "bz" above 37 meters as we are making an effective effort to bunch them on the above mentioned band.

We are always anxious to QSO U. S. hams. Here is hoping for both of us, *but please stay above 37.5 meters!* We realize the difficulty and size of the job of the Radio Inspectors, but from the number of stations off the band, we can only wish "more power to them".

—*Alvaro S Freire, bz1AB.*
—*C. G. Lacombe, bz1AC. Pres.*
Brazilian Section, I. A. R. U.

Ford Radio Apparatus

1018 West 5th Street,
Dubuque, Iowa.

Editor, *QST*:

Remote controlled transmitters have been suggested as the solution to the problem of the cold outdoor shack or the summer-hot attic. Remote controlled transmitters are O. K. but the relays necessary in such an arrangement are costly. Those on the market are out of reach of the average ham's purse and the ordinary run of home brew relays is not dependable. Revamped Morse sounders are all right but the average static room does not boast such things. The best substitute I have yet found is the generator cut-out on a Ford. They're quite cheap—in fact worn out ones can be had for the asking at most Ford service garages. It may be necessary to root in the junk pile for them, tho.

There are two windings on the core of the magnet; a heavy series winding and a fine shunt winding. The heavy winding is of no value and can be removed. The fine winding is used to energize the magnet. It has a D. C. resistance of about fifty ohms and will pass 100 milliamperes continuously without heating. The action of the armature can be regulated by bending the clip that holds the tension spring. In this manner the relay can be made to close the breaker points with the terminal voltage at the magnet coil as low as one volt. By various spring tensions and resistances in the line as many as four of these relays can be operated in a non-selective arrangement by shortening out the resistances to close the different relays; thus but two wires are necessary to control four circuits at a distant point.

It is much nicer to sit in a room of "human" temperature than to bake or freeze in an isolated static room.

—*C. M. Smith, 9BYP.*

Alpha Sigma Delta

Mass. Inst. of Tech.,
Cambridge, Mass.

Editor, *QST*:

With the approval of the Grand Secretary, Mr. Green, I inserted a "stray" in February *QST* regarding the Alpha Sigma Delta Radio Fraternity. The main purpose of this stray was to let hamdom know that such an organization existed, and so that we might get acquainted with similar bodies if any, or perhaps combine forces if it seemed desirable. From the number of inquiries I have already received and the character of some of them, it is evident that my original stray was unfortunately worded, and gave a "free for all" impression. In addition to the radio requirements for membership, our Grand Council must be satisfied that the character of the petitioners is such that they would be acceptable to a regular social fraternity.

—*Killian V. R. Lansingh*

Coil Construction

41 North 6th St.,
Hudson, N. Y.

Editor, *QST*:

Recently, while constructing a coil in accordance with the scheme outlined in "Celluloid Supported Coils", on page 21 of the February 1925 issue of *QST*, I discovered a little kink which should prove helpful in making coils of this type. In the article mentioned it is directed that after the spaced winding is complete, collodion should be applied along the strips of celluloid to bind the turns to the strips. In order to hasten the drying of the solution the coil and form were placed in a fairly hot oven for a few minutes. This had the desired effect of hardening the collodion quickly, and further, immediately on removal from the heat, the coil due to expansion of the wire turns, was found to be quite loose and easily removed from the form.

This simple stunt makes unnecessary any special preparation or mutilation of the form as indicated in the article already referred to, and further, the coil is ready for use with minimum delay. If it offers no other advantage, this type of coil is certainly free from macerated insulation and disarranged turns; faults common to basket-weave or pickle-bottle coils.

Close wound inductances of this type are practically as easy to construct as the spaced variety. In making the former, it is only necessary to apply collodion to the celluloid strips just before placing the turns, as the winding progresses, and a second or third application of the solution over the strips after winding is finished. It is always advisable to place a wrapping of waxed paper around the cardboard cylinder before placing the celluloid strips, as a precautionary measure against an excess of solution spreading. The wax paper will permit the coil to slip off the form even though the collodion is used too generously. The paper, in turn, can be removed easily after the coil has been taken off the form.

—*L. R. Hennessy*

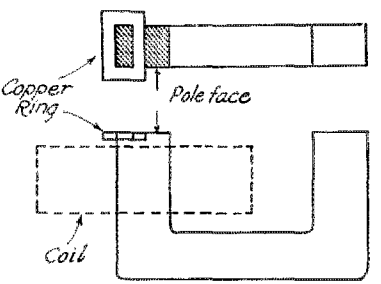
Non-Chattering A. C. Relays

34 N. Washington Ave.
Battle Creek, Mich.

Editor, *QST*:

I was interested in the article in the February issue of *QST*, by Harold P. Westman on "A. C. Relays". I have been devoting considerable time to this subject, and I believe I can give a few tips. If, instead of complicating the construction by adding weight and springs to make the armature hold over the zero part of the cycle, a shallow slot is sawed in the pole face as shown in the diagram, and a closed copper loop is pressed into the slot the armature will not chatter. This is due to the copper ring setting up a field which is out of phase with the exciting current.

If the experimenter will go to the meter department of the local power company, he can usually have for the asking some of the handiest articles imaginable, that is coils and cores. I have found that the cores from the sangamo and G. E. polyphase meters are the most useful. There is one type which requires only two nips of the tin shears to yield very fine laminations for small shell type transformers. I



usually saw out the middle tongue and put the coil over one outside leg (all of the laminations being assembled one way) and make several magnetic contactors, holding tight enough on A. C. (with the shading coil spoken of before) so that the armature cannot be pulled off with the fingers. I have made up several Tungar transformers using these laminations for cores.

—*Roy S. Hayes*

In the Backwoods

100 Main Street
Orono, Maine.

Dear Eddie:—

I've just had a string of experiences in the backwoods, and I would like to pass them along. I recently went to work in a mill town back about seventy miles from the firing line of civilization. An old friend of mine was there ahead of me so I sacked along about half of the radio stuff I could find in a hurry around the Queen City Radio Club, in order to build a transmitter. I found the town with a microscope and discovered it to be, without reservation, the coldest and dumbest spot on earth. My friend 1ARV was vainly trying to uphold the reputation of the A. R. R. L. with a single 201-tube. Outside of that, the radio world was represented by about fifteen B. C. L.'s of all degrees of rabidness.

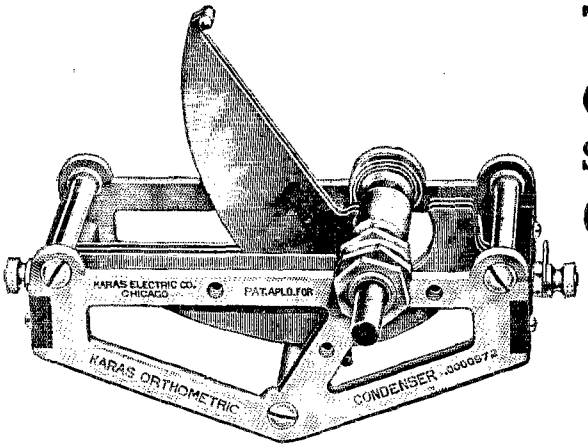
Everybody knows the kind of town; a circle of 50 yards radius drawn around the town pump will take in all the business section and the residences of most of the leading citizens. It was rumored about the time I got there that some radical had purchased a bathtub, but I never saw it. The barber operated between two tables in the billiard hall where the town druggist and photographer were also located. From the table which supported the telephone office, five steps would take you to the blacksmith, or the dry-goods counter, or the grocery store, and almost as far as the "pust-office."

We rigged up about 40 feet of Wm. B. Duck's model 1914 aluminum wire against the ceiling for an antenna and used the bed-springs for a counterpoise.That made it impossible to go to bed if the other operator was working the set because the person getting in bed would throw the antenna system out of tune. Of course we began to work most of the world on forty meters. Naturally howls began to come from the B. C. L.'s the next day. Two or three days after we started operating, a white bearded old gentleman met me on the street and seriously requested me to stop sending because as soon as I started all other waves around town had to stop. Another patriarch has been trying for several weeks to get me to replace the tubes in his neutrodyne, claiming that they all blew up the first time I pressed the key.

Kent, 1ARV, and I had about despaired of ever educating the townspeople into realizing that they had just as much trouble before we hit town, when we conceived a brilliant plan. We posted a notice in the biggest store and in the Post Office and passed the word around verbally. Then one night after the town was all prepared we ripped out the rectifier and filter, went up on 199-meters and set out to show the town what real interference was.

From seven to eight we ran a string of code speed tests. We explained the next day that we were perfectly within our rights but the natives could not decide whether to lynch us or beg us to lay-off. When this attitude of mind was reached we seized the opportunity to locate and eliminate a little power leak which had been bothering everybody. That turned the balance. The result now is an interested lot of B. C. L.'s and probably a few potential hams in the "——Radio Club".

—*John A. Pierce, "J. A."-1EB*



The KARAS ORTHOMETRIC Straight-Frequency-Line Condenser

Designed Particularly for Short Wave Work

Karas has taken the lead in developing condensers to meet the exacting requirements of short wave work. Karas builds the only 140 mmfd. condenser on the market. Karas Orthometric 5 and 7 plate condensers were built at the suggestion of Lieut F. H. Schnell and have been enthusiastically approved by him.

How many short wave experimenters appreciate the extremely exacting condenser requirements of a short wave set? How many realize that many condensers, satisfactorily adapted to the broadcast range, will prove quite worthless in short wave reception?

At 10 to 40 meters, radio energy performs many queer tricks. The dielectric MUST neither leak or absorb energy. It must be highly efficient as a dielectric, and be placed well without the effective electric-static field. The plates must hold the charge without variation. All these things are well accomplished in the design and construction of Karas Orthometric short wave condensers. They are as nearly perfect both electrically and mechanically as it is possible to build condensers.

The accurate straight frequency line characteristics of Karas Orthometrics are vitally important in short wave work. Think of it! There are as many channels of 10 kilocycle separation between 50 and 60 meters as there are between 200 and 500 meters.

Mechanical accuracy is vital. Slight variations in plate spacing that might be immaterial in broadcast work would upset frequency control at the tremendously high frequencies with which the short wave set has to deal. The spring pig tail connections on the 5 and 7 plate condensers are insulated to prevent contact noises at extremely high frequencies.

Karas Orthometric Condensers are mechanical masterpieces. They go far beyond the standards of accuracy heretofore considered necessary in condenser construction.

You will probably want one or two stages of audio in your short wave receiver. You cannot beat Karas Harmonik Transformers. Include one or two transformers with your order. They are $7.00 each.

Specifications of Karas Orthometric Short Wave Condensers.

Price $6.50 each

5 plate		
	Max. Cap.	.0001 mfd.
	Min. Cap.	.00001 mfd.
7 plate		
	Max. Cap.	.00014 mfd.
	Min. Cap.	.0000108 mfd.
11 plate		
	Max. Cap.	.00025 mfd.
	Min. Cap.	.0000115 mfd.

Also—

Karas Orthemetric Condensers for Broadcast Receivers

23 plate, .0005 mfd. price $7.50
17 plate, .00035 mfd. price 6.75

Karas Harmonik Transformers, price $7.00.

KARAS ELECTRIC CO.
Manufacturing Plant: N. Rockwell St.
Offices: 1074 Association Bldg.,
Chicago, Ill.

Order Through Dealer or, Direct on This Coupon

Karas Condensers in the 23, 17 and 11 plate sizes are generally sold by good Radio Parts Dealers in most cities. They are sold subject to our regular 30 day guarantee of "Satisfaction or your Money Back." Due to the scattered demand for condensers built for short wave work, the 5 and 7 plate sizes are not so widely stocked by dealers. Orders will be filled direct, or may be placed through your dealer and his jobber. If you prefer to order direct, use this coupon. Send no money. Just pay the postman the price plus a few cents postage.

Karas Electric Co., 1074 Association Bldg., Chicago.

Please send me.....Karas Harmonik Transformers and .....Karas Orthometric Condensers, sizes as checked below. I will pay the postman the price plus postage upon delivery. It is understood that I have the privilege of returning these condensers and transformers for full refund any time within 30 days if they do not prove entirely satisfactory.

..5 plate; ..7 plate; ..11 plate; .. 17 plate; ..23 plate.

Name .....

Address .....

If you send cash with order, we'll ship condensers and transformers postpaid.

A. R. R. L. Members -- What about your friends?

You must have a friend or two who ought to be members of our A.R.R.L., but aren't. Will you give us their names, so that we may write to them and tell them about the League and bring them in with the rest of us? The A.R.R.L. needs every eligible radio enthusiast within its ranks, and you will be doing your part to help bring this about by recommending some friends to us. Many thanks,

.....1926

American Radio Relay League,
Hartford, Conn.

I wish to propose

Mr. ..... of .....

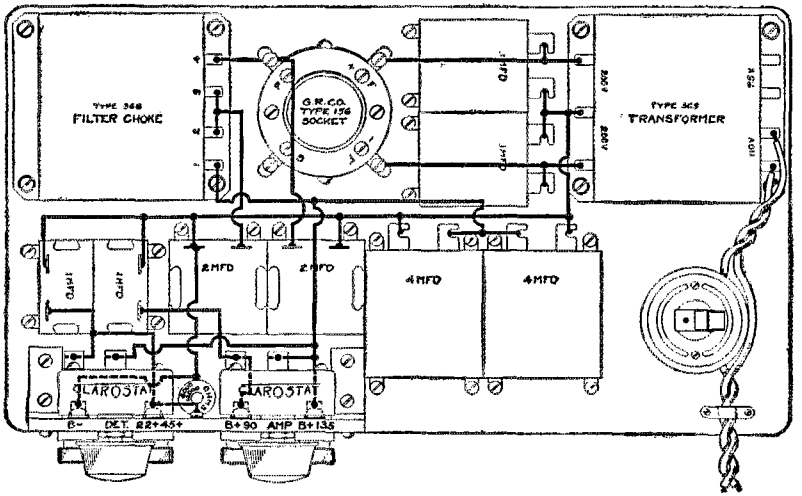
Mr. ..... of .....
Street & No. Place State

for membership in the A.R.R.L. I believe they would make good members. Please tell them the story.

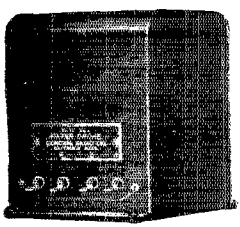
.....

.....

Build a Practical "B" Eliminator



Wiring Diagram for "B" Eliminator



Type 366

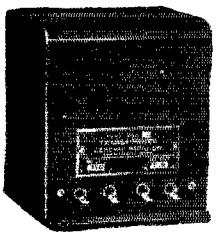
FILTER CHOKE

Price $10.00

THE above diagram shows the arrangement of parts and connections for an efficient "B" battery eliminator using the new General Radio Type 365 Rectifier Transformer and Type 366 Filter Choke. These Transformers give very satisfactory results in a plate voltage supply unit when used with the new Raytheon rectifier tube or other tubes of similar characteristics.

For further description refer to page 9158 of our new Bulletin 923-Q or write for our circular, "Instructions for Building a "B" Eliminator."

GENERAL RADIO CO.
CAMBRIDGE 39, MASSACHUSETTS

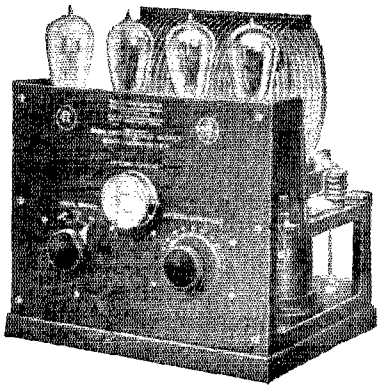


Type 365

Rectifier Transformer

Price $10.00

GENERAL RADIO



C. W. and Phone Transmitter

20 Watt C. W. 10 Watt Phone

Model ET-3619

This is a real opportunity to purchase one of the finest constructed, complete, compact tube transmitters which has ever been built for amateur use, designed along the lines of commercial apparatus, rugged in mechanical detail and having high electrical efficiency,

Designed to work on 150 to 200 meters but can be used on 40 and 80 meter bands with slight changes. Designed to be used with model ET-3620 Power unit but can be used with any other power supply.

Either 5 or 7½ watt tubes can be used.

This transmitter lists for $235.00 with tubes, microphone and key.

New in original cases.

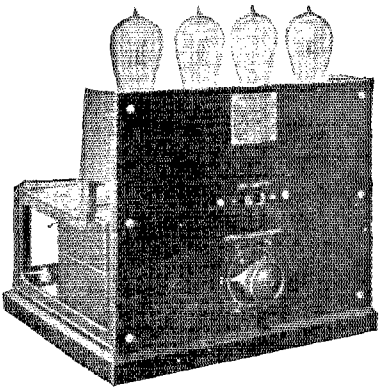
Extra Special Price less above accessories **$18 ea.**

AMERICAN SALES CO., **21 Warren St., N. Y. C.**

KENOTRON POWER UNIT

Model ET-3620

Complete with 4 UV-216 Kenotrons



This power unit will give full wave rectification from a 110-Volt A. C. supply. Will deliver 160 milliamperes at 450 volts, pure D. C., for plate supply, and 10 amperes at 7½ volts A. C. for filament supply. This unit contains suitable filter condensers, reactor, combined plate and filament power transformer, etc.

This equipment has been designed to operate in connection with Model ET-3619 Transmitter but can be used with any transmitter.

New in original cases.

List price $150.00. **Extra Special Price $28 ea.**

AMERICAN SALES CO., **21 Warren St., N. Y. C.**

SHORT WAVES

REL Plug-In Coils are used extensively in most short wave stations throughout the world.

COVER EVERY WAVELENGTH
From 10 to 110 Meters.
$4.50 COMPLETE

(AT YOUR DEALER OR DIRECT)

RADIO ENGINEERING LABORATORIES
27 Thames St. New York, N. Y.

"The Low Loss Coil Pioneers"

A&B Battery Charger ONLY $2

Charges any type of storage A or B battery, or auto battery, using a few cents worth of ordinary house current. Cannot injure battery and lasts for years. Complete directions enclosed—anyone can operate. No "Extras" to buy. **Satisfaction Guaranteed**

Why pay $10.00 to $18.00 for a charger when you can get this splendid GUARANTEED R. B. Charger by mailing us two dollars (bills, money order, check or stamps). Charger will be sent postpaid. If not satisfied, return in 5 days and we will refund your money. Act at once. TODAY.

R. B. SPECIALTY COMPANY

Dept. 25, 308 East Third, Cincinnati, Ohio

For intermittent service

such as is required on radio apparatus, men who know recommend Ray-O-Vac batteries

IT isn't just batteries that the radio amateur requires. What he wants is batteries especially designed for radio use.

Radio sets use batteries intermittently. The drain varies with different sets. Yet a smooth, uniform voltage is absolutely essential for the best results in both transmitting and receiving.

Ray-O-Vac batteries are especially designed for this type of service. The individual cells are so constructed as to give both smooth current and long life.

These batteries have abnormally low internal resistance—far lower than most other batteries on the market. The resistance remains lowest during discharge, too. That is why Ray-O-Vacs deliver signals free from distortion.

Men who know radio and who demand the most of radio batteries, recommend Ray-O-Vacs without qualification. Dr. Lee de Forest, the father of radio broadcasting, says "they most nearly approach my standard of requirements."

If you are not now using Ray-O-Vacs, equip your apparatus immediately with a complete set for all A, B and C current. Use No. 2151 or 5151 BP for detector tubes; Nos. 2151, 2301 or 2303 for drains from 4 to 15 milliamperes; and No. 9303 for drains above 15 milliamperes. They will give you a new idea of battery service.

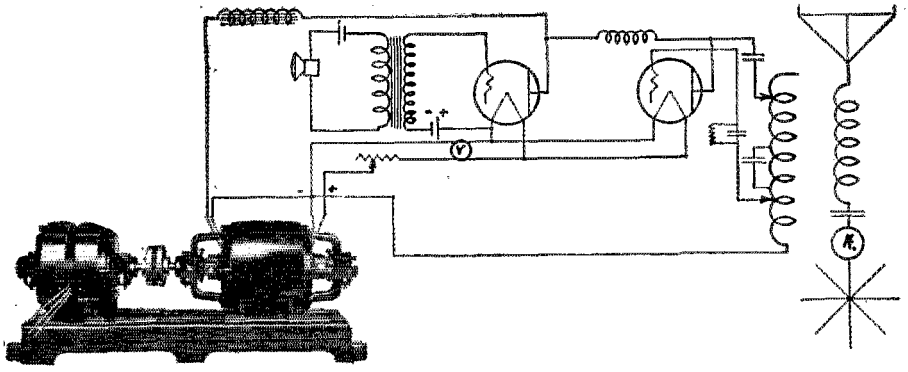
There are Ray-O-Vac dealers everywhere, but if you don't find one, write us for the name of the nearest jobber or dealer who can supply you.

FRENCH BATTERY COMPANY, ***Madison, Wisconsin***

Ray-O-Vac "B" batteries in all standard sizes, both flat and upright.

Ray-O-Vac "A" batteries recuperate during rest periods, lasting longer and giving excellent reception.

Ray-O-Vac 4½ volt "C" batteries with 3 variable terminals give voltage adjustment of 1½, 3 and 4½ volts.



Item 35. Two unit four bearing set. Furnished with ring oiled or ball bearings. Motor to suit local supply. This "ESCO" set delivers 1000 volts, 300 watts for plate supply and 12 volts, 150 watts for filament supply. This set driving two 50 watters will make a good consistent station.

ELECTRIC SPECIALTY COMPANY

Manufacturers of Motors, Generators, Motor-Generator Sets, Dynamotors and Rotary Convertors for all radio purposes. Have you got your copy of Bulletin 237B and ESCO Filter facts? If not write for them.

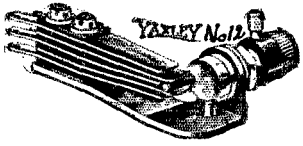
TRADE **"ESCO"** MARK

225 South Street **Stamford, Conn.**

Get an "ESCO" Maximum Miles per Watt POWER supply and you'll need a globe for your records.

YAXLEY
APPROVED RADIO PRODUCTS

Special Switches *for the* Radio Set Builder



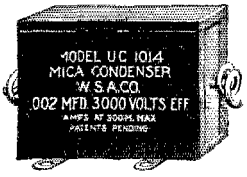
Any spring combination from One Pole, Single Throw to Eight Pole, Double Throw.

Send a rough sketch and write for price or ask for complete descriptive catalog.

YAXLEY MFG. CO., Dept. Q
217 N. Desplaines St., Chicago, Ill.

HERE THEY ARE GENUINE

.002 µfd.



3000 Volts

Faradon
Mica Condensers
Model UC-1014

RCA

Used as a grid, radio frequency by-pass or blocking condenser.
(New in Original Cartons)

WHY BUY SUBSTITUTES?

OUR SPECIAL PRICE $1.10 ea.

UC-1015 Mica Condensers
Three capacities .0003, .0004, .0005, 90c each.

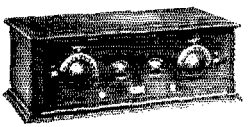
AMERICAN SALES CO., 21 WARREN ST., N. Y. C.

ONE HALF the world always wants to know what the other half is doing. To get only half the stations with your radio means getting only half the fun of radio reception.

Tests at Harvard University show that the Browning-Drake Receiver can get more stations from a given point than any other receiver on the market today, because the slot-wound radio frequency coil designed by Glenn H. Browning combined with regeneration gives a higher amplification factor than any other commercial receiver. And the Browning-Drake Receiver gets distant stations with a remarkably pure clear tone, because the radio-frequency signals come in so loud static is at a minimum.

The Browning-Drake Junior is a 5-tube receiver incorporating 3 stages of resistance-coupled amplification with provision for a power tube in the last stage. Price $95.

For further information address the Browning-Drake Corporation Brighton, Mass.



The Browning-Drake Junior Receiver

BROWNING-DRAKE

To Our Readers Who Are Not A. R. R. L. Members

Wouldn't you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of every issue. We would like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio, and incidentally you will have the membership edition of *QST* delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

.....1926

American Radio Relay League,
Hartford, Conn., U. S. A.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose $2.50 ($3 in foreign countries) in payment of one year's dues. This entitles me to receive *QST* for the same period. Please begin my subscription with the .....issue. Mail my Certificate of Membership and send *QST* to the following name and address.

.....

.....

.....

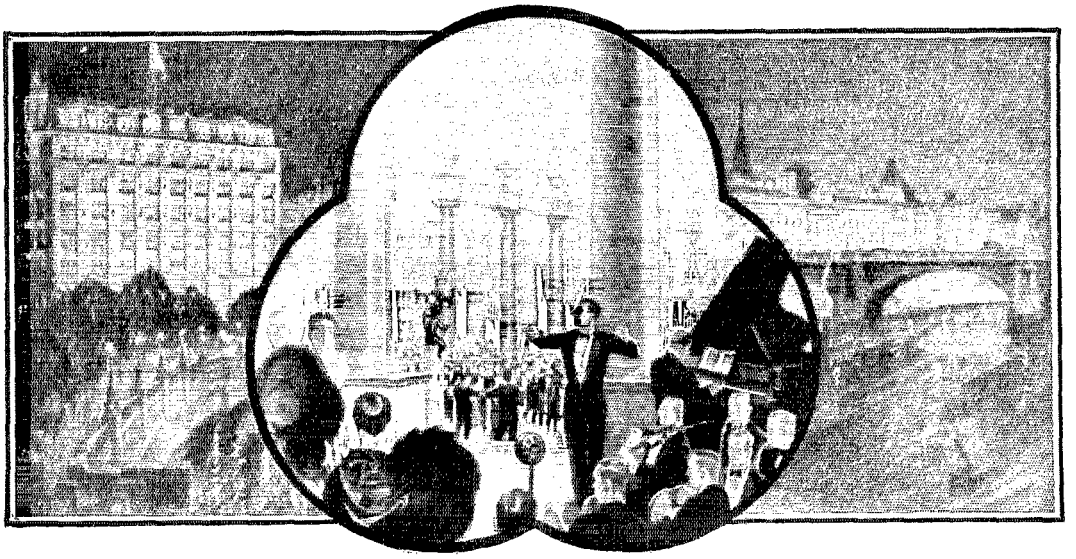
Station call, if any .....

Grade Operator's license, if any .....

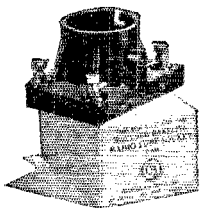
Radio Clubs of which a member .....

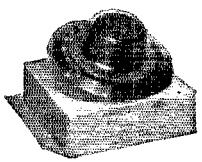
Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may write him about the League? .....

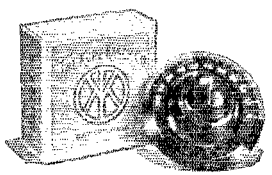
..... Thanks!



"This is Station 2-L.O. London—12 Midnight"





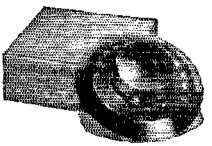


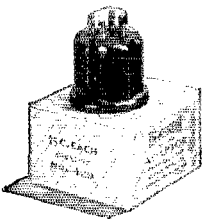
When listeners-in on this side of the Atlantic first heard the voice of the British announcer, and then a program of music from the famous Savoy in London, they experienced one of the real thrills of radio.

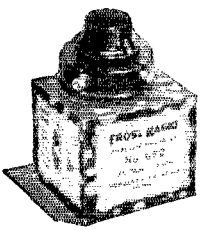
To get everything that is on the air—the faint signals as well as the strong ones—effective insulation of all radio parts is a prime essential. The best way to make sure that a radio set or parts are well insulated, is to buy those in which Bakelite is used.

Bakelite is used by 95% of radio set and parts manufacturers. It is the standard material for front and base panels, dials, knobs, tube sockets and bases, fixed and variable condensers, rheostats, plugs and other radio accessories and parts. Write us for a copy of Booklet No. 27, "Bakelite in Radio"—it's a helpful guide in buying adio equipment.

BAKELITE CORPORATION
247 Park Ave., New York, N. Y.
Chicago Office: 636 W. 22nd St.
BAKELITE CORP. OF CANADA, LTD.
163 Dufferin St., Toronto, Ont. Canada







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REGISTERED U. S. PAT. OFF.

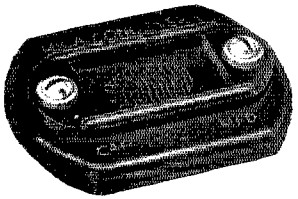
THE MATERIAL OF ∞ A THOUSAND USES

"The registered Trade Mark and Symbol shown above may be used only on products made from materials manufactured by Bakelite Corporation. Under the capital "B" is the numerical sign for infinity, or unlimited quantity. It symbolizes the infinite number of present and future uses of Bakelite Corporation's products."

"He didn't need new tubes,

SANGAMO Accurate Condensers

(Solidly molded in impervious Bakelite)



saved $15

FOR several weeks his receiving set had been disappointing. Previously, it had been a constant delight, but now programs came in so weak his family had to use headsets — they couldn't hear the loud-speaker clearly. Nothing but local stations. Friends said he needed new tubes, new batteries, new aerial, new this-and-that; all with a fine friendly disregard for the cost.

Then a *real* radio expert gave him good advice. *"Trouble may be in your fixed condensers. Moisture creeps in at exposed edges and changes their capacity. This upsets the electrical balance; there is resistance where there ought to be exact capacity, and your reception is spoiled, both in quality and volume.*

"Try Sangamo Mica Condensers. Their accuracy is guaranteed, and the solid, seamless bakelite jacket prevents the capacity from ever being affected by moisture, fumes, soldering heat, or any other cause of condenser troubles."

Putting in these accurate Sangamo Condensers increased volume, cleared up reception, brought in DX and saved a waste of money for new accessories. Such a little, inexpensive part —but tremendously important! Any real expert will tell you so.

APPROVED BY ALL NATIONALLY RECOGNIZED RADIO LABORATORIES

Sangamo By-pass Condensers are also accurate — and surges will not break them down. They last longer.

SANGAMO *Accurate* Radio Parts

Sangamo Electric Company

6332-2 *Springfield, Illinois*

RADIO DIVISION, *50 Church Street, New York*

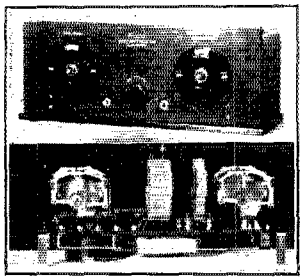
SALES OFFICES—PRINCIPAL CITIES

For Canada — Sangamo Electric Co. of Canada, Ltd., Toronto.
For Europe — British Sangamo Co., Ponders End, Middlesex, Eng.
For Far East — Ashida Engineering Co., Osaka, Japan

for Consistent-Efficient *DX RECEPTION!*

Short-wave Receiver *10 to 110 meters or higher*

Bremer Tully condensers
No Backlash
Marco vernier dial
R. E. L. No-Loss
Plug in coils
General Radio
Audio transformer
Benjamin shock absorbing sockets
Sangamo condensers
Radio panel and sub panel
Solid mahogany cabinet



This receiver is designed and built expressly for efficient and consistent DX reception on the short waves. Its component parts are of the highest quality. **Price** complete in cabinet Less Accessories **$38**

R. E. L. PYREX INDUCTANCE

Single Unit $5.50
As described in QST. Double (with Pyrex) Coupling Rods $11.00

NO LOSS PANCAKE INDUCTANCE

Wound on kiln dried maple 20-40 meter size $5.45
80 meter $5.95

Complete line of Jewell meters—Acme chokes and transformers—Thordarson—Pyrex—Allen Bradley—General Radio, etc.

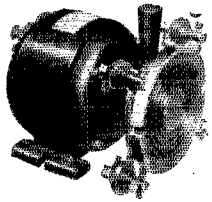
AMATEUR RADIO SPECIALTY CO.

77 CORTLAND STREET, NEW YORK

Everything for the Amateur and Experimenter | *Prices F.O.B. N. Y., send stamps for Bulletin*

You Need This

ADVANCE "SYNC" RECTIFIER



for Farther and Smoother Transmission!

(Ask other A. R. R. L. Men)

Thousands in the American Radio Relay League have improved their transmission with the new Advance "Sync" Rectifier. Gives clearer tone and better volume. Rectifies alternating current at 500 to 3000 volts to direct current for the plates of your transmitting tubes. Puts more energy into the antenna and counterpoise on account of actual copper-to-copper contact in rectification. Very efficient on short waves. Requires no attention—always ready. More in use than any other rectifier made.

Revolving disk is moulded bakelite six inches in diameter. Nickel plated brush holders with adjustable gauze copper brush support and brush holders perfectly insulated.

Price $15.00 **For rectifying wheel with complete brush assembly and mounting ring to fit your own synchronous motor. (Note: Motor must be ⅛ H.P., with ½ in. shaft and 1800 R.P.M.)**

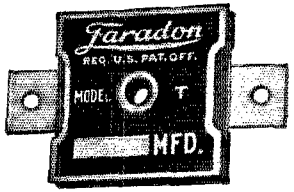
Rectifier with Westinghouse ⅛ h. p. Synchronous Motor—$40.

We Pay All Transportation Charges in U. S. A.

ADVANCE ELECTRIC COMPANY

1260-1262 West Second St., Los Angeles, Calif.

Faradon



ELECTROSTATIC CONDENSERS

For All Purposes

Since 1907 the Wireless Specialty Apparatus Company has devoted its resources to research and development in the Radio Field, specializing in the improvement, production, and application of electrostatic condensers.

Not until a product had successfully passed exacting final electrical and mechanical tests is it considered worthy of the FARADON trade mark.

Each FARADON can be confidently relied upon for thoroughly satisfying service. There are over 200 Models of Standard Faradon Condensers ready for immediate delivery.

Should your dealer not have just the condensers you require, advise us.

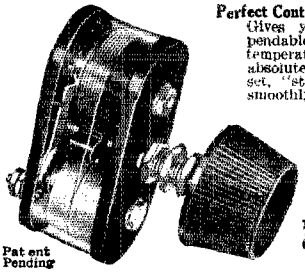
When writing, please mention QST.

Wireless Specialty Apparatus Co.

JAMAICA PLAIN, BOSTON, MASS., U. S. A.

ELECTROSTATIC CONDENSERS FOR ALL PURPOSES

THREE "E" STRAIGHT LINE RHEOSTAT



Perfect Control of Filament Temperature

Gives you a fine, smooth, dependable variation of filament temperature. Runs smoothly, is absolutely NOISELESS, and once set, "stays put!" Controls volume smoothly, and without distortion, over the entire range. Equally efficient for short and long wave sets. By all means secure this precision instrument at once. Ask your dealer or order direct. Price $2.50. Postpaid.

Illus. ½ Size 6-15-30 Ohms

Patent Pending

ELECTRICAL ENGINEERS EQUIPMENT CO.

Radio Division

708 W. Madison St., Dept. 7 Chicago, Ill.

Information on Request

HERCULES

AERIAL MAST

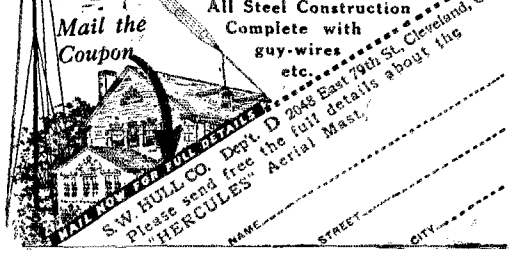
We pay freight

Mail the Coupon

20 Ft. $10. 40 Ft. $25. 60 Ft. $45.

All Steel Construction

Complete with guy-wires etc.



S. W. HULL CO., Dept. D 2048 East 79th St., Cleveland, Ohio

Please send free the full details about the "HERCULES" Aerial Mast.

NAME..... STREET..... CITY.....

We Have Succeeded

in constructing a variable air condenser using

QUARTZ

for insulation so that this finest of all condensers can now grace any man's receiving set.

In the manufacture of Bureau of Standard type of primary standard variable air condensers, we use quartz only for insulation.

In our own laboratory we use variable condensers insulated with quartz only.

The most accurate operating variable air condenser demands quartz for insulation.

Fused silica quartz is the most expensive insulating material and it is the only insulating material in existence that is electrically permanent and of lowest dielectric loss.

All obstacles to adopt fused silica quartz for insulation in commercial condensers have been conquered, and

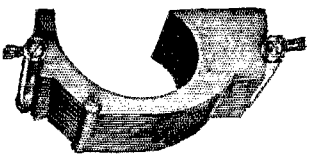
We Have Succeeded!

Concentric Straight Line Frequency

Type 87

Insulated With Quartz

	Maximum Capacity mfd.	Price
87N	.00035	$ 9.00
87D	.0005	10.00

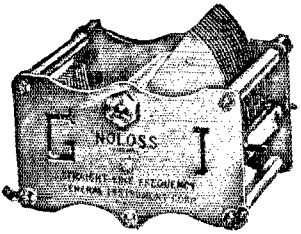


STATOR

Type 80

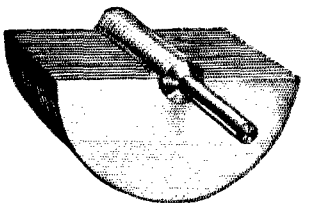
Insulated With Pyrex

	Maximum Capacity mfd.	Price
80N	.00035	$5.00
80D	.0005	6.00



PATENTED

At your dealers, otherwise send purchase price and you will be supplied postpaid.



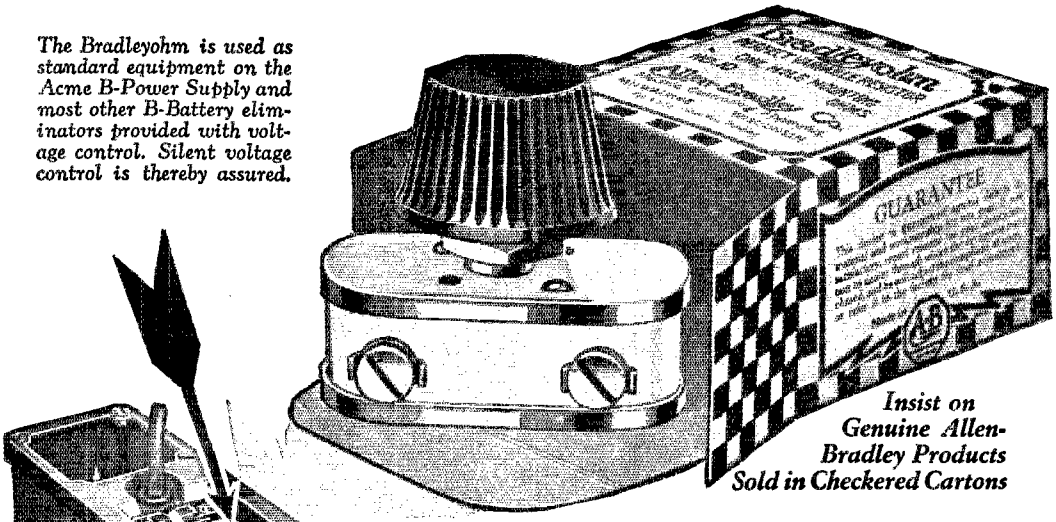
ROTAR

General Instrument Corporation

Manufacturers of Laboratory Equipment

477 Broadway, New York

The Bradleyohm is used as standard equipment on the Acme B-Power Supply and most other B-Battery eliminators provided with voltage control. Silent voltage control is thereby assured.

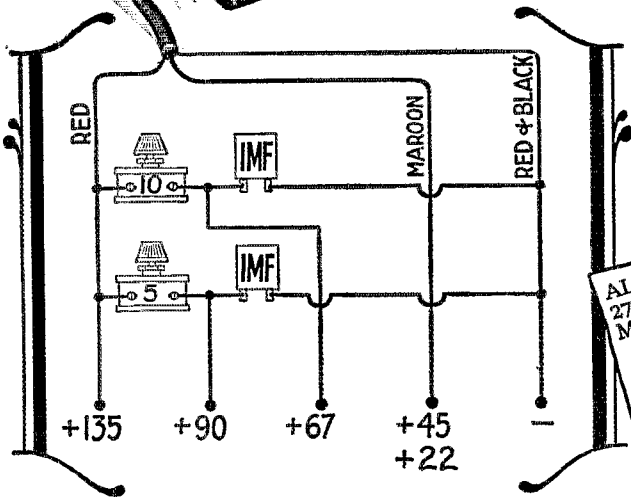


Insist on Genuine Allen-Bradley Products Sold in Checkered Cartons

How to Get Extra Voltage Taps from Your B-Eliminator

MANY radio receivers are provided with several B-Battery terminals for detector, amplifier and radio frequency tubes. To provide the extra voltage taps from B-battery eliminators, such as the Acme B-Power Supply unit, is a simple matter. The diagram below shows the method of connecting the necessary Bradleyohms and condensers.

A Bradleyohm No. 10 for the 67-volt connection and a Bradleyohm No. 5 for the 90-volt connection provide marvelously smooth control over a wide range for these terminals. The condensers may be larger if desired, especially when used with audio-frequency taps. The standard Bradleyohm in the eliminator gives sufficient range for the detector plate voltage. Your dealer can supply you with Bradleyohms and condensers. Try these connections tonight and improve your receiving set.



Mail the Coupon for Literature

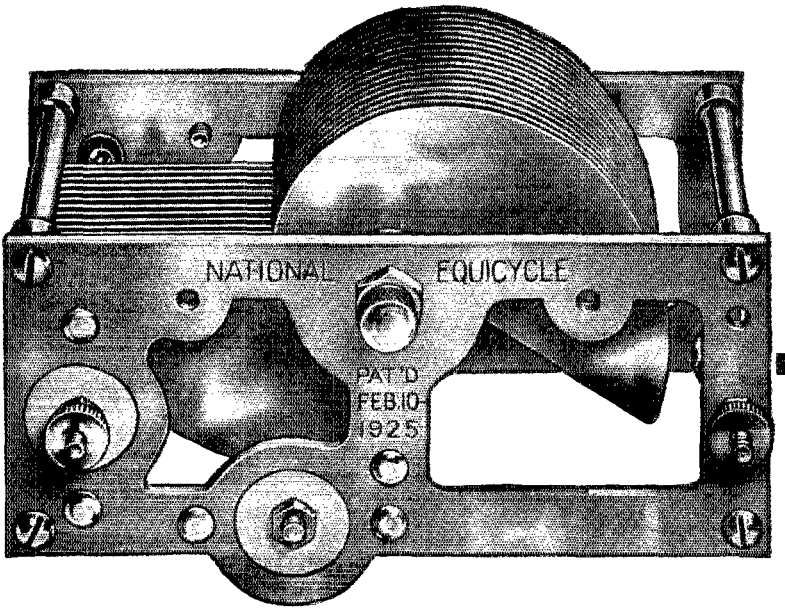
ALLEN-BRADLEY COMPANY
277 Greenfield Avenue
Milwaukee, Wisconsin

Please send me literature on Allen-Bradley radio products including the Bradleyohm.

Name .....

Address .....

.....



The *NEW* NATIONAL EQUICYCLE Condenser

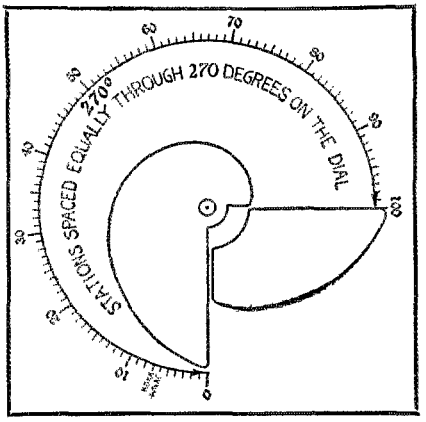
patents pending

It has the following features:

1—The novel shape of the plates spaces the station groups at equal intervals of 10 kilocycles (as specified by the U. S. Department of Commerce) in a true straight frequency line.

2—The useful range of rotation has been increased from 180° to 270°.

3—No gears, cams or levers are used to accomplish this result—consequently no back-lash exists and none develops with use.



4—Its greatest dimension is only 4¼ in.

5—The same electrical efficiency and mechanical ruggedness that have always characterized NATIONAL DX Condensers have been embodied in the **new** NATIONAL EQUICYCLE Condenser.

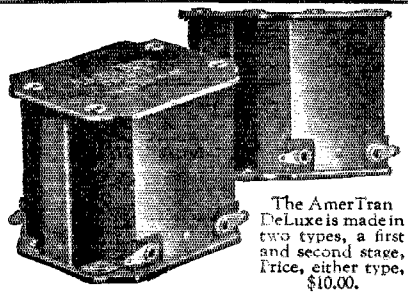
Write for Bulletin 111-QST

It changes a mob into an orderly procession and lengthens the line of march!

Get the Genuine. Insist upon NATIONAL COMPANY'S RADIO Products. Your dealer appreciates your patronage and will gladly get them for you. Write for Bulletin 111-QST.

NATIONAL COMPANY, Inc.

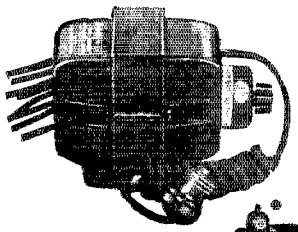
110 Brookline St. **W. A. Ready, President** **Cambridge, Mass.**



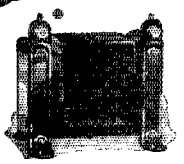
The AmerTran DeLuxe is made in two types, a first and second stage, Price, either type, $10.00.

A New Standard of Excellence in Audio Amplification

The realism of this new audio transformer is outstanding. Realism of this kind results from the uniform amplification of the *fundamental* tones of the lower register. The AmerTran DeLuxe makes possible the natural reproduction of not only the Overtones, but *all* of the transmitted *Fundamental* tones.



AmerTran Power Transformer type PF-45, Price $15.00, type PF-52, Price $18.00.

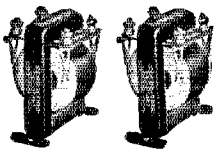


The AmerChoke type 854 is a choke coil or impedance of general utility. Price $6.00.

A Good Audio Amplifier

Requires enough plate and grid bias voltage on its tubes to prevent them from being overloaded by the signal voltage.

The AmerTran PF-45 or PF-52 with the half wave high voltage rectifying tubes now available and suitable condensers and resistances—together with three AmerChokes Type 854 will furnish these proper voltages. This combination will give real *quality loudspeaker volume.* AmerTran Power Transformers also supply A. C. filament current for the last audio tube.

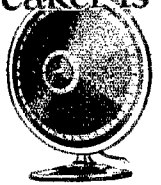


AmerTran Audio Transformers type AF6 (turn Ratio 5) and AF7 (turn ratio 3½) are the leaders in their class. Price, either type, $5.00.

Write for booklet describing these and other AmerTranProducts—with recommendations on their use. It's free on request. All prices are F. O. B. Newark, N. J.

AMERICAN TRANSFORMER CO.
178 Emmet Street, Newark, N. J.
"Transformer builders for over twenty-five years"
Sold Only at Authorized AmerTran Dealers.

You will never know how good your radio is until your loudspeaker is a



$14.75

~~CROSLEY~~

MUSICONE

Write Dept. 18 for Booklet

THE CROSLEY RADIO CORP.
Cincinnati, Ohio

Crosley Radios 4 TUBE $9.75 & 5 TUBE $75.

R.C.A. UC-1015

$1.25 EACH

The Best Condenser for Short Waves

1. It stands 7,500 volts.
2. The insulation is sulphur and mica.
3. Eleven different capacities make close tuning easy.
4. No capacity variation to change your wave.
5. Universal for blocking, by-pass and tuning.

Make your set the best with these condensers. Only $1.25 each, postage prepaid anywhere in U. S.

Utility Radio Co., 58 No. 6th St., Newark, N. J.

Transmitting Grid Leaks

5,000 ohm and 10,000 ohm General Electric Units

Here you are, fellows, just what you have been CQ-ing for. Brand new enamelled porcelain GE gridleaks in 5,000 ohm and 10,000 ohms sizes for all tubes. There is a limited supply so QSL quick. Prices 5,000 ohm $1.25 and 10,000 ohm $1.75.

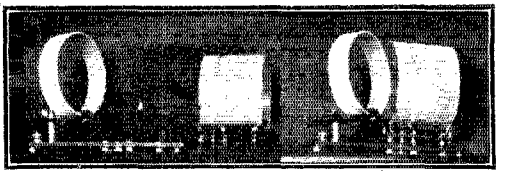
Postage prepaid anywhere in U. S. Order Now!

UTILITY RADIO CO., 58 No. 6th St., Newark, N. J.

FILAMENT TRANSFORMERS

Model UP 1656 — Output 75 Watts
List price $15.00 — **Our price $2.75 ea.**
Model UP 1658 — Output 150 Watts
List price $18.00 — **Special price $4.25 ea.**
New in original cartons
AMERICAN SALES CO., 21 WARREN ST., N.Y.C.

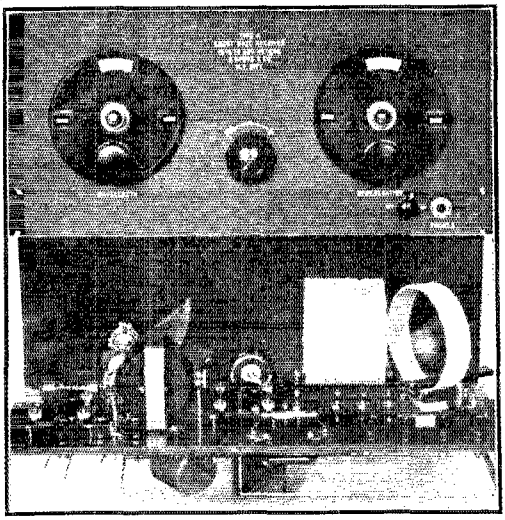
GROSS
LOW LOSS SHORT WAVE PLUG IN COILS



A new departure in short wave design. The new Gross Plug-In Coils are a radical improvement in the field of inductances for short wave receivers.

They are space wound with a uniform distance between turns and although supported by a mere film of dielectric material they are as rugged as a coil wound on a solid form.

The losses are too low to be measured! There is a coil for each of the amateur bands, and these can be changed as easily as withdrawing a plug from a jack.



With the new method of antenna coupling employed, variation from zero to virtually 100% coupling is secured by means of the small swinging arm.

Price for 80 meter band . . $5.50
(58 to 115 meters)

Price for 40 meter band . . $5.50
(30 to 60 meters)

Coils—only—for either band $3.00

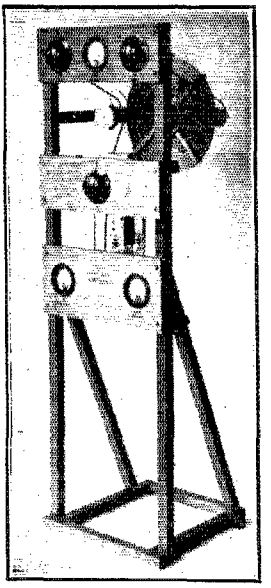
Wavemeters 20 to 200 Meters
$18.75

Low Loss Pancake Inductances
$6.00

Quartz Crystals
$6.75

Full Line Parts on Hand

J. GROSS & CO.
74 Dey Street
NEW YORK CITY
Mailing Address 907 Fox St., Bronx, N. Y. City



SM DIAL

The S-M Universal Vernier Dial with its 14.1 to 1 ratio will fit *all* condensers, right or left, 100 or 200 degree scale. It attaches to any set with but a single extra hole. No locking pin to become lost.

PRICE $2.50

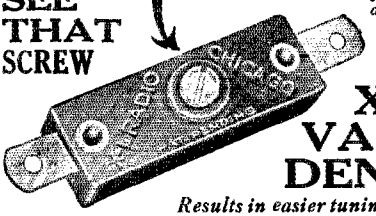
SEE Handle S-M Parts at your dealers. Find out for yourself exactly why they are selected by experts and engineers.

Circulars Sent Upon Request

Silver-Marshall, Inc.
104 S. Wabash Ave., Chicago

SEE THAT SCREW

A screw-driver adjusts an X-L in crowded places.

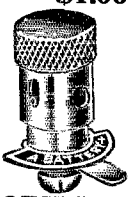


X-L VARIO DENSER

Results in easier tuning, more distance, volume and clarity—greater stability Indorsed by leading radio authorities.

Model "N"
A slight turn obtains correct tube oscillation on all tuned radio frequency circuits. Neutrodyne, Roberts two tube, Browning-Drake, McMurdo Silver's Knockout, etc., capacity range 1.8 to 20 micro-micro farads. Price **$1.00**

Model "G"
with grid clips obtains the proper grid capacity on Cokaday circuits, filter and intermediate frequency tuning in heterodyne and positive grid bias in all sets. Capacity range .00016 to .00055 and .0003 to .001 micro farads. Price $1.50



X-L Push Post
Push it down with your thumb, insert wire, remove pressure and wire is firmly held. Releases instantly.
Price 15c.

X-L RADIO LABORATORIES
2428 Lincoln Avenue N. Chicago, Ill.

RADIO EXPERT

STUDY AT HOME

Radio, the wonder of all ages, has grown with gigantic strides. Radio experts are needed to keep pace with the growth. Thousands of good-paying positions are open to trained men. Be a radio expert—earn big money—travel—get into the limelight. There's romance, power and fortune ahead for men with vision now just as there was when Henry Ford got started on his auto. The ground-floor opportunity is here.

YOU EARN WHILE YOU LEARN

Our home-study course in practical radio can be mastered by you in 8 months. Become a radio engineer. Write for free booklet, "Millions Untouched."

FREE TWIN If you enroll now. Send letter or postal to **RADIO SET** J. E. Mendels—learn how to make $100 wk.

AMERICAN RADIO ENGINEERS,
Dept. 118 Monroe Bldg., Chicago, U. S. A.

HAM-ADS

IMPORTANT NOTICE!

HAM-AD Rates are TEN CENTS A WORD. Name and address to be counted, each initial counting as one word. These rates are shown on QST Rate Card No. 6.

The closing date for HAM-ADS is THE TWENTY-FIFTH OF THE SECOND MONTH PRECEDING DATE OF ISSUE. For example, all HAM-ADS for the June issue must be in this office not later than April 25.

No HAM-AD will be accorded any particular or special position.

MOTORS—New G. E. ¼ HP $12.50, ½ HP $28.50, 1 HP $45. GENERATORS—Radio Transmission 500V $28.50. Battery Chargers—Farm Lighting generators all sizes, Lathes, Drill Presses, Air Pumps other Garage and Shop equipment. Wholesale Prices. New Catalog. MOTOR SPECIALTIES CO., Crafton, Penna.

TELEGRAPHY—Morse and Wireless—taught at home in half usual time and at trifling cost. Omnigraph Automatic Transmitter will send on Sounder or Buzzer unlimited messages, any speed, just as expert operator would. Adopted by U. S. Govt. and used by leading Universities, Colleges, Technical and Telegraph Schools throughout U. S. Catalog free. Omnigraph Mfg. Co., 13M Hudson St., New York.

"The Hawley." An alkali un-acid rechargeable "B" storage Battery of 22½ volts. Not an unassembled battery but ready to use—no extra parts to buy. Uses the largest sized tested Alkaline elements (Edison). Heavy closed top glass cells. Chemical electrolyte included and shipped separate. Any detector or amplifying voltage easily had. Special offer. 4-22½ volts (90 volts) $10.00; 112½ volts $12.50; 135 volts $14.75; 157½ volts $16.80. For those wishing to put their own together buy the knock-down kits. Put up in all voltages at still greater savings in price. The only battery of its kind sold on a 30 days trial with complete guaranteed satisfaction or your money returned in full without any ifs, ands, or buts. Further guaranteed 2 years. Order direct—send no money. Simply pay expressman its cost plus the small carrying charges. Patent pending. Same day shipments. Write for my guarantee testimonials and literature. It's free and it's interesting. Complete sample cell 35c prepaid. B. Q. Smith, 31 Washington Ave., Danbury, Conn.

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MORE THAN THREE THOUSAND FOREIGN CALLS IN OVER THIRTY COUNTRIES: Canada, England, South Africa, Philippines—all others except U. S. The International Call Book Co., Drawer 205, Station "A", Hartford, Conn., sells it for fifty cents. Copy mailed day order received. No C.O.D. Please don't send stamps; we have a million already.

NEW GENERATORS, rated at 275 volts 120 watts will give 500 volts $8. UC1831 variable 4000 volt condensers $1.50. Bakelite 3 coil honeycomb, geared mountings $1.50. Western Electric microphones $1. VT2s $4, VT1s $3. Used generators, 30 volt direct current input, output 300 volts $8. 500 cycle 200 watt $10. ½ KW $15. SEND STAMP for list. R. Wood, 38 Way Ave., Corona, New York.

REAL BARGAINS:—R.C.A. UP1016 750 watt Power Transformers 3000v with midtap and Filament winding for 2 Fifties, $12.50. UP1656 Filament Transformers 75 watt, supplies 4 five watt tubes, $4.00 UP1658 Filament Transformers 150 watt, supplies 2 fifty watt tubes, $5.00. UV712 Audio Transformers 9/1 ratio, $2.50. UC1831 variable transmitting condensers, $1.50. UC1803 Antenna Coupling Condensers, $1.50. Genuine Holtzer-Cabot No. 4 Headphones, 2200 ohms, double pole, high grade, $3.00. DayFan Balanced Vernier Condensers, 7 or 13 plates may be used. Bakelite ends, $1.50. 1000v Mica Condensers, .001 mfd. Bakelite mounted, .25. Bakelite Navy Key Knobs, .25. Cutler-Hammer Variable Grid Leaks, .35. AMRAD No. 2796 Lightning Switches, $1.50. Type 123B Genuine Cardwell Low-loss .0005 Condensers, $2.50. Signal R-48 Telegraph Keys, $2.25. Send for discount sheet and keep in touch with bargains. All items sent postpaid up to 4 lbs. STATE RADIO CO., 286 Columbia Road, Dorchester, Mass.

GENERAL ELECTRIC 24/1500 volt .233 ampere 6000 RPM dynamotors 112 segement commutator unused, $45.00—slightly used $25.00. Ideal for battery drive. $3.00 additional for belt drive. Results equally as satisfactory. Crocker-Wheeler 24/1500 volts 450 watts 6500 RPM 100 segements, $45.00. GE 12/350 volts, .143 amperes with filter condenser $18.00. Holtzer-Cabot 12/500 volts .07 amperes $18.00. All ball bearing machines. 10 volt 20 ampere storage batteries $5.00. Navy Keys $2.00. 500 cycle motor generators. Corona Portable Typewriter. 1500 volt meters $12.50. Henry Kienzle, 501 East 84th St., New York City.

THE ONLY HAM STORE IN THE FIFTH DISTRICT INVITES YOUR INQUIRIES AND SOLICITS YOUR ORDERS. JUST IN. ANOTHER LARGE SHIPMENT OF ONE MFD 1750 VOLT FARADON FILTER CONDENSERS THAT SELL AT 2.50 EACH. WE STILL LEAD IN THE SALE OF CHEMICALLY PURE ALUMINUM AND SHEET LEAD. OURS GETS YOU ENTHUSIASTIC REPORTS ON SIG VOLUME AND QUALITY. LET'S HAVE YOUR QRA. FORT WORTH RADIO SUPPLY CO., FT. WORTH, TEXAS.

Kellogg Broadcasting Microphone, double button type with or without stand, nearly new—$50.00, with stand $70.00. W G B F Evansville, Indiana.

Reg. U. S. BKUMA YRLSBUG Pat. Off.
DODGE RADIO SHORTKUT with APPENDIX and HELPFUL HINTS FOR BETTER KEY WORK
Kills Hesitation in Reading Transmitted Code.
Cultivates and Develops Legible Transmission.
AMONG THOSE WHO ADMIT HAD FAILED BUT WITH SHORTKUT QUALIFIED EASILY AND SO REPORTED ARE
1BIC—1GA—2CWZ—3FO—5OU—6CDY—6BQJ
THEIR REPORTS and 200 others from former Slow Hams Failures Beginners tell the story of rapid progress to ORS and OBS ARRL, also Commercial First. The Learning Experience of 200 Successful Students. Reports and Quarter Coupon (use when order) 25 cents.
SHORTKUT—Appendix—Better Key Work $3.50
APPENDIX—Better Key Work $1.50
FOREIGN except Canada ADD 50 CENTS. None C O D. Registered Mail Delivery—Money Order Remittance.
DODGE RADIO SHORTKUT, MAMARONECK, N. Y.

ROICE 5-WATT DX BABIES $3.15 postpaid. UX-210 7.5-WATTERS $8.85. CURTIS-GRIFFITH, FORT-WORTH.

Building a B Eliminator? Tested 2 Mfd salvaged condensers 75c, fifty henry eliminator chokes $2.95, transformers 300 volts from 110, no center tap $2.95, postpaid when cash accompanies order.
WRAF, THE RADIO CLUB INC., LaPorte, Ind.

EXCHANGE—What NEW RECEIVING parts do you want? Can use perfect, latest model RECEIVING parts, in new condition, in exchange. No sets. RADIO EXCHANGE, KENT, OHIO.

Everything in RECEIVING apparatus. 25% discount to "hams". Over 2 pounds data, catalog, etc.—prepaid—25c. Kladag Laboratories, Kent, Ohio.

IT'S A POOR JOKE WHEN YOU'RE AT THE WRONG END OF IT. CHEAP JUNK THROWN TOGETHER EXPENSIVE AS A GIFT. INVEST—DON'T GAMBLE. ORDER AN EDISON STEEL-ALKALINE B (THE 8ML KIND) AND YOU ARE BUYING SATISFACTION. NO JOINTS—ELECTRICALLY WELDED FOR AB-

SOLUTE QUIET, 54 VOLT $8.25, 100 VOLT $15.00. OTHER SIZES. OAK CABINET. RUBBER MAT. LARGEST ELEMENTS. REAL EDISON SOLUTION. A BIG BEAR OF A B—2000 MILIAMP HOUR FOR THE MULTITUBE SET, 105 VOLTS $24.00. ASSEMBLED CELLS 24c, SAMPLE 30c. QUANTITY DISCOUNTS. PEPPY EDISON A ELEMENTS 5c, WELDED PAIRS 7½c* GIANT SUPERCELL 4000 MILIAMP HOUR 40c, SAMPLE 50c. GET SET OF THREE FOR YOUR 199. ANNEALED TEST TUBES ¾"—3c, 1"—4c. SHOCKPROOF JARS 1" x 6"—4c, 1¼" x 6½"—5c. PUREST SOFT .032 NICKEL 1c ft. .034 (HEAVY) 1¼c ft. RUBBER SEPARATORS ½c. REAL EDISON ELECTROLYTE (THAT'S NO LYE) LITHIUM COMPOUND $1.25 MAKES 5 LBS. WILLARD COLLOID A REAL B CHARGER $2.00. JUMBO $3.00 (FULL-WAVE USE 2). BRING YOUR AERIAL UP TO QST SPECIFICATIONS WITH NO. 12 SOLID COPPER ENAMEL AERIAL WIRE, 75c 100 FT. FOR A PERMANENTLY PERFECT AERIAL. PYREX INSULATORS. LEAD-IN BOWL TYPE PYREX $1.50. PRESCRIPTIONS FOR ALL AILING B'S.
FRANK M. J. MURPHY,
4837 ROCKWOOD ROAD,
CLEVELAND, OHIO.

ANNOUNCEMENT: ON SALE. 50 Motor-Generator Sets 1000 Volt 250 Watts 3500 RPM Wickoiled $75.00 (list price $138.00). 50 Motor-Generator Sets 750 Volts 200 Watts 3500 RPM $50.00 (list price $92.00). All Sets equipped with 110 Volts 60 Cy. Wickoiled Motors. These Sets are our latest model, and contain the latest improvement on Motor-Generator construction, the generated DC is a smooth flowing current easy to filter and produces excellent results on long distance Communication. Every Set guaranteed, prices FOB Chicago. MORTON ELECTRIC CO., 4832 RICE ST., CHICAGO, ILL. Send for Bull. J53 for low prices on Magnet Wire and Silicon Steel.

CASH—NEW SUPER-HETERODYNES $125. MAGNAVOX R3 $25. J. POWELL, PORT HENRY, N. Y.

Motor Generator Bargains. Western Electric 110-220 V. Alternating Generator 1500 volts 600 Watts $135.00. Robbins & Myers 220 V. 60 cycle three phase; Generator 750 V. 400 Watts $60.00. Esco 110 V. Generator 350 V. 100 Watts $30.00. Robbins & Myers 110 V. 60 cycle single phase; Generator 750 V. 400 W. $70.00. Esco 220 V. 60 cycle 3 phase 1750; Generator 400 V. 100 W. $25.00. 110 volt, 500 W. $75.00. All above machines are ring oiled. Also many others, including several 3000 and 4000 V. machines. New ¼ H. P. 220 V. 60 cycle 3450 speed motors $8.50, 110 V. $9.50. ½ H. P. 220 V. 3450 R.P.M. $17.50. ½ H. P. 110 V. 3450 R.P.M. $18.50. Write us for prices on anything in motors, generators and motor generators, stating kind of current, voltage, etc. QUEEN CITY ELECTRIC CO., 1734 GRAND AVE., CHICAGO, ILL.

SELL—McCULLOUGH AC TUBES $4.65. SEND STAMP FOR LIST. JAMES BOYER, 6116 HOWE, PITTSBURGH, PENNA.

HAMS LOOK! 3BOV's Station going at your SAVINGS. What do you want? A few—80—22OM. Wavemeters, 1% accuracy $8; 5 Watt Tubes $4; 10 Watt Sets $30; etc. S. Strobel, 3923 N. 6th St; Phila; Penna.

Want 1KW spark transformer secondaries. 7ACY

SILICON Transformer Steel cut to order .014". 10 lbs. 25 cents, 5 lbs. 30 cents, less than 5 lbs. 35 cents per lb., 4 cubic inches to the lb. .007" for radio frequency transformers, 50c cubic inch, postage extra. At least ½ cash with order—balance C. O. D. Geo. Schulz, Calumet, Michigan.

GRID AND PLATE CONDENSERS. Use RCA UC1015 mica condensers. The .001 mfd. connection is right for plate blocking. Try different capacities from .0002 mfd. up for grid and get a DC note on short waves. Stand 7,500 volts. Price $1.25 postpaid. Utility Radio Company, 58 North Sixth Street, Newark, N. J.

SAVE MONEY ON HAM EQUIPMENT. UX-210 five watt tubes $8. UX-216 B kenotrons $6. UV-203A 50 watt tubes $34. UV-204A 250 watt tubes $135. Cardwell transmitting condensers $18.50. One mfd. filter condensers $1.60. General Radio modulation transformers $4.10. General Radio stand-off insulators, box of ten $2. Amrad S tubes $9. Faradon condensers, Weston and Jewell meters, Thordarson and Acme chokes and transformers, Kellogg hand microphones, etc. All order shipped day received. Complete receivers and transmitters of all types. Send requirements for prices. W. P. HILLIARD & CO. Arcade Bldg., Joliet, Ill. 9PZ.

2BIR SEZ: "The best fifty cents worth I ever got." Meaning of course the International Amateur Call Book.

HAMS: Get OUR Samples and Prices on Printed Call Cards made to order as YOU want them. 9APY Hinds & Edgarton 19 S. Wells St., Chicago, Ill.

FOR SALE—One new Weston Electric 14A power amplifier complete—$45. B. Cruzan, 5521 W 23 Place, Cicero, Illinois.

GRAB THIS—15 dial omnigraph, 6 "S" tubes, 4 Mershon condensers, 2,000-20,000 meter receiver. All new. Best offer or exchange. Box 488 Harwich Port, Mass.

SACRIFICE SALE—Grebe 13 new $35, Grebe CR9 used slightly $25, G. E. 600v D. C. generator built for British Air Service new $35, 2 HW ammeters 0-3 $2. each, Magnavox Transmitter Arm $10. Radio Exchange, Croze., Va.

THORDARSON 650-VOLT POWER-FILAMENT TRANSFORMERS for 5-WATTERS $6.90. CURTIS-GRIFFITH, FORT WORTH.

WESTERN ELECTRIC FIFTY WATTER; with RCA socket, price $20. 9BTY.

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100 WATT power transformer 350 each side, complete. Room for filament winding. Guaranteed high efficiency $7.50. F. Greben, 1927 S. Peoria St., Chicago, Illinois.

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5 WATT set for sale! Complete or parts. Write 8CMQ.

ARE you building receivers, transmitters or eliminators. Write for list. M. H. Leitch, 32 So. Park Drive, West Orange, N. J.

$5.00 New United States Government Aviators, Automobile, Motorcycle and Racing Leather Helmet with headphones and microphones, cost $25.00. Postage free. Limited supply; other Government Radio Bargains. Send stamp for list. WEIL'S CURIOSITY SHOP, 20 South 2nd St., Philadelphia, Pa.

ENSALL RADIO LABORATORY, DEVOTED ENTIRELY TO THE CONSTRUCTION OF AMATEUR AND HIGH CLASS BROADCAST RADIO EQUIPMENT. AMATEUR TRANSMITTERS FOR CODE WORK OR RADIOPHONE, FOR ANY WAVELENGTH. HIGH GRADE AMATEUR RECEIVERS WITH A WAVELENGTH RANGE FROM 5 TO 200 METERS. ENSALL RADIO WAS THE FIRST TO BUILD AMATEUR RADIO RECEIVERS WITH UNIVERSAL AMATEUR WAVELENGTH RANGE. WE BUILD TO ORDER ANY TYPE OF RECEIVER OR TRANSMITTER USEING YOUR OWN PARTS IF DESIRED. WE SUPPLY THE HIGHEST GRADE TRANSMISSION PARTS IF YOU DESIRE TO BUILD YOUR OWN. SUPER-HETERODYNE SERVICE ON A WAVELENGTH RANGE FROM 26 TO 650 METERS. WHEN YOUR SUPER-HETERODYNE WON'T WORK SEND IT IN. IT WILL AFTER. WE ALSO BUILD WAVEMETERS, INDUCTANCES, STANDARD OSCILLATORS, AUDIO OSCILLATORS, POWER PANELS, ETC., ENSALL RADIO SHORT WAVE RECEIVER IS GUARANTEED TO WORK SMOOTHLY OVER THE ENTIRE RANGE FOR WHICH IT IS SUPPLIED. GET THE DETAILS. IF IT'S AMATEUR RADIO LET'S HAVE THE DOPE. QUOTATIONS GLADLY FURNISHED ON ANY WORK. GET QSO, THOS. ENSALL, (ENSALL RADIO LAB.,) 1208 GRANDVIEW AVE., WARREN, OHIO.
(Designers of High Grade Amateur And Broadcast Radio Equipment).

FOR SALE. New Western Electric Headset, $8.00. Oscar Rosel, St. Ansgar, Iowa. 9CHN.

GENERAL RADIO, Bosch, DUBILIER, Daven, MARCO, National, PLIO, WESTON, and all better RADIO PARTS. Price Lists for the asking. DISCOUNTS to ARRL. BARROWS RADIO LAB. 4-6 Columbia Road, PORTLAND, MAINE. Did you get one of our DOLLAR ASSORTMENTS?

OMNIGRAPHS. ELIMINATORS, VIBROPLEXES, BOUGHT, SOLD. RYAN RADIO COMPANY, HANNIBAL, MISSOURI.

BUY THESE! 0-5 General Radio Ammeter $5; 0-7 Roller Smith Ammeter $5; Acme 300 W Filament Transformer $17.50; Acme Modulation Transformer $3.50: Slightly used material as follows—Zenith 3 tube set in A No. 1 condition $30.00; Atwater Kent three tube set in A No. 1 condition $20; Esco 200 Watt 500 V. Motor Generator (used four months) $60; Amrad S Tubes $6.00 each; Magnavox one stage Power Amplifier $10. TUNWALL RADIO, FORT DODGE, IOWA.

BEST OFFER TAKES SLIGHTLY USED MAGNAVOX AUDIO AMPLIFIER. E. KLOPPER, TWENTY-ONE THIRTY-ONE, THIRD AVENUE, SEATTLE.

WANTED—OLD SPARK TRANSMITTING APPARATUS, TRANSFORMERS, LARGE DUBILIER MICA CONDENSERS, ETC. MUST BE CHEAP. M. VALENTINE, 16—SIXTH AVE., WHITESTONE, N. Y.

EDGEWISE wound copper ribbon, the only really satisfactory antenna inductance .350" wide; 3¼" outside diameter 10c turn; 4¼" 13c turn; 5¼" 15c turn; 6¼" 17c turn; 7¼" 20c turn, prepaid any number turns in one piece; Geo. Schulz, Calumet, Michigan.

SUPER-SYNC $50. Used less than one hour. 8CQH.

FOR SALE—Some Super Heterodyne and receiving parts also for transmitting. Write for list. George Benn, Jr., Grand Island, Nebr.

WE'D LIKE TO HAVE YOU SEE THE NICE THINGS OUR FRIENDS WRITE US, ABOUT THE GOODS WE SELL, THE QUICK SERVICE WE GIVE, AND THINGS IN GENERAL. WE CAN'T REPEAT THEM HERE, BUT YOU CAN EASILY FIND OUT WHY FOR YOURSELF BY TRYING US WITH AN ORDER. ASK FOR THE FREE "HAMALOG" TOO, THE ORIGINAL HAM CATALOG. If you are a bona-fide radio dealer, we'll send our discount sheet—name your other jobbers. Such lines as Thordarson, Acme, Faradon, Amrad, Pyrex, Allen-Bradley, Ward-Leonard, Belden, National, Fleron, Goodrich, Sherman, Signal, etc., prove the quality of our goods and our standing with manufacturers. The Amateur's business is our strong suit, and we are prepared to give it the best attention to the smallest detail. WE MAKE EDGEWISE WOUND COPPER STRIP, 1/16" x 3/8" WOUND 6" INSIDE DIAMETER, 12c PER TURN. 4" 10c, STRAIGHT STRIP 5c PER FOOT; ALSO THAT PHOSPHOR BRONZE INDUCTANCE CLIP (SEE JAN. QST, PAGE 27), 20c EACH; Genuine Beldenamel antenna wire, best obtainable. Note new method of pricing, postage prepaid on all antenna wire to any point, up to 25% of value. No. 12 $1.00 per 100'. No. 14 65c per 100', 7x22 stranded enameled $1.05 per 100'; Pyrex 7¼" insulators $1.50, 12¼" $3.50, 6" lead-in bowl $1.50; Sure Fire 20" porcelain insulator $1.00; Findlay 6" stand-off insulator 50c; WARD-LEONARD 5000 OHM GRID LEAKS, CAPACITY 200 MILLIAMPERES. GOOD FOR 500 WATTS OR MORE, $2.00; RADIOLEAK, VARIABLE TRANSMITTING GRID LEAK, HIGH ENOUGH RESISTANCE FOR DEFOREST H TUBE, $5.00; RADIOSTAT, PRIMARY FILAMENT RHEOSTAT $6.50; Acme 2 mfd. 2000 volt filter condensers $6.50, 2 mfd. 750 volts $2.50; Acme .0001 mfd. variable transmitting condenser $5.50; Acme chokes of all sizes in stock, 30 henry 300 mill. $25.00, 150 mill. $18.00; NATIONAL TRANSMITTING CONDENSERS OF ALL SIZES, WITH NATIONAL VELVET VERNIER DIAL, .0001 mfd. 6000 volt $12.50, .00015 3000 volt $7.50, .00023 3000 volt $11.50, .00045 3000 volt $16.50; NATIONAL RECEIVING CONDENSERS WITH VERNIER DIAL, 50 mmf. $5.00, 100 mmf. $5.00, 150 mmf. $5.50, 200 mmf. $6.00, 250 mmf. $6.00; 50 watt tube sockets $2.50; Pyrex sockets for UX tubes 70c; Erla 1000 cycle audio transformer $6.50; Thordarson 450 watt plate transformer $18.00, 100 watt $13.00. 150 watt filament transformer $10.00, 80 watt $7.00. Special plate and filament transformer for one 5 or 7½ watter, $7.50; WE RENT OMNIGRAPHS, SEND FOR TERMS. Try us on your next order, and get the free HAMALOG.: Include postage please, with exception of antenna wire. E. F. JOHNSON, 9ALD, Waseca, Minn.

"EVERYTHING FOR THE HAM", AND WE DON'T MEAN MAYBE. WE CARRY ALL THE JUNK FOR THAT SHORT WAVE SET. IF YOU HAVE NOT RECEIVED A COPY OF OUR NEW CATALOGUE A-2 BE SURE AND GET A COPY, IT'S YOURS FOR THE ASKING. No. 12 "DYNEX" SOLID COPPER ENAMELED WIRE, 1c FT. No. 10 FOR HEAVY DUTY, 1¼c FT. PYREX TRANSMITTING INSULATORS, 7", $1.50, 12", $3.00. "DYNEX" SHEET LEAD & ALUMINUM, 90c SQ. FT. "DYNEX" ELEMENTS, 1" x 4", 6c. 1" x 6" 7c. UC-490 CONDENSERS, $2.50. B-T SHORT WAVE PLUG-IN HAM TUNER. WARD-LEONARD 5000 OHM GRID LEAKS, $1.85. NATIONAL & CARDWELL TRANSMITTING CONDENSERS. THORDARSON FILAMENT TRANSFORMERS, 80 WATT, $7.00. 150 WATT, $10.00. 300 WATT, $15.00. PLATE TRANSFORMERS, 100 WATT, $13.00. 450 WATT, $18.00. 900 WATT, $30.00. ALL POPULAR SIZES ACME CHOKES AND TRANSFORMERS CARRIED IN STOCK. A FULL LINE OF JEWELL METERS. FEDERAL "MIKES" FOR THAT FONE SET. DESK TYPE, $6.50. HAND TYPE, $7.00. GENERAL RADIO No. 260 INSULATORS 25c. NO. 16 COTENAMEL FOR THAT SHORT WAVE TUNER. 75c LB. "DYNEX FOR DX". NICHOLSON ELECTRIC CO., 1407 FIRST NORTH ST., SYRACUSE, N. Y.

SELL—40 meter receiver $25. DX Broadcast receiver $76. L. Giannini, 561 Brussels St., San Francisco, California.

TUBE BARGAINS; Unused tested tubes. UV 204A 250 Watters $75, UV 203A 50 watters $30, UX210 7½ Watters $6. Acme power transformer 300 Watt $17. Anthony McKillup, 134 Northampton Ave., Springfield, Mass.

WANTED: Amateurs to sell and service new one control, six tube, UNITROLA. Retail $80.00 complete. Also, new SUPERSOCKET, fits all tubes, something entirely new. 60c, 2 for $1. Write for territory now. RADIO ELECTRIC CO. West Winfield, N. Y.

Better Edison Elements, welded connections 7c pair. Sample cell 10c. Paul Mills, Woodburn, Oregon.

CANADIAN Hams. 3AD selling out—fifty watter 25 cycle transformers, meters, condensers, etc. Write for list, 124 Stewart Sr., Sarnia, Ontario, Canada.

UP1016 Transformer $12.95. Acme transformers and chokes, all sizes. WRAF THE RADIO CLUB INC., LaPorte, Ind.

Special motor generator bargains. New motor generator sets at less than secondhand prices. We have in stock 25 New Westinghouse 750 V. 200 W. D. C. generators direct connected to 110 V. 60 cycle A. C. motors $45.00 each. Field rheostat extra $4.50 each. 25% with order, balance C. O. D. express, inspection allowed. Subject to prior sale. QUEEN CITY ELECTRIC CO., 1734 GRAND AV., CHICAGO, ILL.

DOUBLE spaced transmitting variable condensers completely assembled with 3½" Bakelite Dials, hard rubber end plates, nickel plated brass parts, aluminum plates, calibrated spacers, 13 plates $3.00, 17 plates $3.50, 23 plates $4.00—can be imersed in oil for extra high voltages. Prepaid cash with order—satisfaction or money back. Geo. Schulz, Calumet, Michigan.

SPECIAL 750-WATT TRANSFORMERS 1500 each side for De FOREST "H-TUBES" $15.00. CURTIS-GRIFFITH, FORTH WORTH.

GRIDLEAKS. Brand new General Electric 5,000 ohm and 10,000 ohm enamelled units. Order one and keep your plate from melting. Price $1.25 for 5,000 ohm; 10,000 ohm for $1.75. Utility Radio, 58 North Sixth Street, Newark, N. J.

Power Rheostats, great for 5 watt tubes, 4 ohms—2½ amps. Will control 2 to 10 tubes in receivers. 35 cents. Sockets, perfect contacts—for receivers or transmitters. 20 cents postpaid, no stamps. Byard, 318 S. Camac St., Philadelphia, Pa.

ATTENTION, HAMS! buy your radio goods, both receiving and transmitting, from us at WHOLESALE PRICES! We offer you SETS: FEDERAL No. 61, 6-tube $223.00 set, $50.00. FEDERAL No. 102, 4-tube Portable $140.00 set, $30.00. CLARATONE 5-tube $60.00 set, $17.50. TUSKA 3-tube $85.00 set, $17.50. SLEEPER MONOTROL 4-tube $130.00 set, $30.00. KENNEDY NO. VI 4-tube $105.00 set, $25.00. KENNEDY NO. III, 3-tube $111.50 portable, $22.50. KENNEDY NO. V, 3-tube set, $20.00. CROSLEY NO. 52, 3-tube $30.00 set, $10.50. AMRAD licensed 5-tube NEUTRODYNE, wired for RUN-A-RADIO (An electric rectifying machine for the elimination of both "A" and "B" Batteries; operates from electric light socket), complete with 2 "S" tubes; list price $235.00, Our price, $75.00. LOUDSPEAKERS: JEWETT SUPERSPEAKER, Adjustable, List price

$30.00. Our price, $11.95. FROST MUSETTE SPEAKER with bakelite bells, List price $12.50. Our price, $4.75. ATLAS GOOSENECK SPEAKER, a $30.00 value priced at $8.95. HEADSETS AND UNITS: KENNEDY 3000-Ohm HEADSET, made by Western Electric; List, $8.00, Our price, $2.00. FEDERAL 2200-Ohm HEADSET, List, $7.00, Our price, $2.00. HOLTZER-CABOT PHONOGRAPH UNIT, List, $10.00, Our price, $3.50, KITS: SELECTROL T. R. F. Kit, $4.50. R. F. KIT, suitable for Browning-Drake circuit, $3.75. TRANSFORMERS FOR RECEIVING SETS: RCA AUDIO TRANSFORMER, UV-712, List, $7.00, Our price, $1.60. RCA SUPERHETERODYNE TRANSFORMER, UV-1716, List, $8.50, Our price, $1.10. RCA R. F. TRANSFORMER, UV-1714, List $6.50, Our price $1.00. COTOCOIL AUDIO TRANSFORMER, 95c. CONDENSERS: ERLA $4.25 CONDENSER, capacity .00035, $1.00. BATTERIES AND TUBES FOR RECEIVING SETS: STORAGE BATTERY, 100-amp. hour, 11 full-size plates, $10.75. 45-VOLT "B" BATTERY, large size, $1.95. LIVETONE GUARANTEED TUBES, 201-A TYPE, 75c. 199 tubes bakelite base, $1.00. CHARGERS: APCO NO. 77 CHARGER, the only silent vibrating taper charger on the market; List, $18.50, Our price $11.95. WIRE, ETC.; ANTENNA WIRE No. 22, 7-strand tinned Antenna Wire, 75c per 100 feet. EXTENSION CORDS, 20-foot, 45c. 5-Wire CABLES, 45c. MISCELLANEOUS PARTS: AUTOSTAT, rheostat suitable for all types of tubes, List $1.35, Our price, 10c. CUTLER-HAMMER VARIABLE GRID LEAK, List, $1.50, Our price, 20c. C-H Potentiometer, List $1.50, Our price, 20c. C-H 30-OHM RHEOSTAT, List, $1.25, Our price, 30c. C-H 4-OHM RHEOSTAT, List, $1.00, Our price, 20c. C-H 4-OHM VERNIER RHEOSTAT, List $1.50, Our price, 25c. HART & HEGEMAN VARIOCOUPLER, List, $4.00, Our price, 60c. HART & HEGEMAN PANEL SWITCH, List, 40c, Our price, 10c. BRISTOL ONE-STAGE AMPLIFIER, List, $25.00, Our price, $3.75. SOCKETS, made by General Porcelain Co., List, 60c, Our price 10c. CRYTALS, ETC.; CLINTONIA CRYSTAL SET, List, $2.00, Our price, 45c. NAECO FIXED CRYSTAL DETECTORS, mounted 25 on a card, List price, (each) 50c, Our price, 10c. DIALS: DIAMOND DIALS, 3-inch, ¼" shaft, set with red or green brilliant, 10c. BAKELITE OR COMPOSITION DIALS, 3", ¼" shaft, 8c. SMALL ITEMS: SINGLE BINDING POSTS, Nickel plated, per 1000, $8.00. INSULATORS, Barrel type, brown porcelain, 3", per 100, $4.00. FIBRE TUBING, 2¾" x 4", 8c. Formica Tubing, 4" x 3", 10c. TRANSMITTING APPARATUS: RCA POWER TRANSFORMER, UP-1016, List, $38.50, Our price, $11.50. RCA FILAMENT TRANSFORMER, UP-1656, output, 75 watts. List, $15.00, Our Price, $4.00. RCA FILAMENT TRANSFORMER, UP-1658, output, 150 watts, List, $18.00, Our Price, $5.50. OSCILLATION TRANSFORMER, UL-1008, List, $11.00, Our Price, $7.50. RCA 5-WATT POWER TUBES, UV-202, List, $8.00, OUR PRICE, $3.25. TWO-TUBE TRANSMITTER AND RECEIVER, Western Electric Make. Used during the war as portable trench set. Operates between 200 and 300 meters. Price without motor-generator or other accessories, $15.00. TELEGRAPH INSTRUMENT, using the ground dispersion method. No aerial necessary. Will cover 5 miles easily. Built by Western Electric for the French Government. Our price, $8.50. SEND FOR OUR SPECIAL PRICE LIST OF TUBES. IF YOU DO NOT FIND WHAT YOU NEED IN THIS LIST, WRITE US! RADIO SURPLUS CORPORATION, 11-19 Stuart Street, Boston, Mass.

IVORY radio panel makes most beautiful set of all. Any size 3c square inch 3/16" thick. Ivory dials inlaid gold numerals $1.35 each. Knobs 55c. Guaranteed satisfactory. Sent prepaid or C. O. D. Write for FREE sample. Ivorylite Radio Panel Co., Dept. T, 3222 Ave. F, Fort Worth, Texas.

Western Electric generator filters, containing one 1000 volt 1 mfd condenser, one 500 volt 1 mfd condenser, a heavy choke coil, resistances and extension cord, $2.00. Extra choke coils, $1.50. 2mfd telephone condensers .30. J. A. Howenstine, 2100 S High St., Columbus, Ohio.

BROADCAST STATION ENGINEERS. All parts in stock for type B frequency indicator. Few new Kellogg microphones at $80. Input and remote control amplifiers; Filter systems; Faradon condensers (all types and sizes) Western Electric high-mu tubes; Complete commercial and broadcast transmitters designed, built and installed. All parts for amplifiers, filter, etc. in stock. Any special equipment built. Let us quote you. W. P. HILLIARD & CO., Arcade Bldg., Joliet, Ill.

"B" STORAGE BATTERIES USING GENUINE EDISON ELEMENTS WILL GIVE YOU A LIFETIME OF SERVICE. UPKEEP VERY LOW. 100 VOLT UNIT COMPLETE IN EVERY DETAIL, $11.00. 140 VOLT, $15.00. NOT A HOMEMADE AFFAIR BUT A FACTORY BUILT PRODUCT. LARGEST SIZE EDISON TYPE "A" ELEMENTS, 5c, INCLUDING WELDED CONNECTOR. 3-G ELEMENTS, WELDED. 6c. ¾x6" TUBES, 3c. 1x6", 4c. PERFORATED HARD RUBBER SEPARATORS, 1/3c. SHEET SEPARATORS 5½x8½", 5c. No. 20 PURE NICKEL WIRE, 1c PER FT. NO. 18, 1½c. CAUSTIC POTASH AND LITHIUM HYDROXIDE FOR 5 LBS. SOLUTION, 85c. A FEW HEAVY DUTY TYPE 5-G, 3000 MILLIAMPERE BATTERIES FOR SALE. 100 VOLT, $16.00 140 VOLT, $19.50. PRICES ARE F. O. B. PHILA. J. ZIED, 904 N. 5th ST., PHILA., PA.

UM533 Hot-wire ammeters $1. 1803 mica condensers .000025 mfd. 50c. UC1831 variable 4000 volts $1.50 Federal 2mfd. 400 volt $1. 750 watt 1016 plate and filament transformers $12. Busser and key sets $1.25. ¼ Hp 32 volt motors $8. 1500 turn mounted honeycomb coils $1.25. ¼ inch by 13x14 bakelite panels. All of above are new. Postage extra. R. Wood, 38 Way Ave., Corona, New York.

MONTHLY CLEANUP SALE. Still have UV206 1 KW tube for $75.00. UV 204 tube $50.00. Thordarson eighty watt eight volt filament transformer, $4.00; Thordarson power transformer for five watter, 650 volt plate, 8 volt filament, for $7.50; Electrose leadin bushing, 25c; Acme oscillation transformer $4.00; UT1643 1½ amp. magnetic modulator, 25c; UT 1357 3½ ampere magnetic modulator, 50c. 2 AHO, 58 North Sixth Street, Newark, N. J.

ARRL SWEATER EMBLEMS SHOULD BE WORN BY ALL MEMBERS. They are 5"x8", yellow and black felt wool. Only $1. ERIC ROBINSON, JEFFERSON ROAD, WEBSTER GROVES, MO.

TRANSMITTING batteries. We carry all parts, write for prices. Elements type A drilled 4c pair. Wired 6c. G. 3c pair. Separators 5c dozen, nickel wire 1c foot, test tubes ½" 3c. Best solution 100 volts $100. Parts for complete 100 volts, cabinet, rectifier $8.50. Prepaid. Wm. Woodroe, 1417 Clairmount, Detroit, Michigan. 8DAC

PURE ALUMINUM and lead rectifier elements, holes drilled with brass screws and nuts per pair 1/16", 1"x6" 13c. 1 x 6, 15c, 1¼ x 6, 17c, 1½ x 6, 19c, single elements half price. Sheet aluminum 1/16", $1.00, ⅛", $1.90. Lead $1.00 square foot all prepaid. GEO. SCHULZ, Calumet, Michigan.

BROADCAST STATION EQUIPMENT. 1 set Willard Storage Battery 1720 volts, 12 amp. hr. capacity suitable for plate circuit with tubes up to 500 watt capacity $1,075.00. 2 sets Willard Storage Battery 360 volts 12 amp. hr. capacity suitable for plate circuit on Broadcast equipment $550.00 ea. 5 sets Willard Storage Battery 350 volts, 12 amp. hr. capacity suitable for send-receive sets similar to those used by U. S. Aeroplane Service, or on receiving sets requiring heavy duty "B" batteries $225.00 ea. These batteries have been in service for Radio Testing about 4 months and were replaced by a higher voltage and capacity battery. They are in excellent condition and represent a worth while saving at the above prices. Washington Battery Co., 1621-23 L St., N. W., Washington, D. C.

OMNIGRAPH No. 2 15-DIALS (used) $20.00; MURDOCK 5-TUBE NEUTRODYNES $37.50, DUPLEX 2-AMPERE CHARGER with TUNGAR TUBE $8.75. 5-PLATE CONDENSERS 49c. CURTIS-GRIFFITH, FORT WORTH.

$3.00 New Roller Smith Hot Wire Meter, type CAR Radio frequency Ammeters, from 0-3 to 0-6, amperes, worth $10.00. We have $10,000. worth of United States Government Aircraft Department Radio Transmitting Receiving Sets and Parts. Get our new and latest reduced price list. Send stamp for list. Mail orders answered all over the world. WEIL'S CURIOSITY SHOP, 20 South 2nd St, Philadelphia, Pa.

EDISON ELEMENTS LARGE SIZE WITH CLAMPED ON CONNECTOR 5c PER PAIR. ALL OTHER PARTS CARRIED IN STOCK. 300 AMPERE EDISON A. BATTERIES. PERFECT CONDITION $35.00. GET PRICE LIST. ROMCO STORAGE BATTERY CO., 146 W. 68TH ST., NEW YORK CITY.

The following stations belong to members of the A.R.R.L. Headquarters gang. Mail for them should be addressed care A.R.R.L., Hartford, Conn.

1BAO R. S. Kruse	1KP F. Cheyney Beekley
1BOI F. E. Handy	1OA R. S. Kruse
1BHW K. B. Warner	1SZ C. C. Rodimon
1DQ John M. Clayton	1XAQ R. S. Kruse
1ES A. A. Hebert	

Q R A SECTION

50c straight, with copy in following form only: CALL—NAME—ADDRESS. Any other form takes regular HAM-AD rates.

1AAO—H. H. Cooley, 460 Ward St., Newton Center, Mass.

1EB—John A. Pierce, 100 Main Street, Orono, Maine.

1FL—Don Meserve, Forest Ave., Hudson, Mass.

1ZA—C. E. Jeffrey, Jr., 725 Commonwealth Ave., Newton Center, Massachusetts.

2ANC—Walter L. Hayward, 98 Franklin Ave., New Brighton, S. I. New York.

2ATX—E. Dielmeier, 8408—114th St., Richmond Hill, Long Island, N. Y.

2CHK—Harold Sachs, 161 West 75th Street, New York City.

2MK—E. F. Raynolds, Central Valley, Orange County, New York.

2UR—R. W. Finter, 1083 Grove St., Irvington, N. J.

3A1R—Fernand Causse, Box 81, Lester, Pennsylvania.

3AKD—Roger Causse, Box 81, Lester, Pennsylvania.

3QL—Samuel M. Hughes, Vincent St., Spring City, Pennsylvania.

4MW—H. Wall, 1407 Nance Ave., Tampa, Florida.

4PF—Henry I. Middleton, Box 370, Hendersonville, N. C.

5AHP—Arthur D. Tennant, Postoffice Box 6, Lynchburg, Texas.

5ALF—S. P. Smith, Pawnee, Oklahoma.

5ALA—Joe V. Wright, Mirando City, Texas.

5A1H—Edward W. Wilkins, Mirando City, Texas.

7GL—Harrison S. Nobbs, U. S. Radio Station, Hotsprings, Alaska.

8AEE—Wm. P. Gainer, 272 S. Main Street, Rittman, Ohio.

8BCQ—H. C. Swan, 35 Birch St., Wilkes-Barre, Pennsylvania.

8CWK—F. Kelwin Kearney, 5053 South Martindale Ave., Detroit, Michigan.

8CZP—Robert Surdam, Skaneateles, N. Y.

8RD—C. H. Vincent, 12694 Northlawn Ave., Detroit, Michigan.

9AAK—P. D. Clough, 4845 Michigan Ave., Chicago, Illinois.

9BGL—L. C. Campbell, Miller, South Dakota.

9BIQ—F. H. Riffle, Jr., Jackson, Ky.

9DMC—Henry L. Otos, 107 W. Delaware St., Knox, Indiana.

9DOE—Alfred L. Bergtold, 1318 Clara St., St. Louis, Missouri.

9DPU—Paul C. Shockley, 1011 N. Madison St., Topeka, Kansas.

9DR—O'Rourke & Diehl, 2415 South 50th St., Omaha, Nebraska.

9GF—Robert Mishell, 853 Lafayette Parkway, Chicago, Illinois.

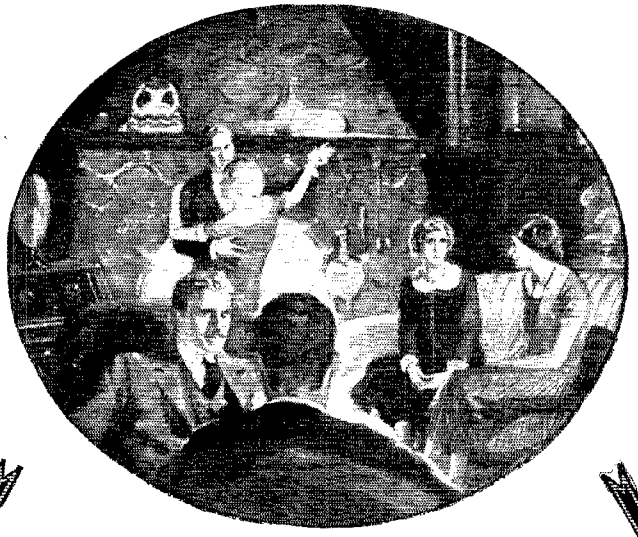
9NP—B. W. Nies, 132 West 4th St., St. Charles, Illinois.

e2AX—W. G. Southam, 15 Grove Park, Westmount, Quebec, Canada.

—FOR YOUR CONVENIENCE—

QST'S INDEX OF ADVERTISERS

IN THIS ISSUE



"Your radio is always top notch. What do you do to keep it so full of pep?"

KEEPING your "B" batteries full of pep, without frequent renewals, is simply a matter of using the right size Evereadys for your particular set with a "C" battery*.

The rule which determines the right size "B" batteries to use is simple, and once learned definitely settles the question of "B" battery service and economy.

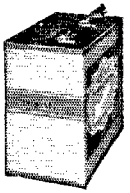
On 1 to 3 tubes—Use Eveready No. 772.
On 4 or more tubes—Use the Heavy Duty "B" Batteries, either No. 770, or the even longer-lived Eveready Layerbilt No. 486.
On all but single tube sets — Use a "C" battery.

When following these rules, No. 772, on 1 to 3 tube sets, will last for a year or more; and Heavy Duties, on sets of 4 or more tubes, for 8 months or longer.

These life figures are based on the established fact that the average year-round use of a set is 2 hours a day.

A pair of Eveready No. 772's for a 5-tube set instead of 2 Eveready No. 770's or 2 Eveready Layerbilts No. 486—looks at first glance like an economy because of lower first cost. But in a few months the 772's will be exhausted and have to be replaced. After the same length of time the Eveready No 770's or the Eveready Layerbilts No. 486 will still be good for many more months of service.

We have prepared for your individual use a new booklet, "Choosing and Using the Right Radio Batteries," which we will be glad to send you upon request. This booklet also tells about the proper battery equipment for use with the new power tubes.



LEFT—*No. 486, for 4, 5 or more tubes.* $5.50

RIGHT—*Eveready Dry Cell Radio "A" Battery, 1½ volts.*

EVEREADY
Radio Batteries
-they last longer

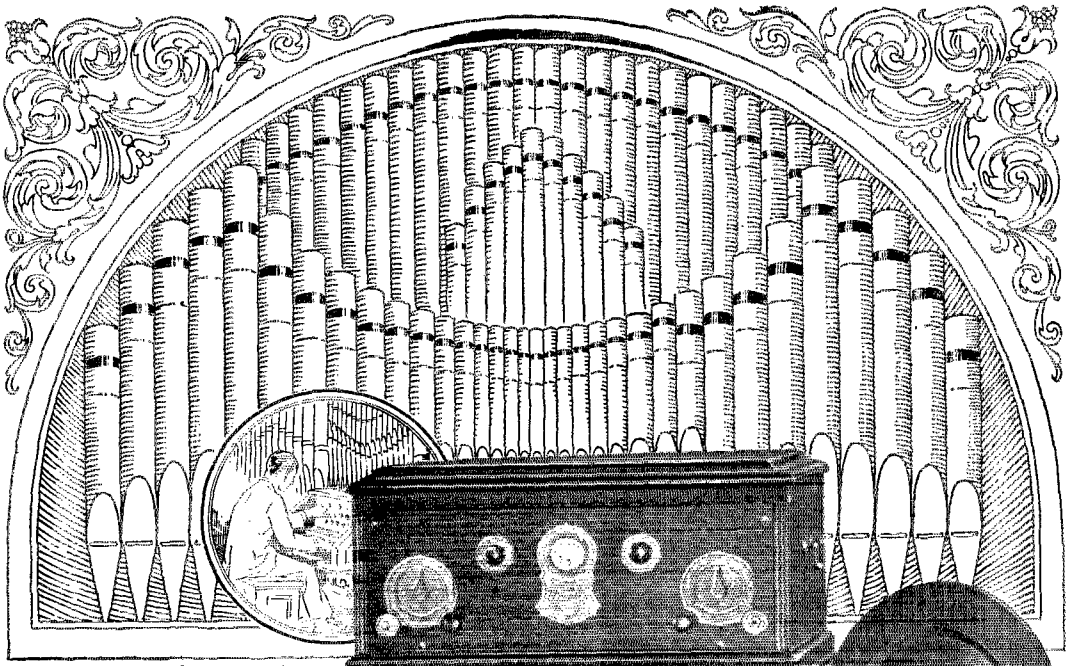
*NOTE: In addition to the increased life which an Eveready "C" Battery gives to your "B" batteries, it will add a quality of reception unobtainable without it.

Manufactured and guaranteed by
NATIONAL CARBON CO., Inc.
New York San Francisco
Canadian National Carbon Co., Limited, Toronto, Ontario

Tuesday night means Eveready Hour —9 P. M., Eastern Standard Time, through the following stations:

WEAF—*New York*
WJAR—*Providence*
WEEI—*Boston*
WTAG—*Worcester*
WFI—*Philadelphia*
WGR—*Buffalo*
WCAE—*Pittsburgh*
WSAI—*Cincinnati*
WEAR—*Cleveland*
WWJ—*Detroit*
WGN—*Chicago*
WOC—*Davenport*
WCCO—*Minn. St. Paul*
KSD—*St. Louis*

Pacific Coast, Eveready Program
KGO—*San Francisco, 8 to 9 P. M.*



No. 601, treasure chest type. 6-tube, totally shielded. Equipped with volt meter. Solid Mahogany. Prices, without accessories; East of Rockies, $210; Pacific Coast, $225; Canada, $290.

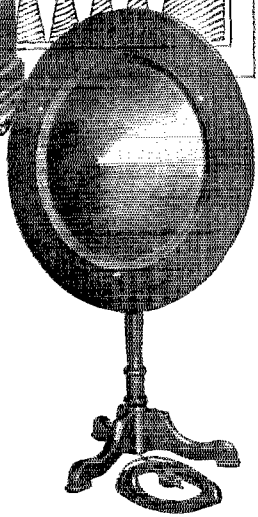
A New Cone Speaker—

Companion to the No. 601 Receiver

To the epic achievement of Stromberg-Carlson's No. 601 Receiver is added that of their announcement of the New Cone Speaker. Produced after exhaustive research and experimentation, this speaker embodies an idea, old to the master creators of musical instruments, but new to the radio trade—that of a soundboard.

The soundboard which functions the same on the new cone speaker as on piano or violin—accomplishes the same purposes—that of giving true pitch and modulation to notes over the *entire* musical register. Whether it is reproducing the majestic roll of the organ, or the piping of the flute, this soundboard liberates the true beauty of intonation and phrasing which the music lover desires and appreciates.

Standing unobtrusively against a wall or in a corner the Stromberg-Carlson Cone speaker so fills the entire room with music that it is difficult to tell from where the sound is coming. In addition, it is as ornamental as a Mahogany Tip-Top Table which it so closely resembles.



Height 34½ inches over all; diameter 22 inches. Equipped with a 20 foot cord and plug. Sound-board and pedestal finished in Mahogany. Used with any Receiver which has semi-power tubes. Prices: East of the Rockies, $35; Pacific Coast, $40; Canada, $49.

Licensed under Lektophone patents 1271527 and 1271529. Other patents pending.

Licensed by NEUTRODYNE

STROMBERG-CARLSON TELEPHONE MFG. CO.
ROCHESTER, N. Y.

Stromberg-Carlson

Makers of voice transmission and voice reception apparatus for more than 30 years

Announcement

AMERICAN RADIO RELAY LEAGUE CONVENTION

HUDSON DIVISION

New York City, May 13-14-15

First Hudson Division Technical Meeting
Activities Devoted Exclusively to Amateur Radio

¶ On May 13th, 14th, and 15th there will be held in New York City what probably will be the most unique gathering of radio amateurs ever held in the world.

¶ In the first place, the exhibit part will be in the hands of manufacturers invited by the League because of their consistent support of the amateur and our League, by the manufacture of parts for the transmitting amateur and their advertising of these products in our magazine, *QST*. These manufacturers have already responded and are going to put on educational exhibits of their products that will be solely of interest to the transmitting amateur and experimenter.

¶ The technical side of the meeting will consist of a program so arranged as to be a resumé of the best we have had in *QST* during the past two years, and comprehensive enough to include every worthwhile advancement in short-wave communication and amateur work generally. It is the purpose of the Committee to make it worthwhile for every transmitting man in the United States to come to New York for the three days.

¶ The meeting is not open to the public, but only to the members of the A.R.R.L. and their friends. There will be prizes awarded in a contest that will be arranged to test the amateur's all-round radio knowledge, including transmission, reception, League traffic practices, etc., but it will not stress the ability to copy code.

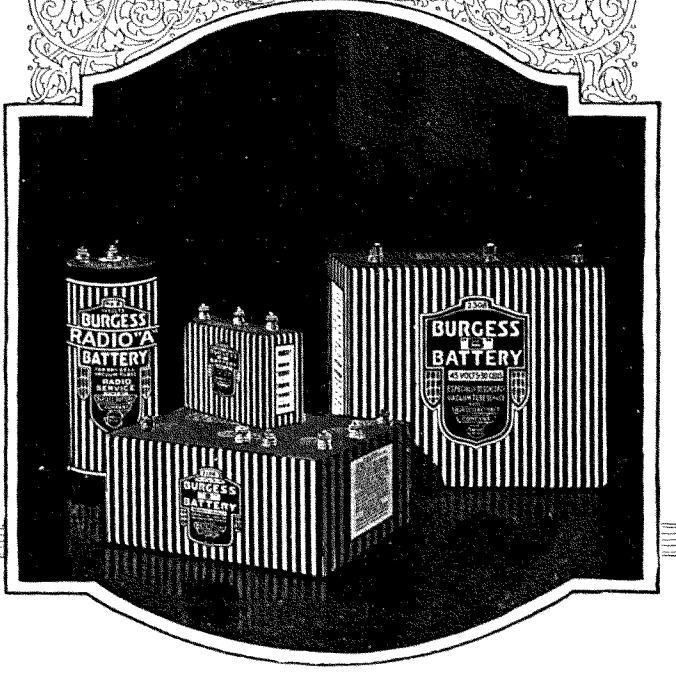
¶ This type of amateur meeting has the approval of our President, Mr. Hiram Percy Maxim; the Secretary of Commerce, Mr. Herbert Hoover; the Chief Signal Officer of the Army, Major General Saltzman; Secretary of the Navy Wilbur; the Director of Naval Communications, Capt. Ridley McLean. So let us all get together and make this a turning point in the League history of amateur conventions.

¶ The price of admission will be very small. Announcement of details will be made in the May issue of *QST*. For further information, address

Hudson Division Convention Committee

480 E. 19th Street Brooklyn, N. Y.

ASK ANY RADIO ENGINEER



Contributors to your radio entertainment

VERY probably hidden away in the cabinet of your receiving set, the batteries you use are nevertheless surrendering their power unseen and unheard.

And to be able to contribute their energy and to add to the complete efficiency of your receiving equipment, those batteries must combine every desirable factor and formula known in the electro-chemical field.

Such Batteries are Burgess—products of the Burgess Laboratories—products which have been used by practically every famous explorer, the majority of amateurs and the leading radio engineers.

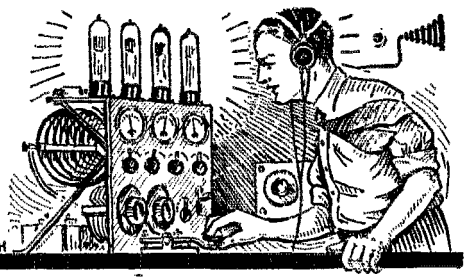
That's why when you use Burgess Radio 'A,' 'B' and 'C' Batteries you are using batteries which assure the utmost dependability, longer life and complete satisfaction.

BURGESS BATTERY COMPANY
GENERAL SALES OFFICE: CHICAGO
Canadian Factories and Offices: Niagara Falls and Winnipeg

BURGESS RADIO BATTERIES

The Communications Department

F. E. Handy, Communications Manager
1711 Park St., Hartford, Conn.



WARNING! ! ! !

Have you checked your wavelength recently? Are you *sure* that you are operating *within* one of our amateur bands?

The Navy Department have cooperated freely with us. From time to time they have operated transmitters expressly for the purpose of testing with amateurs. These experiments have been made using stations working within our amateur bands. Naval stations handling Goverment traffic have been carefully adjusted to work on their assigned frequencies, *not* in our amateur bands.

The Navy Department operate in bands right below and adjacent to our 40- and 80-meter bands. The Navy also uses the wavelengths right above our 20-meter band.

Through March *QST*, through bulletins and broadcast, we have tried to point out the necessity for carefully checking our transmitting sets and keeping them within bounds. NVA, NAR, NAW, and NKF have been badly jammed by amateur stations carelessly operating, using wavelengths *below* 37.5 meters. NKF has been working and notifying off-wave amateurs, asking them to cooperate in this important matter of using legal wavelengths.

NKF has a transmitter on a frequency just above 8,000 kilocycles (37.5 meters), which tests at noon and midnight, Eastern Standard Time, for our benefit. If your frequency is higher (wavelength lower) than the frequency of this transmitter, you are probably within the Government band and causing interference for the Naval stations and the foreigners who work there.

The U. S. Naval Research Laboratory (NKF) is cooperating in every possible way to bring about better conditions. If you can get in touch with NKF they will be glad to check your frequency within 1/8 of 1% accuracy. The Navy Department is anxious to help as much as possible, settling this interference question in a friendly way. They are justified, however, in reporting persistent offenders to the Department of Commerce and recommending that licenses be suspended and cancelled.

If you haven't a good wavemeter, get one at once and check it, using the standard frequency transmissions or OWLS service announced in *QST* for calibration. There are plenty of good wavemeters on the market, so there is no excuse for being without one. Prompt action is required to avoid certain trouble. *Just take heed before it is too late, OM.*

ARMY-AMATEUR NOTES

Each month we want to chronicle the outstanding work in these columns. Therefore the new heading above shows its face for the first time. Interesting news that is sent in which comes under the above heading will be included here from month to month. We hope to see this section growing steadily as the work gets under way.

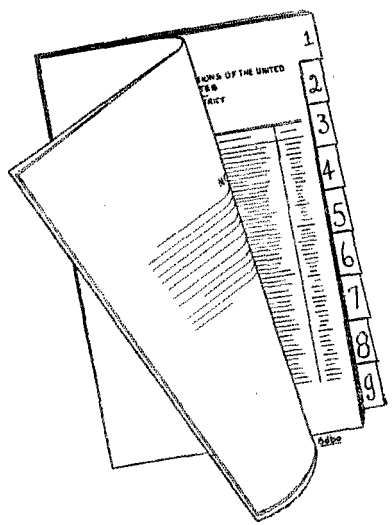
Last month we showed a picture of the Army-Amateur certificate in this part of the magazine. Under the cut were the words, "If you haven't received your certificate, it is because we haven't your application." A lot of the gang took this wording literally, so this month we must explain more in detail. Before any appointment certificate can be issued, it is essential that the station concerned be *designated*, to serve a specific National Guard or Reserve unit. A number of certificates have been issued, but there are an equal number of stations on file whose certificates are being held *pending* designation.

A slow but sure policy of enrolling Army-Amateur stations is being followed. Appointments are being made every day as fast as the applications and information from Army units can be co-ordinated. There is still room for hundreds of additional stations in the Army-Amateur organization that is being built. An appointment certificate will be forwarded to every station designated just as soon as the designation is made.

You are *not* asked to work day and night handling hundreds of messages for the Signal Corps. Some periodic relays are held that give you an opportunity to show your stuff, though. When the enrollment is completed, there will be some special and very interesting activity. You will want to get a crack at it. Don't wait until it is too late, but send us your application today. Get lined up while the opportunity is still good. Take another look at that certificate which was shown last month and then write Headquarters for more dope.

Radio nets for all National Guard and organized Reserve units in the First Corps Area have been developed. Arrangements also have been made to furnish a daily Army-Amateur Radio Station service for the Corps Area recruiting officer between Boston and Providence, New Haven, and Springfield. One highly successful Governor's Relay was held in February. We look forward to definite reports which list the stations who did the best work.

2SC, of Governors Island, is the amateur radio control station at the Headquarters of the Second Corps Area. 1YC and 2SC regularly send Ediphone code practice messages broadcast. Amateurs picking up these messages should copy them accurately and turn them in to the Corps Area Headquarters for a check on the speed and accuracy of the copy. This is FB!! We want to include a complete list of these stations with their schedules as soon as such a list is available.



WHY NOT FIX YOUR NEW CALLBOOK LIKE 8DBO'S AND SAVE YOURSELF A LOT OF TIME IN LOOKING UP THE QRA OF THAT HAM YOU JUST HEARD?

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
9SE	10	—	1012	1022
9CAA	124	34	149	337
6BJX	127	59	85	271
8CI	4	28	181	213
8EU	98	15	115	228
9DXY	20	20	176	216
8AYP	63	79	72	214
2CDH	38	27	144	209
9CDV	78	28	98	204
2GY	165	20	—	187
1AMZ	104	29	54	187
1ATJ	33	4	144	181
9BDW	25	12	120	157
9DOA	28	24	102	154
1YD	98	13	38	149
1YB	71	21	56	148
9APY	76	36	32	144
1BIG	38	8	94	140
3ZO	3	1	136	140
6AFF	58	40	32	130
8ABS	17	6	97	120
9EAM	2	20	96	118
1AYJ	23	11	82	116
9QD	15	17	84	116
1JL	73	30	11	114
3BWT	9	17	87	113
9CZC	2	—	110	112
9BOV	10	—	100	110
1AOX	19	18	72	109
9NV	38	28	42	108
9BFG	30	14	63	107
1BFT	23	21	60	104
1HJ	17	1	86	104
2AFV	3	9	91	103
c3NI	45	25	32	102
9DOL	33	2	66	101

36 stations in the Brass Pounders' League turned in some heavy message totals. 9SE and 8EU stay in the same leading positions as last month. 9DOA, 8AYP, and 1ATJ worked hard and put themselves nearer the leaders. 6BJX pulled himself up to third place. 9BFG, 1YB, 9EAM, 1AOX, 1BFT, and 9CZC are also still with us, but have slipped nearer the lower edge of the honor roll.

9SE is again in the starred rectangle. Once more and he will have copped the Traffc Trophy. Does he get it? Schnell says not if he once gets started at 9EK-XH!

D. A. Bancroft—9SE
7324 Aldrich Ave.,
Minneapolis, Minn.
Dakota Division
Orig., 10; Del'd.,— Ry'd., 1012; Total 1022

Traffic Briefs

AN American girl is in Paris studying art. Her glasses become broken. The prescription for grinding the lenses is 8,000 miles away in Montclair, N. J. Problem: what to do? The need is urgent. No time must be wasted!!

u2BIR gets the prescription over the telephone and shoots it in a message to an English station for forwarding to Paris. The glasses are quickly made using the information made available by amateur radio. Weeks later the mailed verification arrvies.

u2BIR handled the message with SPEED and ACCURACY. Every single word and figure had to be transmitted and copied CORRECTLY. Otherwise the message would have been wasted. In our message handling world *accuracy* should always come first.

More power to 2BIR! We want to hear of more like him. FB!!!

This isn't the Traffic Department now—the Board of Directors changed the name to Communications Department. Read the report of the Annual Meeting of the Board. You'll find it elsewhere in this issue. Some interesting things took place. We remember once when the secretary was calling the roll on a "yes" and "no" vote. When he came to Gravely, "Deacon" Gravely (3BZ) ups and shouts, "Alabama casts 19 votes for Underwood." Deacon, the democratic national convention was held some two years ago.

5ARJ, H. A. Snow, Tuscaloosa, Ala., wins the NRRL 50 watter! He guessed that we would receive 714 cards up to noon of March 5th, and hit it right on the nose—we received exactly 714 cards. Miss Dorothy Menk (who writes our letters) counted them and we are sure the count is ok. The 50 watter was tested by F. E. Handy and found ok with 1600 volts on the plate. No doubt it is perking at 5ARJ by now. Congrats, OM!

Cards were received as follows: Holland, 5; Belgium, 1; Alaska, 1; Sweden, 1; Mexico, 1; Canal Zone, 1; France, 1; England, 10; BCL, 11; Canada 1st. dist., 6; 2nd., 2; 3rd., 6; 4th., 3; 5th., 5; U. S. 1st. dist., 81; 2nd..67; 3rd., 46; 4th., 24; 5th., 52; 6th., 62; 7th., 28; 8th., 114 and 9th., 185.

The prettiest cards were turned in by 1AOF, 2CRP, 3DW, 4JF, 5ON, 6CQA, 7NT, 8ER, and 9CA. It must be borne in mind that this is the opinion of an individual and represents nothing. Each and every amateur believes he has the prettiest card—and we agree he has. Some of them are more practical than others and contain information of value. There are cards and cards and we urge you not to regard our opinion too highly as it is your opinion which counts.

The intermediate "AU" has been assigned to Alaska, temporarily. It will be used the same way that the Hawaiian amateurs use "HU." When a Hawaiian station calls a mainland station the complete intermediate should be "UHU" and when a mainland station calls a Hawaiian station, the complete intermediate should be "HUU." When an Alaskan station calls a mainland station the intermediate should be "UAU."

Now gang, this is the last Traffic Brief or Traffic Grief of the old Communications Manager. The next time you hear from "FS" it will be from the C. F. Burgess Laboratories, Madison, Wisconsin where 9EK-9XH are located. Anybody want any schedules? "FS" will operate as often as time permits to keep in touch with the old gang on the air. No, I'm not going into the commercial game—I'm going to stay right with the A.R.R.L. and amateur radio 73 and CUL—F. H. S.

---

c5GO established what is thought to be a new world record when he worked AQE, a whaler exploring the Antarctic and carrying short wave radio apparatus. A 37-meter wavelength was used. We shall be pleased to record any further useful traffic handling with AQE in these columns.

---

pi1CW keeps schedules with stations in Portland, Oregon, and Denver, Colorado. Australia and New Zealand traffic is cleared to those points three times a week regularly. Los Angeles is worked nightly. A fifty watt beam transmitter operated on SCHEDULES does the trick. This Philippine Island location seems to be a wonderful clearing point for international traffic. Page Radio Central!!

Hu6DCF (FX-1) recently held a 35 minute conversation with o-A4V. On February 12, messages were exchanged between the station at Fort Shafter, Honolulu, T. H. and Johannesburg, South Africa. On February 14 hu6CLJ clicked with HVA in Indo-China. We expect that further details of this wonderful international work will be available for our IARU News Department by next month. What's next?

6BJX reports that his schedule with pi1HR is still going strong. This makes the fifth month without a break. But two days have been missed during the entire time! F. B.!!! We also observe that 6BJX stands well in the Brass Pounders' League. Can it be that there is some connection between *regular* schedules and *good* message totals? We guess that the rules of *cause* and *effect* are responsible. Try it and see for yourself!

Next month we are going to put some additional figures on our "score board." In the Traffic Summary we will include the percentage of Official Relay Stations under each officer. The percentage of the total number of messages handled by each section of the country can be compared directly with the first figure to show our strongest and weakest Communications Section. Perhaps further changes in the "score board" will make it even more useful in showing us how *our* state and Division compare with others. Comments and suggestions are invited.

4IK of Atlanta Georgia effectively demonstrated the possibilities of amateur radio communication to the Georgia Railway and Power Company. He kept a schedule with 9BGN at Alton, Illinois, and with 9BYQ at Louisburg, Kansas, for ten consecutive nights. At 12:30 a.m. a single call was enough to establish communication. A whole string of messages were handled. Not a word was garbled and every message got through strictly on schedule! This shows what wonderful things can be accomplished when a problem is tackled in the right way by someone who knows the difficulties to be overcome. 4IK is now lining up *reliable* stations to be part of a relay system that is almost nationwide. Stations in Florida, Georgia, Texas, Kansas, Illinois, Pennsylvania, Colorado and California are needed. 6BBJ will probably be the Western terminal of this route. 5ABO, 5LJ, 5AWE, 8BRC, 8BUN, 8DQN, 9BSP, 9CDG, 9DNJ, and 9EBQ helped in the preliminary work. Congratulations Mr. Dale on your good organization work! We hope to have a regular progress report from you.

January 23 a "Pine-to-Palm Motorcade" left Winnepeg, Manitoba, for New Orleans, Louisiana. About a dozen cars were in the "motorcade." c4DE was right on the job from start to finish arranging for the communications of the party. Besides arranging a schedule with u5UK, the Winnepeg Division Manager had Official Relay Stations on the job at different stopping places along the route to collect messages. c4AW, c4EA and c4DY (80 meters); c4DW, c4CR, c4AE, c4DF and c4DE (40 meters) kept a nightly schedule at Winnepeg to handle the traffic. As the party was not due in New Orleans until February 17 we are unable to give a more complete report on how the preliminary arrangements worked out.

Brass-pounders are doing much for the Chicago public. The Chicago Daily News, cooperating with the Chicago Radio Traffic Association have a desk with one stenographer who is busy every day taking messages for free transmission by amateur radio to different points. We hope to have a complete report of the success of the message-handling service for these columns next month. A report on the percentage of different types of messages, on the number of messages DELIVERED, and on the speed and accuracy of handling them will prove enlightening. A list of the active stations and their schedules will show who is doing the best work.

The Chicago fellows want to call attention to the fact that the messages are being promptly handled. As weak spots come to light they are patched with additional schedules. Thus far much of the traffic has been "applause" traffic for different distant broadcasting stations. This move on the part of the Chicago gang to originate good traffic can be duplicated in many other sections of the country to good advantage. Stations keeping schedules with Chicago should see that especially good relay and DELIVERY service makes this work effective. The Chicago public are invited to assist by supplying messages for handling.

Listen for Salvador 2WR on 77 meters. This station is operated by Mr. Wm. Renwick, Fiscal Representative, Chatham Phoenix National Bank, San Salvador, Central America. Another new station open for traffic is DG1 on 36.5 meters. Address Mr. Colin Grattan, Argentine Navigation Co., Nicolus Mihanovich Ltd., Calle Cangalls, 300 Buenos Aires, South America. The station is located at Bernal, 15 miles south of this city. Who will be first to open some useful citizen radio traffic routes with Central and South America.

Here are four good points observed by the BEST amateur stations (Official Relay Stations).

1. Operate WITHIN the assigned amateur wavelength bands. If you do not own an accurate WAVEMETER—get one immediately.

2. Use a good plate supply. Eliminate key clicks with a suitable "thump" filter. A slightly (20%) modulated note is easiest to read. A 100% modulated note is broad and causes undue interference.

3. A *steady* note is most important. Uses a primary tuning condenser. (a high ratio of capacitance to inductance) especially on the shorter wavelengths. Normal or slightly sub-normal plate voltages make the note steady. Loose coupling (few turns in the antenna coil relatively far from the primary circuit) is necessary if the frequency is to be nearly constant while sending.

4. Avoid unnecessarily long calls. Use judgment in all operating. Arrange schedules enough to move traffic accurately and quickly in the right direction. Work break-in when possible.

How does YOUR station rate on these four points??

OFFICIAL BROADCAST STATIONS

Changes and Additions

Call	Local Standard Time pm 7.00	pm 10.30	pm 12.30	Days of Transmission Day of Week
1BFT	39	——	39	Sat and Sun.
1OC****	——	——	——	——
5ACL**	——	——	——	——
6ANW	80	——	——	Friday
6ANW*	——	——	——	——
9CVR	——	38	——	Sat. Sun.
9ECC***	——	——	——	——
9DZI	——	——	39.9	Sun.
9DZI	75.6	——	——	Tues. Sat.
c-4BT	40	——	——	Fri. Sat.
9CPM	——	38	——	Tues. Thurs.
9CPM	——	——	38	Sat.

** 84 meters, voice at 7.15 pm on Tues., Thurs., and Sat.

* Tues. at 10 pm and Sat. at 12 m on 80 meters.

*** 20 meters, 1 pm Sat.—40 meters 6.00 pm Wed.

**** 6 pm, Fri., Sat., Sun., Mon.—39 meters.

WHO GETS THOSE MESSAGES?

By L. R. Huber, 9DOA

A look at the traffic figures for the last few months will convince 'most anyone that a great many of the messages started in our stations never reach their destination. There are several plausible reasons for this, but the one most obvious seems to be that somebody evidently does not care whether he relays messages or not.

All ORS are on their honor either to relay traffic within 48 hours or forward by mail, telegraph, etc. So much for that. There is little reason to believe that any ORS would violate this trust. But the messages do become lost, strayed or stolen. There must be a reason for it.

All right, there is a reason for it, but what is this reason? Let's stop and look over the situation a little. It is safe to presume that most of the messages originated at reliable stations. By reliable stations, is meant those stations which, although not necessarily ORS, feel that it is their duty to move traffic within reasonable length of time. This time cannot be over 48 hours, since it is reasonable. Very well, they all, or nearly all, start at RELIABLE stations. It follows that somewhere enroute, some UNRELIABLE stations get hold of them. Now if the UNRELIABLE stations are kept from getting the messages, it is quite natural to suppose that the messages stand a much better chance of getting thru. Since this is the logical remedy for the present deplorable situation, we need only to work it out.

There is a way of doing this, and it is for the RELIABLE stations to refuse to let the UNRELIABLE stations have their traffic. And how can you tell the two kinds apart? Well, this should not be so hard for one who has been pounding brass for a year or so. Nine times out of ten a poor operator gives himself away, with his fist, by his method of doing things, or various other "ear marks". For instance, a station that calls CQ eight times, or even six, can hardly be called reliable. Again, a station that answers your call with over three calls is liable to be a little "off color". An old timer does not need this much evidence. He can tell you what kind of an operator a man is by only hearing three or four words of his sending.

The rest is simple. When you have traffic and want to get it off, DO NOT give it to a "lid" operator. If you do, the chances are that it will die right there. Many times I have become QSO with several stations in one direction, with the intention of QSRing, only to find that they are either unreliable or questionable. In this case I refuse to give them my traffic, but instead I mail it. Nearly every time I get an acknowledgment from the addressee, and many times more traffic originates as a result.

Another thing relative to message handling, while not in direct line with delivery, but still it is important, is the spacing between words in sending. I find that when QSO is somewhat difficult, if each word is sent ONCE, with plenty of spacing between words, the receiving op has less trouble getting it than by QSZ. Try it yourself and see if you don't think so too.

TRAFFIC SUMMARY

DURING January-February there was slightly less message-handling activity than during the previous month. The figures show a slight improvement in percentage delivery. However, but 60-% of the messages originated during the "message month" got *delivered* during the same period. This is a serious condition to observe but one which can be improved if *each* station owner who reads these words will *do his part.*

The problem of message RELAYING and DELIVERY must get some serious attention if our general service is to be one of which we are proud. The reports show that messages going over regularly scheduled routes get through with the desired speed and 100% accuracy. The figures show that there is plenty of traffic to be handled. More individual responsibility regarding prompt relaying and delivery will bring the results we want.

Messages received should always be *delivered immediately* (a) by telephone, (b) in person, or (c) by mail if no other means of effecting delivery are available.

Never accept messages which cannot be handled or delivered without informing the chap filling the message of the circumstances.

Keep the hook clear by handling traffic on *schedule* daily.

The different Assistant Division Managers are listed below. Are you doing *your* part to keep your State and Division a leader?

If every station owner who reads these words will see that every message he handles is delivered or passed along promptly and report his good work, we will be able to show 100% delivery in the National scheme of things in a short time! DO YOUR PART IN IMPROVING RELAYING, OM.

State or Division	A.D.M.	Orig.	Del.	Rel.	Total
ATLANTIC DIVISION					
W. N. Y.	C. S. Taylor	194	84	376	654
D. of C.	A. B. Goodall	9	17	87	196
Md.	G. L.Delchmann, Jr.	40	28	70	138
Delaware	H. H. Layton	4	—	3	7
So. N. J.	H. W. Densham	19	7	64	90
East. Pa.	J. F. Rau	173	60	434	657
West. Pa.	P. E. Wiggin	160	141	622	903
		599	337	1356	2645
CENTRAL DIVISION					
Wisconsin	C. N. Crapo	109	164	141	414
Ill.	W. E. Schweitzer	349	265	618	1252
Mich.	F. D. Fallain	—	—	—	140
Ky.	J. C. Anderson	—	—	—	—
Ind.	D. J. Angus	65	36	183	570
Ohio	C. E. Nichols	—	—	—	1106
		623	465	942	3482
DAKOTA DIVISION					
Minn.	C. L. Barker	302	154	1699	2143
N. Dak.	George R. Moir	9	5	21	35
S. Dak.	M. J. Junkins	—	—	—	189
		411	159	1720	2369
DELTA DIVISION					
Tenn.	L. K. Rush	—	—	—	—
La.	C. A. Freitag	—	—	—	23
Ark.	Dr. L. M. Hunter	10	6	43	59
Miss.	J. W. Gullett	33	10	50	95
		43	16	93	177
HUDSON DIVISION					
N. Y. C.	F. H. Mardon	179	167	503	859
E. N. Y.	H. N. Ammenheuser	407	118	489	1009
N. N. J.	A. G. Wester, Jr.	177	75	337	590
		763	355	1329	2449
MIDWEST DIVISION					
Kans.	C. M. Lewis	70	29	164	263
Iowa	D. E. Watts	—	—	—	675
Nebr.	H. A. Nielson	102	54	396	422
Mo.	L. B. Laizure	112	41	513	912
		284	124	1073	2272
NEW ENGLAND DIVISION					
Maine	S. B. Coleman	171	64	383	618
West. Mass.	C. J. Green	166	87	283	536
East. Mass.	Miss Gladys Hannah	174	139	379	693
New Hamp.	C. P. Sawyer	59	36	214	309
Vermont	C. T. Kerr	112	26	56	194
Conn.	H. E. Nichols	74	59	339	472
R. I.	D. B. Fancher	51	25	153	229
		807	436	1807	3051
NORTHWESTERN DIVISION					
Wash	Otto Johnson	167	156	345	668
Ore.	Ashley C. Dixon, Jr.	23	52	226	301
Idaho	K. S. Norquest	72	19	202	193
Mont.	A. R. Willson	13	19	42	293
Alaska	Leo H. Machin	6	1	1	8
		281	247	716	1214
PACIFIC DIVISION					
No. Sect.	P. W. Dann	209	164	637	1009
So. Sect.	L. E. Smith	319	270	496	1332
Hawaiian Sect.	K. A. Cantin	146	51	43	240
Nevada	C. B. Newcomb	7	—	10	17
		681	485	1186	2598
ROCKY MOUNTAIN DIVISION					
Colo.	C. R. Stedman	267	130	438	842
Utah	Art. Johnson	31	21	195	247
		298	151	633	1089
SOUTHEASTERN DIVISION					
Ala.	H. S. Brownell	85	188	43	316
Porto Rico	Luis Rezach	—	—	—	66
So. Carolina	A. Dupre	—	—	—	429
Fla.		—	—	—	—
Ga.	J. Morris	—	—	—	—
		85	188	43	811
ROANOKE DIVISION					
West Va.	C. S. Hoffman, Jr.	128	103	194	425
No. Caro.	R. S. Morris	46	48	166	261
Virginia	J. F. Wohlford	33	11	92	136
		207	162	452	812
WEST GULF DIVISION					
No. Texas	W. B. Forrest, Jr.	66	24	187	277
So. Texas	E. A. Sahm	31	7	58	98
Okla.	K. M. Ehret	90	59	248	397
		187	90	493	772
PRAIRIE DIVISION					
Manager	F. E. Rutland	34	17	10	61
ONTARIO DIVISION					
No. Ont.	Wm. Sutton	—	—	—	129
East. Ontario	F. A. Harrison	—	—	—	31
So. Ont.	J. A. Varey	—	—	—	38
Cent. Ont.	A. R. Williams	—	—	—	187
					385
VAN-ALTA DIVISION					
Manager	A. H. Asmussen	39	18	60	117
MARITIME DIVISION					
Manager	W. C. Borrett	39	26	25	90
QUEBEC DIVISION					
Manager	Alex Reid	—	—	—	—

TOTAL FOR COUNTRY

Originated	Delivered	Relayed	Total
5381	3276	11938	24,424

Club Activities

CALIFORNIA—The Modesto Radio Club fellows are busy straightening things up after the big Ham Fest. January 3d, the Western Amateur Radio Association of Oakland staged the best banquet and get-to-gether yet. The old amateur spirit was much in evidence. 6BAA surely did his stuff in the Marionette Show. The movies of the S. C. A. R. A. and the Modesto doings were FB!!! Director Babcock makes a second Valentino! You should have seen such shieks as O'Brien and Quement. The San Jose fellows are plannings to put over a big ARRL Convention in October. The Polytechnic Radio Club of San Francisco, 6QC is on the air, handling traffic.

Lick Wilderming Radio Club has the call 6BVC. The Clubs' membership and enthusiasm is coming forward rapidly. The Secretaries of the Affiliated clubs are asked to forward a monthly report to their Section Manager the first of every month. Thanks.

DISTRICT OF COLUMBIA—Goodall's illustrated talks on the mercury arc rectifier and Mr. Downey's talk before the Washington Radio Club have been interesting and instructive. Pres. Harsh has a program mapped out for coming meetings that will prove interesting to visiting hams as well as the Washingtonians. Next on schedule will be a lecture on the Jenkins' picture transmitter and receiver.

ILLINOIS—The Chicago Radio Traffic Association have had several interesting meetings. During the last few meetings, descriptive talks on "Capacity", "Television" and "Synchronous Rectifiers" were offered. Feb. 2, Mr. Moss of the 33rd company, Signal Corps Guard, invited the entire gang to an oyster stew dinner. The plans for a radio net were discussed. Everyone had a good time.

Mr. G. Housley of the Chicago Daily News was appointed publicity manager.

The C. R. T. A. is in touch with Mr. C. C. Dimock, of the Chicago Mil. & St. Paul, regarding railroad emergency work. A list of stations along that line and other detailed information has been given our members to aid in this work. 3CAB, 2AUC, 6CMS, 6BPQ, 2WC, 9DOL, and 5ACZ were recent visitors at meetings of the Association.

MAINE—Every Friday the Queen City Radio Club holds a red-hot session. The following officers for 1926 were elected: Pres. Grover G. Brown, Vice-Pres. Sumner H. Fifield, Sec. G. A. Melvin, Treas. S. B. Coleman, Reporter G. L. Clement. Plans for a summer convention are being actively discussed. A committee of four members is making a preliminary study of the convention situation. Definite plans will be presented at the first meeting in March.

Feb. 12 an open meeting was held at the University of Maine. A paper entitled "The Ideal Ham Station" was presented by S. B. Coleman. Discussion of the various points brought out in the talk followed. Membership is growing steadily. This Bangor Club's activities are stimulating an increasing interest, especially among the BCL group. Fine business! Come and learn to pound brass.

A traffic trophy is offered by the Club to the member handling the largest number of messages each month. Keen competition results. This month it goes to 1UL!

MANITOBA—The Winnipeg Radio Traffic Association are publishing a monthly bulletin of Division and Club news. It is furnished to anyone at 10c a copy (the cost of printing and mailing). It is a live, newsy ham paper. Boost it along and get some interesting dope by sending to c4DY for your copy.

MINNESOTA—Sixty hams attended the TCRC Old Timer's Banquet, January 22nd at the Minneapolis YMCA. Interesting talks with some musical numbers by 9SE, 9CMB and 9CHY made the program really enjoyable.

9IG, as auctioneer, disposed of a hundred trick novelties during the evening, each sale swelling the Club's treasury from 10c to a dollar. "IG's" "wisecracks" soothed the gang who parted with their money. C. M. Jansky, Jr., Dakota Division Director, gave a report on the 1925 Radio Conference, of which he was a delegate. Wallace, 9ZT, acted as a very able toastmaster.

In St. Paul, the St. Paul Dispatch-Pioneer Press inaugurated a radiogram service. The St. Paul Amateur's Club place the message blanks at stores in different parts of the city where the public may file messages for transmission via ARRL. Messages are collected at intervals and started from St. Paul Official Relay Stations. 9BAY, President, has charge of the message service. This service is given publicity in the St. Paul paper. It is hoped that a similar service will be established in Minneapolis in the near future. The front of the message blank is shown. On the back, both the ARRL Communications Department and the work of the newspaper are explained.

NEW JERSEY—Feb. 4th a reunion of the Radio Club of Irvington, N. J. was staged at the Elks Club House. About 30 members attended. The gang plan to meet once a month for a good time. The club is one of, if not the oldest radio organization of its kind in the country. It was organized in the days before there were any radio laws, when there were no wavelength or power restrictions. The club idea helps in reducing QRM. The exchange of ideas is valuable. This club has passed down thru the era of "watts per mile" to the day of "miles per watt."

OREGON—The Jefferson (High School) Radio Club is putting up its station, 7ALA. A whole crew of operators are in training. Miss Edith Daugherty is one of the YLs due to become a "ham."

PENNSYLVANIA—The Lehigh Valley ORS Club postponed the February meeting at 3TP on account of bad weather. The meeting will be held later at 3BNU.

The Amateur Transmitters' Association of Western Pennsylvania are holding monthly "ham-fests." Interest in the meetings holds up well. There are 49 active members—all brass-pounders!!

RHODE ISLAND—Everything is active about Providence Radio Association Headquarters. The Convention promises to be a bang-up affair and a good time is promised for all. GET READY GANG.

TEXAS—The Dallas Radio Club held an amateur "hamfest" March 27 at the Hilton Hotel, Dallas, Texas. A big feed and blow-out was staged! About 200 Texas hams were corraled from all accounts. Good talks, stunts, music, and rag-chewing made it hard for the gang to drag themselves away from Dallas after the fun was over.

DIVISIONAL REPORTS

ATLANTIC DIVISION
E. B. Duvall, Manager

THOSE fellows who have been complaining about reports not appearing in this department will have to say that this month's report is certainly the "berries," for completeness. We have all sections of the Division with us this time even Delaware who has been among the missing for several months. The ADMs who have complained and lost interest in the work on account of few reports coming in from their territory should make note of our ADM of Delaware's position who has only 2 stations in the whole state who *some* times report. Of course, the state is small and not a great deal is expected, but every little bit helps and there are possibilities of Delaware growing in ham population in a short time. Those few DS and CMs who have been reporting direct to me must discontinue this practice now that I have the promise of every ADM to get reports in complete and on time. There is still a little improvement wanting on the time proposition, several ADMs having had to resort to Special Delivery in mailing late reports. I have mentioned before that there is no SD service at my post office and such letters do not get any special attention at this end. The only thing for the ADMs to do is to mail the report early—regardless whether all the reports you are expecting are in—then some of these fellows will wake up and mail their reports more promptly. Response to my circular letter of Feb. 18th has been fairly slow, and indications from those who have contributed to the Division Bulletin show that the first two circulars on the matter were never received. Anyone inerested will receive the circular mailed in January upon request. I am endeavoring to QSL by radio all letters sending contributions. I would like to begin work towards getting the Bulletin started next month and you can help me greatly by telling your fellow ORS who you work on the air. I would like to answer and thank every one who has contributed, but at present my clerical work is way behind and such is impossible at present, however, I will reach every many by radio before long.

District of Columbia—ADM-3AB—The Washington Crowd always enjoys its usual privilege of having a large number of out of town visitors. 3BWT is stepping on it more than ever now. 3ASO and 3BSE both are crystal control stations. 3ASO is the only station left in the 200 band. 3AB and 3BWT operate on both the 40 and 80 band. 3CDQ is getting to be a regular "he" station now, keeping a regular schedule and in operation consistently. Since the installation of the mercury arc, Miss Zandonini is taking more interest in traffic work and is just beginning to get some "kick" in working a transmitter that stays put and takes less attention. The Washington stations are anxious to hear from all the stations in the Atlantic Division who would be interested in maintaining schedules and handling Army traffic into Washington.

Traffic: 3BWT 113, 3ASO 15, 3AB 42, 3BKT 26.

Maryland—ADM, 3HG—Activity seems about the same as last month in Maryland and yet there seems to be a few stations who have come out in the open this time and are reporting some good work. 3LL has moved to 5110 Centre Ave. and is using a small vertical antenna. 3WA turns in a fine traffic report. 3ZD-3APT has remodeled and will be hitting on all 6 by April. 3BUR is active again. 3CGC has been quite active with a fifty. 3GT is kicking out well on 40 and 80. 3CJ also is getting excellent results. 3AEA worked 6BCJ on 80 and expects to arrange a schedule this month. 3LG on enough to turn in a report, but is very QRW school work. 3OP is now operating on the S. S. Sester Weems. 3ACW has little time to be on the air but is reaching out well. 3AHE and 3PS are midshipmen at Annapolis and have regular schedules with eight stations.

3QI is going strong on 80 with two 250 watt jugs. 3RF has been QSO F-8YOR using one new 7 watt tube. 3VI has been doing great work on 80 and is now using a DeForest H tube. 3AHA has little time due to being op at WCAO. 3OU is about ready to go on the air again. 3APV has two good regular schedules on the 40 band and has worked G-2SZ on 20 meters in daylite. 3DW has been on 82 testing several antennae.

Traffic: 3PS 47, 3RF 5, 3LG 12, 3LL 9, 3BUR 3, 3CGC 2, 3GT 2, 3CJ 4, 3AEA 3, 3WA 23, 3HG 15, 3APV 7, 3DW 6.

DELAWARE—ADM, 3AIS—It has been hard for the ADM to make reports up from no material. He is certainly congratulated for the interest in holding what little together he could to make a report this month. 3WJ has moved his station to Claymont and the YLs are doing a good bit to keep him from the set. 3BSS is having trouble working on 40. 3AIS has had better luck this time, working G-2QB and being reported R5 by Australian A-1699, a receiving ham. 3AIS is on but three nights per week and is the only station operating in Wilmington. 3SL, QRA Silverside, Delaware, has been trying to make his spark coil CW work but ND so far. There is some prospect of having two new stations at Dover, Delaware. Hams from that town have paid the ADM a visit and have promised to have sigs on the air in a few weeks.

Traffic: 3AIS 7.

NEW JERSEY—ADM, 3EH—Quite a few stations in the 6th N. J. Dist. failed to report this month. However, what stations are active are doing excellent work. 3BTQ says his small traffic totals are due to school work. 3DH, at Princeton, Univ., seems to be right on the job at all times. 3ZI is having rather a hard time of it trying to keep two transmictters on he air. 3XAN has been appointed as the control station for New Jersey in the new Army Amateur radio net and 3ZI as the alternate. 3SJ came across with another report this month and it looks as if he were in line for an ORS., if he continues his good work. 3BFH seems to have dropped out and will be surprised with a cancellation unless we hear from him very soon. 3KJ and 3OQ report from the 7th N. J. district but give no details as to activities. 3AIO writes that he has trouble with message delivery. 3OB has a new QRA—339 N. 49th St., Merchantsville, N. J. 3CO lost a 5 watter and was off the air for a few weeks, but is back again with a UX210. 3VX is building a new xmitter and receiver. 3ALX advises no foreign stuff for him.

Traffic: 3XAN 6, 3ZI 4, 3DH 11, 3BTQ 2, 3SJ 14, 3KJ 8, 3JW 36, 3ALX 2, 3VX 2, 3CO 4, 3BO 1.

EASTERN PENNA—ADM, 3FM—3HD lost most of the month by falling off a roof whi'e erecting a 30 ft. mast. 3AHR has been QRW exams at school. 3LW is the real big DXer this month. Among the best were GDAX, AQE in the Antarctic and a flock of Zedders. 3AWT is very QRW at the Univ. of Penna. but managed to find a little time to traffic. 3CGS is getting a new H tube in shape for next month's traffic.

Dist. 1—3AEN has just been able to get some signals out on 40. 3ZM has QRM from power stations close by. 3PY is temporarily off the air due to reconstruction.

Dist. 2—8AVL, on 40, worked O-AGN, I-1GW and I-1NO. 8CTZ is on 79. 3LK is on 85 and is rigged up OK. 3AVM with a new H tube and on 40, says he hasn't had much luck with DX. 3BNH is working temporarily on a 5 watter until his 50 comes back on a replacement. 3TS is now going on 40 and 80. 3CJN is on 80 and has had trouble blowing 50 watters. 3BLC back again after a month off. 3BUV, on 40, and QSO west coast, Canal Zone and France.

Dist. 3—3ZO and 3AUV, only ones reporting. 3ZD has been QSO G-2CC and F-8DP. 3AUV is handling some traffic in spite of QRW.

Dist. 4—Walleze has sure thrown some pep into his newly reconstructed district. The big figure cut this month was to get in direct touch with activities in Wilkesbarre. 8WI will act as CM and it is hoped Wilkesbarre will keep alive from now on. Since the W-B gang are not yet fully organized, 8BWI could not give us such a hot report as will come later. 8BWI has a 5 watter perking on 80 and a 20 watt phone on the upper band. 8ZS, QRW with a BC set, 8AJK is breaking out FB now with a new H tube. 8BLM has a new 50 ready to go on as soon as he can skip a date with the YLs—8BCQ is a new one. 8BPN perking fine on 40 and 8AWS is away at school. 8AZY is going strong on 80.

Traffic: 3LW 8, 3ABH 27, 3AHR 1, 3HD 2, 3FS 6, 3AWT 15, 3AEN 2, 3ZM 4, 3BNU 8, 3AVM 4, 8CTZ 6, 8AVL 4, 3BUY 5, 3CON 24, 3AUV 28, 3ZO 140, 8EU 228, 8AVK 4, 8CGZ 8, 8BFE 13, 8CFT 9, 8BSZ 41, 8BQ 32, 8RQ 15, 8AFR 10, 3BIT 10, 8WH 3.

WESTERN PENNA.—Dist. 5—8AXD closed down due to burn out generators. 8XE is handling bulk of traffic in this section. Crossley, of the Dept. of Elec. Eng. Penna State College, is DS and in charge of the station. 8CON is one of the ops along with a host of other 8th and 3rd dist. hams. PRR tests and regular traffic constitute the work of this station. 8XE, operating every day from 7am to 7pm and all night.

Dist. 6—8AKI has abandoned the high waves. 8BES is a new station working 50 watts Kenotron rectified AC on 40. 8CCK bought a new $100 cabinet to put the transmitter in so it will be out of the way of the family. 8DRA is inactive and wants to sell his transmitter. 8DOQ is working CW on 40.

Dist. 7—8DRB is changing his set for use of the short waves. 8ADS-8DSV will join the ranks of the married ones in April. 8BYI, getting out fairly well on both 40 and 80. 8CCK is out of town so station is not being operated at present time. 8AUD says there is nothing doing on the 150 band so he is changing to the 80 band. 8CUH seems to be the only station getting tfc in this district.

Dist. 8—8ABM has moved his station and is now up at a new location, in the same city. 8GU is very active on 80. 8BDJ is also active holding down the 40 band. 8AAT has moved from Elmo, Pa. to Franklin. 8BUN is working on 80 and 175. 8DTS is working regularly 8DTX is a newly licensed station and has a set going doing some local work. 8BXE is a new comer in the district. 8ALF is back again after a quiet period. 8BRC is doing his share of the work as usual. The work of the supt. in this district has certainly been most satisfactory when you consider this district was formerly dead with the exception of one or two stations—ADM.

Dist. 9—A further substational gain in traffic in this district is noted this month and the increase is not due alogether to the increase in size of the district, as there have been but few reports from the new territory, but a general increase in interest on traffic, together with the PRR work now going on in the Central Region of the PRR accounts for the improvement. 8GI still leads the district by a large margin. 8BRB took an awful slump this month on account of midterm exams but says that he will be back on next month strong. 8ABS sends in a fine report from new territory. 8CEO is busy helping to organize the PRR gang. 8DNO is doing excellent work with a fiver. 8DCV handles lots of traffic. 8SF takes most of his traffic from the West Coast. 8BBL is putting up a Hertz. 8DBL has just returned from the West Coast. 8DKS says that he is glad to find out where to report. 8BY is QRW school. 8AGQ has been having a bad power leak. 8CKM is now using a 250 watter and is getting out just as well as 8CES does with his one fifty watter. 8DGL says that Monessen has a Jinx. 8AMU wants to bust into the tfc game. 8AYH, though not an ORS, reports regularly. 8CRK has had a series of troubles finally losing his only tube.

Pittsburgh—8CIT has a new 250 watter and is working on 39.2. 8AGO is still working on 77. 8VE is the portable station of 8AGO and is using one 5 watter with an input of 26 watts on 40. 8CLV is on every now and then and was QSO H6AFF. 8BT is using a lone 250 watter and is being reported from Australia and other far off points. 8BHJ is rebuilding and expects to be on the air by the time this goes to press. 8JQ is still working the foreign hams as usual adding a new laurel every week. 8EW is also very active having located a new 38.4 station on top of a 12 story building. 8AIO is in Springfield, Mass and will not be on the air for the next period. 8CVX is busy with school work. 8AYW has been active as usual but says he will be among the missing soon as he apires to be a Commercial op. 8CDK has been active on 39 using a 250 watter in a self rect. Hartley. 8BUY is on the air again, having recovered from an operation. 8AJU is now operating on 40. 8AEY is on the air again after a period of illness. 8CTF is working 39 as usual. 8ZD has been inactive for the past period but promises to be in operation for the next period.

Traffic: 8BIT 28, 8AGO 72, 8VE 2, 8CLV 2, 8CUK 7, 8CUH 25, 8GI 253, 8ABS 120, 8CEO 72, 8DNO 51, 8DCV 42, 8SF 39, 8CGF 22, 8DBL 17, 8DNF 36, 8BBL 12, 8DKS 7, 8BY 4, 8BRB 1, 8DOQ 8, 8BES 5, 8AKI 4, 8BRC 29, 8BYI 36, 8BUY 17.

WESTERN NEW YORK—Reports from the gang show that foreign DX has improved immensely, nearly every station reporting some foreign work of some kind. 8ALR works traffic with Australia and England handling traffic with these foreign countries on same dates. 8ADE has been heard in Australia and is also going strong on 5 watts. 8CTR handles traffic and has worked ship off South America on his pipe antenna. 8BLO will be back again soon with the gang. 9NT has a little set working for local DX. 8DPL works traffic between Phila. and Buffalo with a 201A with 5 volt plate supply. 8RV works 40 regularly and hooks up with Australia and New Zealand. 8UL handles traffic and tries his best to keep schedules with everyone signing up with him.

Due to great activities in Syracuse, the report of the CM was late. 8BIN and 8CTL have been appointed as official test stations for the DeForest Co. Mr. Van Brant of the Company spent several days in Syracuse getting 8BIN-8AWP and 8CTL in shape. 8CTL is off the air waiting for new tubes. 8AXA just got his fifty going, using a Hertz antenna with great success. 8CNX holds the traffic record here this month and is doing FB on 40 and 80. 8FV will have a 400 watt station on 40 and 80 with kenotrons behind it. Utica has a 100% Brass pounders club. The Rome gang are thinking of an auxillary to help carry on the good work. 8ADG is working the globe on his 50 watter. 8DSM craves more messagse but its too bad he is going to get hooked up for lift. 8CCR has been doing considerable work on 20 so not much traffic moved. 8ASP and 8BZU are making a terrible fuss on 40. 8AOZ is going over the entire station getting ready for OBS work. 8BCW is making a new transmitter so it looks like a big noise from there soon. 8BQB has opened up with 50 watter. 8CNH takes the lead for high traffic in Dist. 8. 8AKS and 8AIL are new stations doing good work. 8DHX is doing good tfc work and DX with a new H tube. 8DRJ and 8BQK are going strong. 8DX has worked France, 8AVJ hasworked G-2LZ and heard in both France and England.

Traffic: 8AYB 2, 8UL 14, 8QB 5, 8BSF 7, 8DFK 25, 8BCZ 16, 8ALY 2, 8MC 10, 8KS 11, 8BEN 6, 8BGN 25, 8APO 4, 8RV 23, 8HJ 5, 8VW 3, 8WW 14, 8ADM 13, 8BFG 3, 8CZP 11, 8DME 26, 8ZU 32, 8DSM 25, 8CCR 30, 8BZU 8, 8CNX 97, 8AXA 9, 8BIN 45, 8CTL 35, 8BQK 37, 8DRJ 18, 8DHX 30, 8AKS 28, 8CNH 49, 8DX 8, 8AVJ 8.

CENTRAL DIVISION
C. E. Darr, Manager

ILLINOIS—Dist. 1—9BHT continues to work Africa and Australia every A. M. 9DGA is very QRW at college. 9BUH, on 40 once in a while. 9COL has quit the air. 9NO is moving to town. 9BVM, a new station with 7½ watts but can't raise anyone.

Dist. 2—9ELR wants schedules on 85. 9DLO works DX on both coasts. 9ALF uses but 500 volts on a fifty but will have a new transformer soon. 9BUK and 9BRX have consolidated and are experimenting. 9RQ is arranging schedules with 8CW-8BGS. 9AZ works the west coast regularly with two UX-210's in a four coil Meissner. 9ELF is experimenting on 80. 9ARM has a L.C. Hartley working FB with 500 volts on the plate and 1.7 amps. 9CZR is working on a broadcast station. 9CTF is out of commission. 9ARM heard O-A3B (QRA?).

Dist. 3—9AHJ expects to be on regularly now. 9ATT is going to install heavy duty B batteries when he gets the wherewithall.

Dist. 4—9CLJ keeps schedules with 9CVE every Sunday evening. 9BGE. back on the air on 40. 9DQU pounds brass, goes to college and operates two broadcasting stations. 9VV is all torn apart and is remodelling for 80 work.

Dist. 5—9AYB works 6s and 7s regularly although be burned out his 30 watter. 9BLO works NAJ on the high waves using fone and 1CW. 9DBI works East coast on high waves.

Dist. 6—9EHQ has been off the air nearly all month. 9ALW too QRW for brass pounding. 9DCG erected a new antenna for 40. 9DQR changed to 80 and has trouble in getting out. 9CEC got married so he has passed into the fifth ham stage. 9CEC is also working on QRM interference and reported a spark set to the Radio Inspector.

Dist. 7—9BWS is using a tantalem rectifier with 5 mikes and a choke. Anyone hearing 9BWS please compare his signs with others and QRK to him. 9AIZ has tube trouble along with school QRM. 9NK changed his set from a 50 watter to a 5'er with 220 volts on plate. 9AAW's third op is on the job while the first and second ops are away on their world cruise. 9PU wishes an ORS. 9CSB uses a fiver and reports no DX. 9MR is working on a broadcast station in one of the Chicago hotels. 9EIN nothing but delivered messages this month. 9CXC and 9CN have consolidated and have a model station. 9CSL is remodelling. 9DYD is always improving. 9NV has plenty of ops and handles lots of traffic.

Traffic: 9APY, 144; 9QD, 116; 9NV, 108; 9IX, 90; 9BNA, 73; 9PU, 50; 9DWH, 45; 9DLG, 43; 9CXC, 42; 9AYB, 39; 9BVP, 36; 9GE, 32; 9MR, 30; 9CSB, 28; 9ALK, 26; 9RK, 25; 9US, 24; 9NK, 22; 9CSL, 21; 9CZL, 18; 9CLJ, 14; 9DAF, 13; 9VJ, 13; 9AJJ, 12; 9DGA, 12; 9DYD, 12; 9DGU, 12; 9AAE, 11; 9EIN, 10; 9BGC, 10; 9DCG, 10; 9ELR, 10; 9DDE, 8; 9BBA, 8; 9EAS, 8; 9KN, 8; 9DAV, 7; 9FI, 7; 9DLO, 6; 9EJY, 6; 9NB, 6; 9AIZ, 5; 9AWT, 5; 9EHQ, 5; 9AAW, 4; 9AFF, 4; 9ALM, 4; 9ARM, 4; 9BIZ, 2; 9DYL, 2; 9VV, 2; 9BWS, 1.

WISCONSIN—Dist. 1—9DOL is in line for an ORS. 9EHM says traffic moving slowly on 40. 9BWO increased his antenna current from .8 to 1.25 amps. 9CKU moved here from Menominee Michigan and is QRV for traffic on 40 and 80 with one fiver. 9RH blew a fiver. 9BKR reports OBS being resumed this week. 9UH says owner of building says antenna must come down. 9AUG still reports good results with Hertz antenna. 9CIB has a new DeForest H tube with 20 watts. 9AFZ, rebuilding transmitter and still a staunch Naval Reservist. 9ATO hopes to be on the air soon on 20, 40 and 80. 9ELD, back operating WGZ. 9CII says selling out—50 already gone. 9DTK handled 234 msgs. this month.

Dist. 3—9DKA has worked A-3BD and HU-6CLJ. 9CGL, our new ORS at Sheboygan, is on 40 and 80. 9EMD is down on 40 with ten watts. 9BVA is the only active station in Amherst. 9ANE has received his appointment as ORS in Marinette. 9AEU claims that school work and YL keeps him from putting station up at Madison.

Dist. 4—9AZN's msgs handled shows a considerable drop from last month's total. 9DCX has schedules with 9AZN and others not having much time for DX. 9BSO is coming back again strong. 9BLF has again started up. 9EIL is silent. 9EIK is a new station at Colby. 9CAV is also a new station at Alma Center Jackson County. 9PJ has applied for fone. 9BKC has got permission to use fone on 85. 9AKY is not on much due to YL QRM. Since the News Department has been discontinued from lack of funds and the necessity for economy, the DS says that he will have more time to build up the 4th District and all hams will be rounded up and started to pound brass.

The BADGER ARRL NEWS founded by 9VD and published in the interest of Amateur Radio and distributed free heretofore, will be published in the future by the Milwaukee Radio Amateur's Club and will be the official organ of that organization. All amateurs interested in receiving this publication should communicate with secretary John Meyer, 9BKR, 888 44th St., Milwaukee. The subscription price is one dollar a year, which includes membership in the Club to those residing outside of Milwaukee.

9CKU, formerly of Menominee, Michigan, is now located at 325 Farwell Ave., Milwaukee, Wisconsin.

Traffic: 9DOL, 101; 9EHM, 21; 9BWO, 18; 9CKU, 15; 9RH, 15; 9BKR, 7; 9UH, 4; 9AUG, 4; 9CIB, 2; 9AFZ, 2; 9DKA, 43; 9CGL, 15; 9EMD, 7; 9BVA, 6; 9ANE, 3; 9AZN, 67; 9DCX, 54; 9BSO, 10; 9BLF, 18; 9PJ, 2.

KENTUCKY—9CVR is on 80 meters. 9OX is in business but handles a few when he can. 9WU works spasmodically. 9DTT has several 80 meter schedules. 9MN is troubled with X-ray QRM. 9HP and 9BEH are on 40. 9DYC has given up radio for a time. 9CJW is a new station at Centre college, Danville, Ky. 9BPB is going to get a big tube. 9EP is having trouble. 9EI is on nightly around midnight. 9BUD is building a 10 watt set. Some of the Covington bunch at last have come to life. 9AMJ and 9APS are changing to shorter wavelengths. 9VZ has things working nicely. 9ALM is working in the 150-200 meter band and handling considerable traffic. He keeps several schedules with good results.

OHIO—Dist. 1—8BN handled a test message for the PRR Sunday Feb. 16th. 9LO was heard in Italy. 8AOE put up a new single wire antenna. 8BQI sold his S tubes to 8CVV. He is not in operation at present. 8DHS is waiting for 8DSB to make him a new filament transformer. 8CVS has constructed a whole new outfit. He will be on the air soon. 8BDCB is on the air little. 8ANN has a hard time trying to get out of the back yard. 8BSW has his 50 watter operating on 80 meters. 8DNR is still doing good work with his fiver. 8BSC is using 2 7½ watters.

Dist. 2—Traffic is moving along in good shape this month. More stations are in operation trying to get messages to handle. 8DBM is using a UX210 tube and has schedules with 8GR and 8DIH for handling. 8DDQ is stepping out. Schedules are kept daily with 8AUB and 8CCH for handling traffic. 8DIH is on the air with a fiver and also handling traffic through two schedules. 8CTE is rebuilding his set. 8BKQ has not been able to get his crystal controlled set working right yet. He will appreciate suggestions from the gang regarding crystals. 8WG will be on with a UX210 tube soon. 8BCE continues to receive reports

from foreign stations. 8AJZ and 8BXQ are off, school, etc.

Dist. 3—8BKM's in the lead as far as traffic is concerned. 8DAE ran second, and both should be in the brass pounders league, only we haven't their full report. 8RJ should be mentioned for good work. The message business looks better. Reports show that the boys with lots of messages have been working on schedule. Figures prove it was worth while. 8DAE added Brazil and Italy to his list. 8ADA is doing his usual DX. 8BPL, 8ACY and 8BNH worked a number of foreigners. 8BRX has built an addition to the house. 8ATW is changing his location. 8DPN and 8AWX have had little time to pound brass.

Dist. 4—8BGF is sick. The Dayton fellows are at the top. 8BZJ is another new station. 8AIB got a 250 watter as a present. 8CWR is on 40 meters. 8CNL mourns a dead 50. 8CAU, the University of Cincinnati, expects to do some new experimental work.

Dist. 5—8BYN's main interest isin the Army-Amateur and PRR work. 8GZ is still playing with lower power transmission and getting good results. 8BBH will get back soon. 8PL is most interested in daylight 20 meter work. 8CBP has an H tube. 8CBI hands in a good total. He'll make a good ORS. 8DSY turned in a good message report. The Army-Amateur and PRR work has been going good. There is a keen sense of cooperation among the gang. 8DEM hasn't been on much due to school work. 8TJ is in Florida.

Traffic: 8DBM, 129; 8DDQ, 87; 8DIH, 32; 8CTE, 7; 8BKQ, 2; 8ATZ, 11; 8CLR, 4; 8BKM, 135; 8DAE, 100; 8ARJ, 58; 8BPL, 19; 8ACY, 18; 8DPN, 9; 8BNH, 4; 8KC, 4; 8AYO, 3; 8CMG, 3; 8AWX, 2; 8BIQ, 71; 8LO, 17; 3BSA, 19; 8AOE, 15; 8BSC, 4; 8BSW, 5; 8BN, 6; 8BYN, 52; 8GZ, 67; 8DEM, 9; 8EI, 1; 8PL, 4; 8CBP, 4; 8CBI, 14; 8DSY, 89; 8DPK, 29; 8CNG, 2; 8CWR, 36; 8AIB, 6; 8BZJ, 20; 8BI, 9; 8CNL, 3; 8AWN, 5; 8CPQ, 4; 8ARW, 18; 8ALW, 3; 8CAU, 59; 8ANB, 5.

INDIANA—Dist. 1—9DBJ burned up his plate transformer while trying to thaw out the rectifier. 9AFY is on 40 meters, but doesn't do much work evenings on account of a BCL in the same house. 9AAI has a fine phone going on 84 meters. 9DVP is using a 1200 volt storage battery plate supply. A new YL arrived at 9BKJ, the CM of Ft. Wayne. Who takes the night trick now, OM? 9AVB has trouble getting his wavemeter to stay put. 9DLN has a 400 volt storage battery plate supply, too. 9ECI worked all districts with a "fiver." 9CKL has an H tube sending out a wicked signal. 9ARH is with us again. 9DPJ is plaving "gone but not forgotten" on the grid of his departed fifty. 9QR can't find time to be on the air as much as he would like. 9BQE has a resistance coupled amplifier hooked to his receiver. 9DDA says he is busy. 9CTB has sold out. 9BEC had his license renewed. 9EG works DX in fine shape, foreigners and all.

9EJT has a five watter on 40 meters. 9EJU has spent most of the month getting his H tube to perk better than a five watter. Ernest Thornhill, a first class commercial op has a ham station license and will be on soon. 9CAP and 9DRS say 40 meters is no good at night in winter time. 9CXY handled some good traffic while home from college. 9EGZ rebuilt the transmitter and burned out every bloomin' tube.

Dist. 4—DUC will soon be on with a 100 watt crystal controlled set. 9ADK has been rebuilding. 9ASJ has a new 40 foot stick. 9CMJ is the only active station in Richmond. 9MM has a 250. 9CSC is doing good 40 meter work.

9ABI is using a B eliminator, a 5 watter and a Hertz antenna. 9DJH has a 400 foot antenna. 9DYT sold his MG and is waiting for a new transformer. 9BK is busy with business. 9CUB just got married. Good luck and plenty of little ops! 9DLZ got smallpox. Don't work him unless you are vaccinated. 9OG is on regularly. 9AKD has gone to Florida. 9AIL has turned BCL temporarily. 9ASX rebuilt but had no luck. 9AMI fared better. 9BBJ can't make his tubes work. 9BYI is in Army-Amateur relaying. 9ABP uses a Hartley circuit. 9CEM had receiver trouble. 9AEB is putting in S tubes. 9CUI has a 5 watter. 9DVE gets out well. 9DDJ moved to Florida. 9RE is an old timer coming back into the game. 9BUZ uses a Hertz antenna. 9ADN blew his new H tube. 9BSK worked a "6" with a fiver and a plate input less than 2 watts. 9CP, using a Hertz antenna.

Traffic: 9DHJ, 8; 9ABI, 82; 9BK, 3; 9BBJ, 4; 9OG, 76; 9AMI, 6; 9BYI, 21; 9AEB, 30; 9CUI, 1; 9ABP, 3; 9BSK, 15; 9CP, 5; 9EJI, 11; 9ADN, 42; 9ASJ, 27; 9ADK, 11; 9DUC, 3; 9CYQ, 11; 9CSC, 20; 9MM, 8; 9CMJ, 8; 9CXG, 33; 9EGZ, 29; 9BKJ, 26; 9DBJ, 16; 9QR, 5; 9AAI, 4; 9EG, 2; 9EJU, 2; 9DPJ, 33.

Michigan Traffic: 8DOE, 25; 8ZH, 12; 8ZT, 5; 8QN, 34; 8CEP, 56; 8ZZ, 8.

DAKOTA DIVISION
D. C. Wallace, Manager

SEVERAL amateurs from other districts, have been visiting in the Dakota Division of late, among them being 8DHC; both father and son.

Professor C. M. Jansky, Jr., our Dakota Division Director, attended the ARRL South Dakota Convention. He reports that about 50 were present and that the convention was highly successful.

The college station, 9DDH, kept Mr. Jansky in constant touch with his family, and other affairs in Minneapolis, via 9XI, 9XT and others. In some cases, answers were returned in less than 5 minutes to particular radiograms sent.

The convention itself was divded into interesting sessions and included interesting concrete information on quartz oscillating crystal and picture transmission. One of the features of the convention was that everyone present received prizes, in all, hundreds of dollars worth of prizes were given away. A few if any of those present, can feel that the convention caused them anything in the way of actual expense.

9SE is still working hard for the Traffic Trophy. We wish him good luck, and hope he succeeds in landing it for the Dakota Division.

SOUTH DAKOTA—Dist. 1—9AGL now has a crystal controlled five watter going but is about to change over to DeForest. As a result of the Dakota Convention several new stations are taking the air and much enthusiasm is being displayed. 9DDH was off the air most of the time as all the ops were busy with convention details. 9CKT won a three thousand volt transformer and is now remodeling to give the DeForest lots of kick. 9ALN had a CQ answered by an Aussie. 9DIY tried 80 but on account of BCL QRM, dropped back to 40, working either coast with ease.

Dist. 2—9BBF lost his rectifier but with raw AC works out in good shape. 9CVH still has YLitis. At last, 9DGR has a 50 and a real DX station. 9NM spends most of his time giving the off-wave stations the "razz" and is getting lots of help. 9DXR was QSO Australia 5 times, N. Z. once and Argentina once, in spite of little time to work. 9DZI is on consistently. 9DBZ continues his foreign DX.

Traffic: 9NM, 2; 9DGR, 50; 9BBF, 20; 9DXR, 3; 9DZI, 52; 9BDW-9DAJ, 3; 9CBG-9DB, 12; 9DJS, 4; 9ALN, 21; 9CKT, 12.

NORTH DAKOTA—9CCT has forsaken 80 for 40 after experimenting for some time. 9DIG has also picked 40 as a favorite. 9BZF has been active and is waiting patiently for an "H" tube to put out a more wicked sig. on 40. 9DKQ is using an "H" tube on 80. 9CRB is still a fone fan and says the 80 band looks good to him. 9BQD is QSO on 80 and 160 with two ops. 9EFN is doing good work when he gets time, and QRM from Oil burners is not too strong.

Traffic: 9CCT, 9; 9DIG, 1; 9BZF, 9; 9DKQ, 12; 9EFN, 4.

MINNESOTA—Dist. 1—9EGF has been very busy but handled a nice bunch of traffic anyway. 9DFD has his transmitter about completed and is ready to come on the air. 9BMB and 9BJD have been fighting the BCL's together all month. 9BPW is still "talking about" getting started. 9EGU has been experimenting with new tuner design, and also has built a new "HE" chemical rectifier that perks FB.

Dist. 2—9DBW wins the free subscription to QST with 157 messages, and leads the district in traffic, making the BPL. 9DMA has worked 46 states with his 5'er. 9DDB keeps schedules with 9DIU. 9EFD has been appointed Official Army Station and worked FWY. Does anyone know QRA of FWY? 9NB is experimenting and working to better his note. 9BCN keeps a schedule with 8VX. 9CUW is a new station at Arlington. 9AIR works a 300 foot antenna on 20, 40 and 80 with excellent results. 9COS, a new ORS at Rochester, has been elected Sec'y. and Treasurer of the BCL club. 9BBV tried break-in system with poor results. 9EHO keeps schedules with 9AIR and 9CUW. 9DJW has a new DeForest "H" tube and "S" tubes and has a terrible wallop. 9SF logs lots of South American and South African DX on his 500 foot receiving antenna. 9BNF has been appointed Official Army Station. 9BIY uses a 50 watter on the 40 band and steps out all over. 9ANJ complains of trouble from the Northern Lights. 9AWM attended the South Dakota Convention and

reports a wonderful time. 9COF was unable to be on the air due to work outside. 9EGG lost one of his poles in a bad sleet storm. 9BKX is an old timer back on the air again. 9CPO has been QRW pulling through snowbanks to think much about radio, although he did pick off a few messages and do some good work with his all-wave transmitter.

Dist. 8—9ZT has been in communication with all continents to date. 9BXV will be on again very shortly with "5 watts". 9CPM has a new panel-mounted 250 watter, and promises to show us some "stuff" 9BNK reports his set as very FB. 9IG is at 9XI doing fine work. 9ECC uses 9ZT's trick of putting his receiver in a copper box, and says it works FB. 9BVH had to buy another crystal and this one is OK. He worked SMYY and SGC, and was reported by a Portugese ship near Cape Town, South Africa. 9BNX seems to have lost its punch lately. 9DPX is silent for a while. 9ABK worked 853 miles one afternoon, using a UX-210 with 5.8 volts on filament, and .45 watt plate input.

Traffic: 9EGN, 33; 9ADW, 26; 9CWN, 64; 9CKI, 10; 9KV, 15; 9BMR, 23; 9EEP, 14; 9EGU, 60; 9EGF, 63; 9CDV, 204; 9ANJ, 10; 9AWM, 4; 9CPO, 8; 9DMA, 26; 9EFD, 10; 9MB, 4; 9MF, 1; 9SF, 5; 9BBV, 6; 9DDB, 2; 9DBW, 157; 9BCN, 1; 9BIY, 42; 9EHO, 16; 9AIR, 13; 9BNF, 15; 9COS, 4; 9BKX, 3; 9BFO, 1; 9BNK, 34; 9SE, 1022; 9ABK, 66; 9IG, 28; 9ECC, 16; 9CPM, 6; 9ZT, 61; 9GH, 3; 9DEQ, 6; 9BMX, 6; 9DYZ, 2; 9RPV, 4; 9BAY, 24; 9BVH, 6; 9CVC, 12; 9CUM, 9.

DELTA DIVISION
B. F. Painter, Mgr.

OUR Director has just returned from the meeting of the ARRL Board of Directors at Hartford. He reports that many constructive steps were taken at this meeting.

TENNESSEE—Memphis—4FA handled a message from Peru to WGY. He keeps a schedule with 9EBW 4EO worked a2YI. He has a good traffic report. 4CU is said to be the best station in the state. He sets a high mark for others to shoot at. Schedules were kept with 9CU and 4GY. 4IV attends college, handles traffic and is crying for schedules on 20 meters. 4DK wants an ORS certificate. 4KM has two stations going. He bought an outfit for 9ABR who will soon be on. 4KM dropped a dial on a 250 watter and it broke—(the tube of course). 4FP blew his 50 watter. 4IB is at a new location doing fine work. He is on top of a 15 story building.

LOUISIANA—5KC has returned home. He works the 7's with a set of Gem tubes and B batteries. 5ACY has a new shack. 5AEN lost his mast. 5UK is busy with other work.

Traffic: 5AEN 23.

ARKANSAS—5ABD is getting out regularly. 5ABI has moved to Conway. 4AQN lost a "50" and two "8s." 5ANN gets out well with a UX-210. 5AW has not been on much. 5QH will have lots of messages next month. 5AIP had trouble with his tuner.

Traffic: 5ABI 38, 5ANN 4, 5QHx 4, 5AIP 18.

MISSISSIPPI—5ANP is working on 80 meters. 5AKP has a blown "S" tube, a receiver that would not work, blown receiving tubes and a change in location. 5AGS is having trouble keeping schedules with 5YD. They are going to stick until they find out how.

Traffic: 5QZ 43, 5ARB 20, 5AGS 13, 5AKP 9, 5ANP 8.

HUDSON DIVISION
E. M. Glaser, Mgr.

2CDH leads the division in traffic. He is the only one of the three handling over 100 messages (the other two being 2GY and 2AFV) that sent his messages in for checking to the DM. His report was 208 messages but the DM found 218.

The second district is full of excitement. The convention of the Council is coming on rapidly and, in May the A. R. R. L. HUDSON DIVISION CONVENTION will be held—and we guarantee absolutely, with no exceptions that it will be the best convention ever held in the East—and, perhaps, in the whole country. Dr. Dunn, director of the division, is at the head of the idea, and is rapidly getting things lined up. Everybody prepare-start saving for the convention. It will be absolutely a 100% amateur affair-and you won't be ashamed to bring your own mother there either.

All stations are urged to keep within the bands assigned to them. If you haven't read the editorial in March QST, do so NOW.

NEW YORK CITY—Bronx—2CVL reported to Manhattan instead of Bronx. 2ALL reports not much traffic available. He is increasing power. 2BBX says he works 6's in daylight on 40. His 2nd op is visiting stations in South Africa! 2APV worked 8 Italian stations in one evening. He says its due to the new spaghetti he put in the outfit. 2CYX is doing some fine quick delivery work and also DX. 2FF has a new rotary converter, which works wonders with DX.

MANHATTAN—2HJ's ORS has been cancelled. 2NZ works the west coast every Sunday on 20. 2LD was heard in Australia. 2FK is doing fine work; real DX and lots of traffic. 2EV with 2.2 watts worked 5QX in Texas. 2AMJ has fully recovered from the auto accident and is batting 'em out as usual. 2KR works Europe on a 7 foot indoor antenna. 2BNL has a fone on 85. 2CHK bought 2BHY's fone set and says he will be blessed by the BCLs in his neighborhood!

BROOKLYN—2PF is on reguarly now. He has been visiting a lot of ham stations lately with 2APV and 2CYX. They took trips to Phila. and Southern Jersey. 2BO thought the CM was dead and was trying to QSO South Africa to find him. 2AQW handed in a good report. 2BRB has a new receiver, thanks to "TW". 2WC operates on 3565 KC with his pretty crystal outfit. He has schedules with half a dozen other crystal stations. 2KU has schedules with 6CCU and 6BIS. 2ADC, the cartoonist, finds time to operate between times. 2CHY has a five watt battery set going. We think he isn't on much because of—well, guess!! Bill wants all Brooklyn stations to report on the 12th of the month.

QUEENS—The CM hasn't been on for a long time. Wonder what's taking away all his time?? 2AEV is doing fine work with a 7.5 watter. 2BSL and 2AHZ are on the air. 2AEP is not doing much. The CM says YLs.

RICHMOND—2AKK is on 40 trying out his fiver. 2AFV has a new 70-foot antenna and is using a WE-216-A with 400 volts. 2AKR claims no traffic his way. 2ACZ operates at 2AYO. 2ATQ is a new station in Tottenville with a 201-A. 2CAC is back after a long absence. 2CEP is doing fine work with his 50.

Traffic: 2ALL 10, 2BBX 43, 2APV 28, 2BQL 39, 2CVL 10, 2CYX 65, 2FF 19, 2APJ 1, 2ADC 18, 2AOF 8, 2KU 29, 2WC 31, 2CTY 2, 2PF 5, 2BRB 2, 2CHY 14, 2BO 17, 2APD 11, 2AQW 12, 2BNL 6, 2KR 22, 2CHK 7, 2AMJ 23, 2EV 20, 2FK 21, 2LD 22, 2CZR 16, 2ALS 8, 2LM 24, 2CHU 57, 2ANX 6, 2BUI 8, 2NZ 30, 2BHY 5, 2AFV 103, 2AKK 14, 2AKR 6, 2CEP 24, 2AVB 8, 2AEP 7, 2BSL 2, 2AEV 36, 2AHZ 3.

NORTHERN NEW JERSEY—2AJA is busy at Lehigh so has not much time to get home and operate. 2CGB can not get going on 40 so works all over on 80 yet. 2CVP at present finds a Chevrolet more interesting than radio. 2BLM has connected with Algeria, Africa and all other remote points. 2CYV blew his bottle so will be off for a short period. 2ADU is going back to the 150 band. 2AT is still going strong as ever. 2ATE is back after a few month's rest. 2CTQ, with 5 watts, was logged 14 miles South of Arctic Circle in Sweden. 2CJX, besides being sick, lost his antenna and mast in a recent sleet storm. 2CJX is busy gathering news for insertion in this column. 2WR was on for one night and worked several European stations.

Traffic: 2CTQ 30, 2ATE 8, 2AT 23, 2BLM 4, 2CGB 13, 2AJA 9, 2CJX 5, 2BW 7, 2BHK 37, 2SY 8, 2EY 4, 2ALM 10, 2CY 31, 2ZB 12, 2CDS 24, 2BBH 4, 2CRP 5, 2LZ 2, 2KA 42, 2GV 19, 2BNT 86, 2AFG 13, 2KS 4, 2BSJ 9, 2BIR 6, 2CDR 22, 2BGI 8, 2AER 4, 2CGK 10, 2BUY 26, 2CPD 7, 2FC 18, 2AUH 33, 2CXL 52.

EASTERN NEW YORK—Dist. 1—2BY handled a pile of traffic for international broadcast tests, schedules were kept with 9EK, 9CM, 9CCQ, etc. F8DK best DX worked. 2AV has been closed for the past month due to exams, but is on strong again.

WHITE PLAINS—2CNS and 2BQB deserve a great deal of credit for their defence of the amateur thru the local paper when a BCL accused the hams of causing QRM. 2CNS advises the complaintant (plaintiff) to learn the code. 2BQB is stepping out, he works the world. 2AAZ has been blowing tubes left and right but manages to keep going just the same. 2AIU has joined the gang on 40.

POUGHKEEPSIE—2COV has moved to Newburgh, leaving 2NW to hold the town on the map. 2NW says he will stick around awhile before trying for an ORS appointment.

HOLMES—2APT is now an ORS and seems to like a sideswiper. He is doing great work on a fiver.

NEW ROCHELLE—2LA now has a fifty and is using "S" tubes. He still sticks to the high waves but will be on 80 sooner or later.

MAMARONECK—One of 2BW's ops is now at 2BQN and is experimenting a great deal with crystals.

BRONXVILLE—2KV is on 80 with his 500 cycle set, using two fifties but gets out better on 40. 2AXP is back on air again after many moons and seems to like 80 meters for rag chewing. 2AON is learning the game.

ELMSFORD—2APQ has an "H" tube, but hit a BCL with his car and bent a fender so has to make good to the OM. He promises to be on when his bank account recovers.

Dist. 3—2AGM is off with flying colors now having worked France and the west coast. 2CDH has worked all districts and been heard in England. Complains of its being hard to get tfc into N. Y. C. 2BM has been QSO 1-1AS. Other records are NZ, G, F. Q. B. 2CYH is reaching out, having received report from g2LF on his 80-meter signals. 2ANV is making a good start by keeping a schedule with SAXA. 2AOI is a new station in Troy using a UX-210.

Dist. 4—2AKH says his small report is due to his transmitter being on the blink, but hopes to have it fixed soon. 2COV got a larger plate transformer and is now using a chemical rectifier. 2CYM has been QRW so not on much during past month. 2AGQ has also been very QRW and hopes to have a larger report next month. He is making some improvements on his station. 2MK, the new station at Central Valley, has worked S. Africa, N. Z. and a gang of foreigners in Europe. 2AOX just got an "H" tube and is getting things in shape to make it perk out. 2AII is still ill but has a receiver going and is listening to the gang. 2BSE hopes to be on the air soon.

Traffic: AKH 11, 2COV 8, 2CYM 1, 2CGQ 8, 2CHH 218, 2AGM 20, 2CYH 15, 2SZ 2, 2GM 8, 2ANV 6, 2AOI 6, 2AAN 13, 2AAZ 7, 2ADH 30, 2APT 99, 2BQB 12, 2CTF 4, 2CNS 19, 2DD 2, 2LA 7, 2GY 187, 2AJE 59, 2AIZ 44, 2KX 14, 2CLG 10, 2AKV 8, 2BPB 15.

2COV has changed his QRA to 146 Third Street, Newburgh, N. Y. 2LA has moved to 53 Glen Road, Larchmont Woods, New Rochelle, N. Y. 2PW is QRW this month. 2BSB is using a fifty with kenotron supply. 2AHG on schedule. 2CGH, our star station at Delmar, is off the air for a while because some peevish BCL complained to the R. I. 2CGJ is now using a huge set with 1-KW in the antenna. He works Sweden, Denmark, Switzerland, Italy, etc, with ease. 2ACS is now one of the operators at 2XQ. At his own station, he is QSO 20 countries. 2CAZ is still experimenting with antenna systems. 2GK has been having tube trouble, but is QSO the A's and Z's. 2AHM is the star station. Bill is using an antenna that would put any BCL to shame (not an inch over 22 feet high), yet there isn't a country on the globe he hasn't worked. He uses a 250 with a plate input of about 200 watts. 2ADM is not on much. He is very QRW building sets but may be on more next month.

Traffic: 2PV 2, 2BSB 50, 2CGH 5, 2CGJ 8, 2CAZ 30, 2ACS 84, 2ADM 71.

MIDWEST DIVISION
P. H. Quinby, Manager

KANSAS, Iowa and Nebraska (with the exception of Dist 2) were very prompt with their reports this month, and the DM away attending the Board of Directors meeting at Hartford, too! Fine spirit of cooperation, boys! Thanks.

The ORS made a fine showing this month. Almost everyone reported! If gratitude was breakfast food, you would be up to your ears in oatmeal! 8DBH is the high man of Kansas this time. Nebraska's honor goes to 9DXY. 9BKV takes Iowa's honor.

KANSAS—Kansas City gang going strong. 9DBH reports relaying message from Chile to Detroit. 9DBH has a kink to kill AC hum in capacity coupled sets by winding a Dry cell case with No. 24 wire and grounding antenna through same. 9BXG reports working Ch-2LD. 9KM says that he don't like 40 as its all DX. Lawrence gang seem too busy for much traffic but are on occasionally. 9DNG continues to be the star station.

Traffic: 9DBH 89, 9KM 7, 9BXG 59, 9CVL 10, 9AEY 24, 9BHA 51, 9BRD 3, 9DHW 12, 9CCS 8.

NEBRASKA—Dist. 1—Traffic is a little lighter this month, although a large number of stations are on. 9EBL and 9CDB were off for some time because of QRM of BCLc. 9BNU is heard occasionally on the 20, 40 and 80 bands. 9DUO has been on using AC on the plate, but has completed a new rectifier. 9AIJ and 9DUH are new ORS in Omaha. 9BYG reports no traffic at his station but handled some traffic at 9DR. 9BFG has been irregular due to QRM. 9DPS is inactive as far as traffic is concerned. 9AWS hands in a very good report. 9CJT is on regularly and maintaining one schedule.

Traffic: 9DR 56, 9DUO 2, 9AIJ 11, 9BFG 107, 9BNU 8, 9EBL-CDB 64, 9AWS 79, 9CJT 9, 9DXY 216.

IOWA—Traffic honors this month go to 9BKV, and 9CZC third. 9BKV's schedules are working fine. 9DOA is second high man, and schedules are kept with 9DXY three days a week and 9BFG four days a week. 9CZC's high traffic was also due to his schedules. 9AED, is knocking the fones off in every district. 9BOS is on the air after work at KSO. 9BPF is again operating 9LC. 9BDH, the station of the HDQTS Troop 14th Cavalry at Ft. Des Moines, is getting lots of American DX. 9EKK says that 9CHQ is on again with fone and that ex-9DCZ will be on soon. 9DMS is on the air almost every morning from 12.30 to 2 am.

Traffic: 9HK 12, 9DAU 74, 9AXQ 3, 9EFS 14, 9DOA 154, 9AXD 6, 9CS 3, 9AED 5, 9BOS 14, 9BKV 185, 9CZC 112, 9EKK 2, 9BDH 38, 9DMS 32, 9EBX 5, 9BV 15.

MISSOURI—Dist. 1—Traffic has increased, those reporting showing larger totals than last month. Crystal oscillators are the rage in St. Louis, 9BEQ, 9BHI and 9AOT having taken steps to install them. 9BEQ says he is getting a wad of messages with big checks. 9PW is working with him. 9DXN is QRT for some time. 9DLB is rebuilding. 9AAU had numerous msgs but reports no details. 9NC has been heard on lots handling traffic but don't report figures.

Dist. 2—9DAE is off the air account outside interests. 9AYK is working back on 80 with good DX. 9EAO is working a fone. 9DIX reports QRW. 9AOB still shut down but pounding the key at 9DTA. 9DVF still uses the 201A with good DX. 9CWZ blew a 50 and went back to 201A. 9BCQ is a new station at Butler. 9AJW reports loose coupling saved him from the BCLs. 9AJW applied for CM appointment in Joplin. 9CDF is getting a new transformer. 9CFV is a new station in Butler.

Dist. 3—9BOB reported direct to the ADM by radio with the following notes; 9CBW is a new station at Morehouse. 9CZI is on at Charleston.

Dist. 4—9ADR led in traffic this month. 9RR was second but only on one week due to tube trouble. 9AHU is the K. C. station of 9DRD at Forest Lake, Kans. 9ACX is working the 40 band with a 210. 9BKK has been QRT with business QRM. 9TJ still minus tubes. 9ELT got busy trying to get back inside the 40 band again. 9WV, still on high waves. 9DVU reports a junior operator, but says he doesn't have the code very well learned, in fact all he can get off is "dah-dah-dah" without any "dits" in between. 9ACA is still using the amplifier tubes. 9BND ran a race with 9EEZ for DX honors. 9EEZ also put over some msgs. 9CZW is using DC on a 210. 9AXJ is on with 10 watts.

Traffic: 9AAU 92, 9BEQ 84, 9AOT 42, 9BHI 16, 9AJW 95, 9CWZ 10, 9DVF 51, 9DTA 16, 9EAO 8, 9AYK 8, 9ARA 8, 9BOB 110, 9DVU 18, 9ADR 44, 9AHU 2, 9RR 32, 9DBD 4, 9FF 4, 9BND 44, 9CZW 45, 9EEZ 48, 9AXJ 1, 9ACA 4.

NEW ENGLAND DIVISION
R. F. Cushing, Mgr.

THE Official Relay Stations are now reaching their stride in New England. We should stand the second best division in the United States in the second best division in the United States in the amount of traffic handled. If every ORS will originate ten messages each month, as suggested by ADM Green, of Worcester, Mass., we will stand at the head of the list. Let's all do this next month, and take first place.

The following stations have been appointed ORS: 1SL, 1BAT, 1ALP, 1BBJ, 1AMZ, 1CDS, 1AMS. We welcome all these newcomers, and hope they will turn in some fine reports. The ORS of the following stations have been cancelled for inactivity: 1MC, 1AEY.

The ORS appointments are on the increase. How about yours, OM? Any good station owner who handles traffic regularly and will report same, is welcomed to the ranks. Hurrah! The Providence Convention. Let's all meet there and talk it over, with a good time thrown in.

MAINE—Nice thick traffic report this month, boys, in spite of the rotten "wx"!.

Dist. 2—1AAV reports terrible month, QRN power leaks, X-ray, bat chargers, punk "wx," storms and a freeze, out in the shack. 1AYJ is QSO France and the west coast. 1SO worked 6BCC and handled 5 msgs. concerning the international tests. 1VF is getting an MG set. 1BNL rebuilt his set and left plenty of space on the board for a 203-A. 1APF is building a new 10-watt set. 1CKQ and 1ASW have decided that two ops are better than one. 1CFO, 1COE and 1ADI are hitting it up in fine style. Msg. totals are picking up since the fellows started keeping schedules.

Dist. 3—Bangor gained a flock of new stations this month. Altho no new ORS have been assigned, their efforts deserve comment here. 1UL using a 202 with 200x volts B-battery, "copped" the Club trophy this month with 40 msgs. 1BFZ, 1FP and 1AQL are going strong. 1UU is limited to week-end operation on account of college. 1CDB is struggling with an "H" tube. 1BHH is prying dope out of everyone he meets. 1AXU had some tough luck. 1ACK is operating with a 201-A.

Dist. 5—1AUC is on after three months absence. Bar Harbor Radio Club, 1BGS, is on 40. FB! Sawyer (HS), Tabbut (ART), Grindle (FG), and Sprague (CHET) are the ops. There's a bunch Maine is proud to own!

Dist. 6—1BIG, 1ATV and 1KL are doing business here. Augusta is starting a club with 1BHR holding the reins. Just ye look at 1BIG's traffic total! 15 watts and good schedules are the reason. 1KL is going in for traffic. (There's the right spirit). 1ATV is a minstrel artist. By the way, better get QSO 1BIG if you want to know where to get traffic.

Traffic: 1AAV 60, 1APF 15, 1AYJ 116, 1BML 73, 1BUB 33, 1SO 17, 1UU 11, 1VF 82, 1EF 1, 1ATV 2, 1BIG 140, 1KL 68.

WESTERN MASS—Dist. 3—1AMS and 1AMZ are newly appointed ORS. FB, keep up the good work you have started. 1AMS serves coffee every Saturday at midnight for visitors. He had to buy a large coffee pot to handle the demand. 1VC has come back to life. He worked Europe 26 times this month. 1AAE says the fellows aren't prompt in keeping schedules. 1CLN is operating the Armory stations DFS—1AIC. 1ARE built a reflecting telescope. However, he keeps schedules in great style and can be depended on. 1ASU visited 1ARE during the month and had a wonderful week-end.

Dist. 4—1PY worked Australia and Europe. 1IL is handling a bit of Army traffic. 1BVR has signed up as an Army station. 1BLU is still handicapped by the loss of his stick.

Dist. 5—1BIZ worked Europe and Australia.

Dist. 6—1AOF received cards from all countries where there are hams. 1CCP worked E-AR23 with a 5-watt bootleg tube. 1BOM is suffering under the spell of a Y. L. Oh, he'll be back with us soon.

Dist. 7—The gang has come to life! The ORS's are all becoming Army stations. 1AAL has been heard in South Africa. He is using two transmitters, one on 40 and one on 80 meters. 1AQW reports mediocre results. 1AKZ reaches out in great style with a couple of UX-210's. 1BBP reports terrible QRM from power leaks. 1BIP lost both sticks in a recent storm. 1BKQ has a new station on the 40 and 80 meter bands. 1JE lost his faithful "50" and is getting an H tube soon. 1XZ is overhauling the set. 1ASU is running schedules which take most of his time. He worked Europe several times with a UV-202.

Traffic: 1AAL 10, 1AKZ 16, 1AQM 6, 1ASU 69, 1BBP 3, 1BIP 12, 1DB 6, 1JE 10, 1BKQ 6, 1BIZ 98, 1VC 2, 1AAE 82 1ARE 23, 1AMZ, 1AMS 8, 1AWW 6, 1EO 14, 1IL 22, 1APL 6.

EASTERN MASS—Dist. 1—A Lynn newspaper is running a two-column write-up of the "Ham" stations of that vicinity, taking a different station each week. 1AEO wishes the Lynn gang to report traffic on the 15th of each month instead of sending it direct to the DS as in the past. Traffic reports from other than Official Relay Stations are welcome—every message reported helps Eastern Massachusetts' total.

1BKE has been recommended for appointment as an ORS. Any other "live wire" stations in this district? 1NV has poor luck as far as results on the 40-meter band are concerned. Where do the 40-meter signals go at night??? 1CEA is writing for schedules with Maine and New Hampshire stations. 1JL, a prospective ORS, is a real traffic man. 1CJR is confident that his new 125 foot Hertz antenna is going to work perfectly. He will have some schedules for traffic by the time this is in print. 1RW will soon be on with a "250." 1ATR is trying to get his set going on 40. 1AHB uses a UX-201, UV-203A, and a UV-204. Ex 1AEL, now 2AKS, has his set perking again on 40 meters. 1CIT is snowed under with college studies. 1ZW has new four wire cage.

Dist. 2—During the last snow storm 1YC lost a 160-meter antenna. 1AIR is using a Hertz antenna. 1CPQ follows two rules, but what they are he doesn't say. 1AVY handled some traffic. 1ALP is doing good 20 and 80-meter work. Attention Brass Pounders! 1ABA with a UV-301A and 180 volts plate juice is our highest traffic station this month, and he is also working DX!!! 1BHS is on regularly now. 1AXA worked 26 foreigners during week-ends. He has schedules with 2CVJ and 1CAA. 1RF is trying to get a good note. 1GA is on 20 and 40 meters. He reports 20 meters the berries for DX and traffic. 1BVL worked South Africa. 1BAT is going strong with a "fiver." 1DI wants an ORS. Send in your message reports each month, OM. 1RR has changed his QRA and is going with a 250 watter and an OW. 1BBM and 1AYX have not much time to be on. 1OU has rebuilt his set. 1BCN is using an H-tube. 1ALA has come back with a "fiver." 1SE, CM of Attleboro, has resigned. He feels that his job should be in the hands of a live station. We are sorry to lose him. 1ACI is being invited to take his place.

Traffic: 1AGS 11, 1BGH 20, 1JL 114, 1BBK 33 1CJR 5, 1ACJ 4, 1BZQ 16, 1KY 46, 1AEO 19, 1LM 51, 1AWB 7, 1ACL 38, 1AVF 15, 1AVY 8, 1ABA 61. 1AIR 9, 1ALP 18, 1AXA 10, 1BHS 9, 1BAT 6, 1BCN 8, 1BVL 22, 1CPQ 39, 1GA 29, 1OU 8, 1RF 7, 1RR 2, 1SE 2, 1SL 14, 1YC 62.

NEW HAMPSHIRE—1ATJ holds the honor of handling most messages! Ex-1BAY has gone in with 1CAZ. A "fifty" on 80 and 40 meters will sign 1CAZ. 1BFT reports power leak QRM bad in Concord. He heard 10 Aussies though. When you secured your ORS appointment, you agree to report promptly each month. I am sorry to say several stations have failed to keep their promise. Next month I shall publish the names of all stations failing to report.

Traffic: 1ATJ 181, 1BFT 104, 1AOQ 24.

VERMONT—Dist. 1—1YD, the star station of the whole state, is QSO anywhere in the world. 1BBJ is in the Army Amateur net and doing FB. 1BEB is experimenting, and not on so often. 1AVZ sleeps days and works nights. 1BDX has a poor antenna but works across the pond.

Dist. 2—1AC is busy with the "YL" and 1CQM is at college. 1AJG finds traffic good. 1APU is wrapped up in his business. 1BIQ is at high school. 1FN says the new Jr. "op" keeps him busy.

Traffic: 1YD 149, 1BEB 3, 1BBJ 8, 1BDX 9, 1AJG 30.

CONNECTICUT—Our radio season is at its peak. However, special attention is urged upon all the fellows to notice that some of the real low power sets are accomplishing commendable results and turning in good traffic totals. This should encourage everyone to press forward and be on the alert for messages and to see that they get to their destination promptly, for after all, this is real relaying.

1AOX shows what can be done in spite of adversity. With a 201-A he handles most messages in our district. 1HJ handled some traffic and worked A, BZ, E and O's. He got the prize for handling most traffic in his city for three months in succession. 1CTI has his power transformer and the rest of the works under control. 1BGC says several new stations have started up in his city. 1BHM is carrying on 20-meter experimental work. 1CBG has been working lots of stations with a 201-A and dry batteries for power. 1CKP reports consistent contact with South America. 1AVX says the Jr. Op. has demanded his attention constantly. 1MY is working Brazil consistently. He has relatives there who keep the ether supplied with traffic. Even the mail planes couldn't give the same service in the way of delivery. Great work! 1ADW, is on the job and arranging a schedule to dispose of his northern traffic. 1AYR promises to keep up his usual good work 1AXN worked France Italy and Brazil. His new call is 1VY.

Traffic: 1ADW 18, 1AOX 109, 1AVX 10, 1AXN 17, 1BGC 13, 1BHM 24, 1CBG 7, 1CKP 7, 1CTI 4, 1HJ 104, 1MY 7, 1VY 52, 1BGQ 6, 1PE 57, 1AJO 87.

RHODE ISLAND—Dist. 1—Things in Pawtucket art at a stand-still. 1DD and 1AHE are tied up with BCL business. The coming convention has pepped things up in Providence. 1AFO is building a 60 jar rectifier. 1AID is on Mon. Wed. and Fri. from 3 to 5 pm, to QSR or rag chew. Glad you are with us again, Mildred! 1AWV is busy at college and doesn't get on much. 1BIB has just changed his transmitter to the 3 coil circuit which works

f.b. 1BHI who has his set at R. I. state college is getting out good and handled some traffic for a gang that was snow-bound during one of the blizzards. 1AWE using a UX-210, worked Italy and the Canal Zone. He now has an H-tube. 1PB is rebuilding. 1ABP says things are about the same with him. 1BCR is using 450 volts of DC on a "fiver." 1ALD is getting an "H"-tube. He is bringing old ex-1CUT back into the game. 1CAB is banging away as per usual. 1BPB is using a "250" but can't get it to get out. 1AEI hasn't been on much due to rebuilding. He says traffic is light.

Westerly—Dist. 2—1CDS is a new ORS, using 2 "fivers" in the M. O. P. A. circuit. 1BVB was on the sick list this month. The rectifier froze up and he lost 28 jars. 1AAP is doing good work. He has sold his transmitter and is building a new one. 1QV is back again, on 40 meters.

Newport—Dist. 3—1BQD is on "40" but reports traffic scarce. 1AOA is on once in a while.

Traffic: 1BQD 18, 1BIE 3, 1BPB 10, 1ALD 15, 1CAB 7, 1CDS 1, 1BCR 15, 1AAP 28, 1ABP 11, 1PB 4, 1QV 34, 1AID 32, 1BHI 5, 1AFO 9, 1BVB 37.

NORTHWESTERN DIVISION

Everett Kick, Mgr.

THREE stations qualified for the Brass-Pounders' League. Only one will be mentioned for sending his messages in with the complete dope for count. When your traffic totals go over 100 send them to the DM for recount if you want to be included in the BPL. The ORS certificates issued the past month were: 7OY, 7ABF, 7MP, 7MZ, 7NL, 7VL, 7AFN and 7FL.

WASHINGTON—7FD, ADM—7BB and 7VL passed the hundred mark but didn't send in messages for recount. "H" tubes are popular with the gang. 7NH, 7NG, 7GY and several others report "H" tubes working with varying results. Many report trouble with local contact on 40 meters. 7NH, 7WQ, 7NG, 7ADQ, 7OT, 7AFO and 7GB are among these. 7DC, 7UQ, 7ABF, 7AG, 7EN, 7FQ, 7CY and 7DF report good "DX". 7HO, 7OT, 7OY? 7NS, 7WA and others are busy with school work. 7TT is going to sea as a commercial "op". Mason and Waskey, 7BU and 7UU, have gone north with the Wilkins Arctic Expedition. Get QSO gang! 7UU will be operated by John Waskey. 7NL is busy at Mason's Shop. 7AG wants an ORS. 7TG handles lots of traffic at WSC. 7UL is on with a "50". 7MZ, 7VL, 7CY, 7AFN, 7ABF, 7NL and 7MP are new ORS. 7AFN, 7AF, 7AIM, 7AGI and 7FD have new equipment. 7IJ has a YL. 7BY, 7KO, 7OR and 7BO are coming along nicely. 7EK x 7ABB worked A, NZ, PI, and Ch's. Thanks for the excellent cooperation in getting reports thru on time, OM's! 7MP is at Leavenworth. 7VN tried to remove the base from his "fiver". The pliers slipped! ! ! Moral: "Try again!"

Traffic: 7BB 113, 7VL 112, 7MP 62, 7NH 49, 7TG 42, 7MZ 37, 7DF 30, 7UQ 29, 7CY 19, 7AFO 18, 7FQ 18, 7WQ 17, 7ABF 14, 7AG 14, 7TT 14, 7EK 12, 7BY 12, 7KO 9, 7EN 9, 7NS 7, 7DC 8, 7OT 7, 7GB 6, 7VN 6, 7OY 4.

OREGON—ADM, 7IT— Dist. 1—The active stations are 7AY, 7AAJ, 7EZ, 7KG, 7UJ, 7OZ and 7HB. The star station is 7UJ. 7AAJ is a close second. 7UJ did some notable DX. 7AAJ has two good 'ops', Mr. and Mrs. 7AAJ. They know all the principle languages of the globe. Foreign countries need not be hesitant about calling 7AAJ. 7AY gets out well and worked AQE. 7EZ works all over the continent. 7KG uses a UX-210. 7OZ has an "H"-tube. 7PD-SY is using phone a little. 7HB worked a5DA in daylight with a 2 UV-201-A's. 7LR pounds brass at other ham stations but his 'ow' makes him come home early. Stations in Lane Douglas, Linn, Benton, Polk, Marion, Coos, and Lincoln counties should report to DS, R. C. Ring, 70 Bush St., Ashland, Ore.

Dist. 2—7OK is doing fine work.

Dist. 3—7AKH is busy at college. 7HV has no receiver. 7EO was on little on account of his father's sickness.

Dist. 4—7AJB is now DS. Please send your reports to him at 607 East Taylor St., Portland. The star stations of this district are 7LQ and 7ADM. 7LQ worked GECQ near Borneo. His transmitter has a tremendous punch. He has the neatest layout in Portland. 7ADM used 7IT's O-1 thermo-ammeter to measure his antenna current and almost blew the thing out. He is working above the fundamental frequency. 7AEK was on a few times. 7PP "Peep" has been rebuilding. 7AJB has an "H"-tube. 7ALK moved. 7IT has been busy at school and with KFJR. A thousand volts of Willard batteries put his signals in the air. 7VH and his brother 7TM continue to shove out a wicked signal. 7FE, 7VQ and 7JO are on once in a while. 7IP puts out a good signal using an "H"-tube. 7WU and 7KI are active. 7KI is having trouble to get out. 7WU works across the pond every morning he stays up. 7GJ is experimenting. 7YK has been on during the noon hour.

Dist. 5—7ACM shot his plate transformer just as the set got going. 7NF worked the East Coast. 7QJ is using 7LO's transmitter. 7MF is having trouble with his new tube. The DM wants to warn some of the Oregon gang about being off wave. Five offenses were noted last month! !

Traffic: 7UJ 78, 7ADM 42, 7LQ 40, 7IP 22, 7AAJ 21, 7VQ 20, 7HB 16, 7AEK 11, 7VH 10, 7WU 8, 7FE 7, 7IT 5, 7AJB 4, 7YK 4, 7KI 4, 7EO 2, 7UN 3.

IDAHO—7JF is chief traffic handler this month. He is surely after the medal. He leads the Division and is in the Brass Pounders' League this month! 7GW is doing good work. He WARNS the gang that there is a new 'YL' starting up in his town. 7GX is on 80 meters again. 7IU is not on much. 7PS is also busy with school work. 7PJ is the most active station in Boise. He is going back to sea in a month or so. 7YA is breaking in a new staff of "ops."

Traffic: 7JF 146, 7PJ 30, 7GW 14, 7IU 8.

MONTANA—7NT, ADM—Butte loses 7GS and 7MX who both sold their transmitters. Sorry to see you go, OMs. 7PU was awarded the ADM prize QST subscription. (Hereafter this prize will not be awarded to any station with a smaller message total than fifty unless lots of experimenting is done and a full report sent in). Butte stations should report to 7DD. He maintains a schedule with 6HJ. 7ACI worked all US and Alaska with a 201-A.

Traffic: 7PU 30, 7DD 28, 7ACI 20, 7FL 1.

ALASKA—It is believed 7DE, the ADM, is coming to the States. 7KN is expected to take up his duties. The Wilkin's Arctic Expedition is making slow progress towards Point Barrow. They will have a set on low waves when they arrive. 7GL has 100 watts perking on 82 meters. He wants schedules with the States and will give good work QSR to any parts of Alaska. 7DE is on 75 meters and keeping schedules with 7SM and 7OE.

Traffic: 7DE 8.

PACIFIC DIVISION

(Northern Section)

P. W. Dann, Mgr.

DIST. 4—6CLP is very consistent and handled traffic with PI this month. 6AOI is waiting for an oscillating crystal for his set. 6CIS-6ADB and 6CAI are keeping their end of the Traffic game up also. 6BVY did some weather report and Army test work and 6AMM joined the Army Amateur communication system while 6CSX is maintaining a regu-schedule with Honolulu. The ASM had the pleasure of meeting and inspecting 6CLP-6BVY-6CIS and 6ADB and says they're a fine bunch of fellows with A-1 stations. 6CUL dropped in on the ASM and listened to fellows in his own district. 6CUX should have a medal; he converted two BCL's to hams. 6NX has got rid of a power leak and is looking his nater'l self again. 6BON rebuilding, but not forgetting traffic. 6BMW first on Coast with "H" tube and also Jenkins machine. 6AJZ built a pair of Pancakes and swears by them. 6CKV, with his pure B. C. note, is the envy of all. 6APS received some correspondence from NKF??? What's the joke, OM? 6OI broke the world's DX two-day communication when he worked GAFX at 7.30 am. PST. The distance by the night route was 19,000 miles and is the record. 6HC is rebuilding his shack. 6AIH is also looming up as one of the consistent ones.

Dist. 5—6BHM-6CQG and 6EW are all using the new "H" tube and report it FB if you use it right. Three new ORS have been added to this District, 6AQ, 6BBJ and 6IM. 6GU is the first station to report. 6BFU, using 50 watts until he gets enough voltage for the 250 watter. 6CEG says only one more wire to connect and then watch his smoke. 6CKC reports from the East Coast and is homesick. 6CLZ had hard luck with his 50 and is using a fiver for the present. 6BER, on again and very dependable. 6CEJ has a 250-watter on 40 and three fivers on perfect??? fone. 6VK-6WP are on again after remodeling. 6CMG has his MOPA going, and uses a 201-A as oscillator and gets away with it. 6ABX from Woodland, reports ND at present, but hopes to be on soon. 6ALV,

working on third harmonic; he is QRM'd by power leaks. 6RJ, after tuning, did better DX. 6ANW is new OBS for Richmond. 6CTX, now on 80, using 7.5-watter. 6CGV, using a Hertz antenna, handled many messages. 6BQL still QRW with BCL's. 6AON, the new OBS for San Francisco, is experimenting with phone. 6SZ has a new EE 50 watter. 6BTB put up a real antenna and expects to do some traffic handling soon. 6VR is San Francisco's prize DC. CW station. 6HJ says lots of ORS's fail to be ORS's. 6CHE had everything going FB when his tube went "WEST". 6BIP, 6TI are reconstructing the whole shack. 6ZX still off the air on account of a deceased 50. The following appointments were made effective Feb. 9—ASM, Dist. 5, George Becker, 2375 Fruitvale Ave., Oakland, Calif. succeeding B. Molinari, resigned, H. J. Irthum, DS, Oakland, Calif. 1090 55th St. J. C. Steventon, 151 Valdez, San Francisco Calif. DS of the following counties: Mendocine, Lake, Napa, Sonoma, Marin and San Francisco. H. J. Irthur handling the rest of the territory with the exception of the counties named. F. Lorsheter, 635 52nd St., Oakland, Calif., CM for Oakland. Art Hart, 741 47th Ave., CM for San Francisco. It is requested that all the fellows interested in Dist. 5 take note of the new personnel in order that the reports may go to the proper persons.

Dist. 6—Hurrah! Adams has another ORS to add to his list and that's sure doing fine for the few stations and large territory which he has. 6SA is the new ORS in Eureka. 6BWR has been off the last month waiting for "S" tubes. 6BAF had his new 50 going and says it went soft in four days, so he's using a fiver now. Hopes for a replacement on the fifty. Adams says he hopes to have a station up in Smith River, which, by the way, is on the boundary line between Calif. and Oregon but in Calif.

Traffic: 6CUX 22, 6CUL 20, 6BVY 26, 6CIS 12, 6AOI 9, 6CLP 64, 6NX 4, 6BON 9, 6BMW 36, 6AJZ 12, 6CKV 33, 6APS 23, 6CSX 10, 6OI 10, 6AMM 3, 6CAI 4, 6AIH 23, 6CVQ 138, 6BQL 3, 6AON 6, 6SZ 7, 6BTB 3, 6VR 30, 6DCD 4, 6HH 3, 6AOU 16, 6DG 4, 6HJ 58, 6ANW 70, 6CTX 23, 6EW 6, 6GU 30, 6BCQ 15, 6IM 5, 6BER 16, 6CEJ 6, 6BHM 88, 6CQG 10, 6VK-6WP 62, 6BSF 14, 6CMG 47, 6ALV 14, 6RJ 15, 6CWN 8, 6ALX 20, 6CAX 18, 6AHG 6.

NEVADA—Dist. 7—6UO reports lots of sickness in the family and too QRW for much work altho he manages to keep up the broadcasts. Sure looks as if Reno were coming right ahead. One of the real old timers, 6ZO, is coming back on the air to help us out. 6GA and 6AJP are off for a very short spell in order to make room for the 100 watter to operate on 40 and a fiver on 80. 6GA and 6AJP helped 6ZO put up a pole the other day so it looks old times again.

Don't forget the coming ARRL Convention in San Jose, Calif. Oct. 14-15 and 16th, 1926. A good time is assured all.

Traffic: 6GA 11, 6AJP 6.

SOUTHERN SECTION
L. E. Smith, Mgr.

The new officials of the Southern Section the becoming accustomed to the "harness" and things are now running smoothly. Many of the stations that have been inactive for awhile are coming back and many DX records have been broken. All continents have been worked.

Dist. 1—How's this, boys? 6AJM has worked Holland, N-AM1, with 38 watts input! 6LA is QSO HolNIPM at Manila. 6BAS is using a master oscillator on 40m. with fone on 83m. 6ZH still power leaks around him, so is not on much. Most of the QRN was from Tia Juana, so it may be better now. 6BQ went on a trip but still leads in message total. 6BWY can QSY almost instantly from 40m to 80. 6APP, 6DN and 6SB are getting out. 6APP wants traffic. 6EC still has trouble getting traffic into L. A.

Dist. 2—Activity has increased in some parts of the dist, lessening in others. 80 meters is becoming popular. Some of the gang are neglecting to report and will be dealt with accordingly. They will be dropped if not heard from at once. 6BBV has new QRA without power leak. Send all QSLs to 1010 Bates Ave., Hollywood. 6BEV says a lot of old timers are coming back. 6BGC will be at 6CNN, the KB Radio Lab. Station. 6BJD-6BEB-6BPG combined report hearing all continents. 6BQR is a little disheartened about radio. 6CTO still finds time to pound the brass. 6DAI is trying 5 meters but ND so far. 6OF likes 80m. better than 40. 6RF likes 80m. too. 6UT is a new ORS. 6US-6ZBE is QRW with his radio shop but is building a 250-watt master oscillator with a 2000-volt MG. 6AJI had three 50-watt tubes "go west" so he worked PI with an amplifying tube. 6AHP is experimenting with antennae. 6CIX has been off for a while trying to encourage himself to make a date. 6CSS has a 250-WE perking now and thinks it is FB. 6CTN has moved away from power leak QRN now and handles traffic better. 6AKW has a half-inch copper tube ant. and is going after the "Jewell" miles-per-watt watch with a 301-A xmitter.

ARIZONA—Stations in the state are active altho no exceptional DX records have been made. School causes the most "QRM." 6BAH is going to use B batt. supply. 6CUW and 6CAP are getting out well. 6CUW is now DS of So. Ariz. 6YB is on regularly with real DC. 6CBJ is also consistent. 6AAM is on now but needs a good receiver. 6BWS has had no success with low power. However, he is tickled with the results he gets from a Grebe CR-5 on high waves. 6BJF is trying to make a fiver perk on 40. We received the report that 6ANO has been off most of the month on account of transmitter that cannot be found. Every effort is being made to locate this trouble.

Traffic: 6NW 247, 6CTN 97, 6AKW 15, 6CUW 35, 6CAP 16, 6ANO 36, 6RS 69, 6YB 28, 6ARX 4, 6CBJ 6, 6BQ 50, 6BWY 30, 6BDE 21, 6BAS 20, 6SB 16, 6AJM 19, 6CHX 4, 6CGC 4, 6APP 15, 6HU 5, 6DN 25, 6LA 6, 6BBV 7, 6BEV 3, 6BGC 16, 6BJD 92, 6BJX 242, 6CTO 1, 6DAH 16, 6DAI 59, 6IH 11, 6OF 11, 6RF 54, 6AHP 6, 6CDY 6, 6US 5, 6AJI 17, 6BUR 24.

HAWAIIAN SECTION
H. A. Cantin, Mgr.

6AFF traffic report for the month shows that it is worth while to operate in an efficient manner and advertise the fact that you are on the air for traffic. In thirty-one days, 6AFF, worked all the U. S. districts, Australia, New Zealand, Canada, Chile, Philippines, China, Samoa, Tahiti, and Alaska.

Radio Club of Hawaii, Station 6BUC, did not do much traffic work during the past month due to the fact that the operators were kept busy acting on an "Interference Committee" formed by Major Dillon, Supervisor of Radio 6th District. Mr. Dillon who was on his tour of inspection for this district, gave a very interesting talk at a public meeting for the radio fans. The amateurs came in for a word of praise when he told how the amateurs in his district were cooperating with him to reduce interference to the BCL.

6AJL is back on the air again after being on the sick list. He worked 1YB direct and was reported as R6 by FB9 Argentina. 6CLJ did good work for the month. Best DX worked 2ACS and 9th districts. Mid-term exams kept 6CST QRW hence very little opportunity to pound brass. 6AJE has been appointed ORS. They have several operators on the job and expect to handle considerable traffic. 6CMH has been experimenting with different type of transmitters. 6ASR is kept busy selling and repairing BCL sets. 6TQ, with his lone 50, was heard in England while working NKF. 6BCG is on again with a 5'er. 6DB is on occasionally and gets his traffic off without any difficulty. 6OA had his ORS suspended for failure to report. 6CLW is ex-37C operating at Air Station, Luke Field, T. H. 6DCF keeps a schedule with KFUH. Captain Adams working with FXL, Fort Shafter, T. H. is experimenting with radiophone on the 40 band. Signals from FX1 have been reported in New Zealand. WVY, Army Station, Presidio, San Francisco, Calif., is being received in Honolulu with excellent Signal strength.

Traffic: 6AFF 130, 6BUC 48, 6CLJ 36, 6AJL 11, 6CST 8, 6TQ 7.

ROANOKE DIVISION
W. T. Gravely, Manager

WEST VIRGINIA—The lower portion of the state seems the most active in message reports, although the "Panhandle" reports the best DX worked. 8AUL, again the star station. 8CDV worked 6BCS, 99X and X4AH. 8BSU-8AKZ, on 40, is very QRW. PRR traffic handled through Wheeling FB with 8AUL the star station. 8ALG, rebuilding for "H" tubes. Glad to welcome ex-9AEK to West Virginia with his new call, 8IT. 8BXP blew his fifty. 8BJG reports 8AIA new station with three operators in Charleston. 8DOI, still going good on 80. 8CQH works west coast consistently. 8CBR, on 40, reports working foreigners. 8AMD, getting out FB and has a pure DC note. 8DJN uses very low power and getting good results. Did the gang see 8AMD's wonderful Valentine cards? It is the picture of a ham and on the reverse side says "You are half-baked if you

don't ask me to be your Valentine!" The Huntington gang have organized a regular ham radio club. 8AMD is President and 8CQH, treasurer and secretary. 8AGO, of Pittsburg, visited Wheeling several times this month and made arrangements about the PRR tests.

Traffic: 8AUL, 24; 8CDV, 6; 8ALG, 4; 8BXP, 4; 8BJG, 11; 8ATC, 8; 8CBR, 20; 8DOI, 30; 8IT, 13; 8AYP, 214; 8CQH, 28; 8AMD, 63.

NORTH CAROLINA—Dist. 1—4SX gets out fine on 40 and has worked I-1AS. 4OU is handling lots of traffic when he gets time to pound brass. 4TS will soon have a 1000 volt storage battery. 4MI gets out fine in U. S. and PRR but ND on foreign DX.

Dist. 3—4BX is doing excellent work on 40. 4RY has been off the air for exams, but is back now. 4AC, a new station in Charlotte, uses a 7½ watter. 4QK handles some traffic on 80. 4TJ's YL sure helps him run up a traffic total.

Dist. 4—4RW is off the air at present waiting for a DeForest 150 watter. 4WE is doing loads of DX. 4NT broke a fifty and roof blew off shack and wet all junk.

Traffic: 4TJ, 64; 4QK, 10; 4BX, 35; 4JR, 77; 4MI, 41; 4TS, 10; 4RF, 5; 4WE, 18; 4RW, 1.

VIRGINIA—Dis. 1—3BS and 3JF have consolidated with one 7.5 watter on 40. 3AHK has big time blowing tubes, one 7.5 watter now. 3OL, business QRW working on new receiver. 3MK, no traffic, very little work done account power leaks and poorly tuned xmitter. 3CKA working on 40 and 80 with new xmitter. 3AHL working FB on 40 and on regularly QSO anywhere. 3TI xmitter works fine on third hump antenna. 3BNE made PRR emergency station, placing transmitter on panel. 3CEL reports handling some traffic.

Dist. 3—3AAI has junked the old set and having a new crystal controlled set build by laboratory engineers. 3BFE has recovered from a long spell of sickness and is moving the shack to Charlottesville. 3RL is on every night on 168 with RAC on plate of 201-A 3KG is suffering from a sore foot but says the sixes sound good in daylight. 3IW has not said anything for sometime. 3BGS installs a new set of storage batteries for the 32 volt plant.

Dist. 4—3CKL has worked some of the A and Z stations with a lone fiver. 3BZ has worked O-A3B, Italy and France.

Traffic: 3UX, 17; 3BZ, 2; 3BNE, 12; 3BS, 21; 3AHK, 2; 3CKA, 17; 3TI, 65.

ROCKY MOUNTAIN DIVISION
N. R. Hood, Mgr.

COLORADO—Denver—9CAA decided that the traffic trophy would look good in his shack. He is out after it hard. The result is the biggest total since the Radio show two years ago. He has had some trouble with rectifiers, tho. 9EAM comes second in totals. He is holding down his usual nightly schedule with 9BKV. 9CAW is rebuilding. 9ABC moved to Wyoming and is now 7UW. 9BXQ worked 6ZAC on 39 meters. 9OO has all his stuff mounted on glass. 9WO has a schedule with 8CBR. 9CDW is disgusted with his new QRA and is going to move again. 9ADM says he knows a keen looking "YL". 9BJN and 9DKM are having a race to see who can work the most stations. 9DKM is one of our best stations. 9BJN puts in practically all his time on the air. 9DQG has little to report, but will try to do better. He has been rebuilding aerials and sets. 9AMB, 9DED, 9EFY are all at college.

Traffic: 9CAA 337, 9EAM 118, 9BJN 95, 9OO 46, 9DKM 44, 9CAW 10, 9DQG 7, 9BXQ 3.

Dist. 1—9DVL blew his plate transformer, and is using 110 rectified volts on the plate now. The ADM wants to know where he gets that R4 wallop with that power. FB, OM. There are several other stations operating in this district who show no interest in the department. Drop 9CJY a card if you want information.

Dist. 2—9CHT lost his certificate for failure to report and not being on the air. 9DUI works Denver every day on schedule. 9ADI was laid up a while but is on now. 9CDE put thru some good traffic. 9EAE is off the air temporarily. 9CFY and 9BUG report as usual.

Traffic: 9DVL 6, 9DQG 7, 9DKM 44, 9WO 11, 9OO 46, 9EAM 118, 9BXQ 3, 9CAW 10, 9CAA 337, 9BJN 95, 9ADI 74, 9CFY 10, 9EAE 1, 9BUG 19, 9DUI 29, 9CDE 32.

UTAH—Salt Lake City—Everything is going fine down here although a number of the stations have slacked off and are not running as much as usual. I suppose some of the new stations starting up here will be going good in a month or so. 6RV and 6BTX are on the air regularly. 6RV, working 1AM on schedule. 6BUH continues to report regularly although he does not seem to be able to get on the air.

Dist. 1—There is only one active station in this district, 6CVA, altho not an ORS at present. 6CJB, the only ORS in this district, is on the road as a salesman so at present does very little radio work.

OGDEN—6FM was the only ORS to turn in a report but 6BUV turned in a report of ten. There seems to be no amateur radio stations in any other part of the state. Several new stations are expected to be on the air shortly in Salt Lake. Several are just waiting for DeForest tubes. 6CRB bought out 6RM's transmitter and will be probably going full blast with the 250 watter by the next report.

Traffic: 6FM 10, 6BUV 10, 6BTX 61, 6RV 62. 6RM 23, 6CRR 12, 6CRS 19, 6CVA 50.

SOUTHEASTERN DIVISION
A. D. Trum, Mgr.

THE amateurs of the Southeastern Division are requested to send in to the DM pictures and articles about their stations so that we may have some in *QST* from time to time. Active stations are requested to get in line for ORS. Communication officers are requested to boost activity. We want a live crowd in our division. The fellows are holding their own. Foreign DX is excellent. Porto Ricans request hams in this division to watch for their signals so that they can connect more easily.

ALABAMA—Ham activity in general has held its own. Traffic figures have dropped just a bit. Dist. 3 leads the state with a total of 193 messages. 5ATP of the same district has the largest station total of 91 messages. 5YB at Auburn, Ala., comes second by handling 62 messages.

Dist. 1—Birmingham shows little activity. 5AX works out consistently on 40. He has been officially appointed as an Army Station. 5VV holds forth whenever school work lets up for a few days. Several promising new stations are coming into line. 5ARJ is working regularly with two H tubes. 5ACV can be counted on for reliable communication with 5YB and 4AV.

Dist. 2—5AC handled most traffic this month. He has a regular schedule with 99X in Panama. He worked Mexico City and has been heard in New Zealand. 5QK is getting about with a new "fifty" He worked I-1BU and 6ZAC-NPN in Samoa. 5AR has left the game for the present. His ORS has been cancelled accordingly. 5DL and 5QF are on again.

Dist. 3—Montgomery fellows are bound to keep in the lead in general activity and traffic handled. 5ATP led the district with 91 messages handled. 5AJP still holds to 80 meters, but is now using 40 meters too. Our DM is out for new material and has several prospective hams coming into line. 5ADA is handling traffic very nicely. He has been working Porto Rico consistently. 5DI left 5YB long enough to get home for a week-end to pound some brass. He got 29 messages out of his system in a single week-end. 5DI is at 5YB and handling ARRL affairs there.

Dist. 4—A recent visit by the R. I. added several new "ops" to the staff of 5YB. A "250" is being installed and great things are to be expected of these fellows.

Traffic: 5AC, 22; 5AAD, 3; 5ADA, 35; 5AJP, 33; 5ARJ, 9; 5ATP, 91; 5AX, 12; 5DI, 29; 5QK, 7; 5VV, 8; 5YB, 62.

PORTO RICO—Every station in Porto Rico has already linked with some foreign station. The thrill of these QSO's keeps the gang increasingly interested. 4SA takes the honors for foreign communication 4SA takes the honors for foreign communications with 4JE close behind. 4RL and 4UR take third place. FB OM! 4KT at his farm in Carolina, takes pride in offering dependable service to the mainland in real emergencies. 4RL has one operator at college. His traffic has gone down some. 4OI has done little work this month.

Traffic: 4SA, 12; 4JE, 19; 4KT, 9; 4BJ, 7; 4RL, 6; 4UR, 11; 4OI, 2.

The DM wishes to express that the hams in Porto Rico are a fine lot. We are proud of the way they handle traffic and their mode of working fellow hams.

SOUTH CAROLINA—4MV is a new ORS. He leads the state in traffic handled. We have a star 20 meter station in 4VQ. New stations are coming on the air all over the state. Many "ole timers" can't keep away from the brass. Among the latter is 4JK. All of the active stations are doing good work.

Traffic: 4IT, 70; 4VQ, 134, 4JV, 44; 4MV, 152; 4AAM, 9; 4RR-VL, 20.

GEORGIA—Georgia hams are doing fine work. DX here is fine. The hams in this state are requested to turn in to the SCM bigger and better reports in more detail. Let's get some stories about our station in *QST*. 4AAB has a new "H"-tube. 4AAD worked Belgium and France. 4AAE at last worked NZ. 4FC and 4RM moved. A new 60-foot tower is going up. 4AV, Radio Club of Ga. Tech, is on with a "fifty". 4SI has been in the hospital. 4KL is on after a lay-off. 4OA has a crystal set going. Jimmie Morris has been sick this month, fellows. He sez that all of you who want to affiliate with the ARMY-ARRL to drop him a line PDQ.

FLORIDA—Florida reports are incomplete despite the DM requesting the DS's to turn in their reports direct to him. However, some individual reports were sent him. An ADM will be appointed soon, however, all Florida stations are requested to report direct to the DM until notified of appointment of an ADM. 4OB is still pounding out into the ether with good work! 4OB handled some traffic. 4TK is on the air regularly doing good work. 4TK handled some traffic. 4KK sez that he is doing fine work and hopes to turn in a big traffic report soon. 4MY and 4LK are trying but ought to watch themselves on good operating.

The DM has had occasions to work a number of Florida hams this month and they are to be commended on their splendid way of handling traffic and their mode of operating. A number of those are to be complimented on their gud fists.

4UA is working fine on the 40 band. Worked Germany, Italy, Aus., NZ., S. Africa, Eng. Has schedule with G-2IH every night at 6 PM.

WEST GULF DIVISION
F. M. Corlett, Manager

NORTHERN TEXAS—The ADM calls attention to the fact that the wavelength violators are being checked and brought to account. Use your influence with off-wave stations you work to save their licenses.

5AIJ is attending A & M College. 5ZAI should separate the A and I in his call. Then, he would be listed in Calls Heard as 5ZAI instead of 5ZL. 5JF says that a 250 ft receiving antenna is vy FB.

Dist. 1—5AQL was busy with school and experimenting. 5AMB is also off the air. 5NW moved to Denton shortly after Xmas.

Dist. 2—5JF worked s-SMZS, this month. 5VU is working on 40 meters in daylight and 80 at night. 5WW of Jasper has moved back to Center, Texas.

Dist. 4—5SP is keeping the west part of the state open for traffic through his individual efforts. FB, OM! He has been using a single UV203.

Dallas—5HY reports traffic good. 5AJJ returned from New York recently. He visited several stations. 5AKN has kept the same fifty watter in use for two consecutive months. He says he poured a bunch of emery dust into 5ACL's generator, so he could beat his records. 5ACL expects to handle the ARRL Official Broadcasts on voice on 80 meters in the near future. 5VF is reconstructing.

Waco—5SD says all Waco stations are now on with the exception of 5CV, who is at WJAD. 5AFU and 5ATX are doing good work. 5AKZ managed to pile up a nice traffic total. 5AKL used an H tube but has gone back to the UV203.

Traffic: 5NW, 69; 5CC, 4; 5JF, 5; 5ACL, 23; 5AKN, 8; 5AJJ, 17; 5HY, 34; 5AKL, 12; 5SD, 11; 5AKZ, 44.

SOUTHERN TEXAS—The month has been uneventful. Many of our stations are rebuilding. The amateur is never quite satisfied with what he has but is ever striving for something better. 5ASD has gone to Chicago to school. He operates 9ALG to keep QSO his beloved 5th District. 5EW is rebuilding. 5ZAI keeps a schedule with Z-2XA. He handles regular traffic from ARRL Headquarters to NZ via the 40 meter route. FB, OM! (We want more channels with other foreign countries—Communications Manager—FEH). He handled two news bulletins from New Zealand and one from Australia for QST. 5ZU, at Austin, has a transmitter and is going strong. 5HS moved his transmitter into the house March 1. L. D. Wall, our Army Representative in the Eighth Corps Area just Okayed 42 Army-Amateur station application. Let's have some more!

Traffic: 5ZAI, 38; 5EW, 10; 5ADZ, 48.

OKLAHOMA—5AAV is doing good 20 meter work with a team of 7½ watters. 5ATV hooked CH 9TC this month. 5AKA has the makings of a real Ham. 5SW was heard in Australia. 5ATK eluded the clutches of the fair ones long enough to dust off the old set. 5APQ is doing his stuff with traffic and schedules. His H tube will be going soon. 5PU has test schedule with BZ 1AW. 5ASK has an H tube. 5ADO is operating 5AML, a new portable station. 5ATY is a new Cushing station. 5ARX lost another mast. 5JU has been handling messages daily about the condition of sick relatives. 5AAJ is a 10-watt phone and CW station at Sulphur. 5TW reports that his YL is still on the job. He wants to QSO ex-5CG either via radio or by mail. 5AHD rolled out two this month. 5VM was on the job. We wonder what became of the balance of messages originated at Radio Show. 5AVF applied for ORS. We forgot to mention that the YL at 5AUD-5ALU is back. Her signals look better than ever. ORS are in line if the YL will consistently keep the various "ops" at 5AUD-5ALU lined up.

Traffic: 5APG, 25; 5ATV, 3; 5AKA, 1; 5ATV, 17; 5ARX-5AIB, 6; 5AUD-5ALU, 61; 5ADO, 11; 5PU, 6; 5APQ, 84; 5AQW, 14; 5JU, 47; 5TW, 5; 5AHD, 2; 5VM, 62; 5AVF, 53.

CANADA

MARITIME DIVISION
W. C. Borrett, Manager

INTEREST this month centers around the new regulations issued for the annual competition for the Murphy Radio Cup. Any stations that have not received copies of these new rules and regulations write the DM at once and he will forward copy by return mail. The following alteration and additions to the rules should be taken note of by all stations.

Rule F was misprinted. It should read; one point for every British Empire STATE worked while using the 52.50 wave. Not every British Empire Station as printed. The following additions are made and go into effect at once. Rule (I). One point will be awarded for the station handling the most traffic each month. Rule (D) stands as printed with the addition of fifteen points for the second greatest miles per watt and ten points for the third greatest miles per watt. These alterations are made at the suggestion of different members who answered the circular. No further changes can be made now this year.

The DM wishes to draw to the attention of all the gang the fact that the Jewell Electrical Inst. Co. have offered a No. 64 Thermo Couple Ammeter to the Maritime Division for the station that does the most miles per watt between now and May 1st.

Traffic is rather slack this month. 1AR'S best work is a relay of a message from South Africa to Hawaii. 1DQ reports that he is working on test schedule with NKF. 1BZ is back again and asks reports on his sigs. 1DD has been QSO with two Australian stations this month and also every Canadian district. 8AR, of St. Johns, is banging away in good style and has worked Europe every day for a period of nearly thirty days so far. Several of the European stations have found us now on 52 and have been QSO. 1DJ spends most of his time QSO with c9BJ where ex 1EB appears at times. 1AW is about to go to USA. Other stations on Cape Breton are heard with 1CX as the leading spirit.

Traffic: 1AK 39, 1AM 9, 1DQ 9, 1AR 4, 8AR 9, 1DD 20.

ONTARIO DIVISION
W. Y. Sloan, Manager

ONTARIO AMATEURS CONDUCT TESTS FOR HYDRO-ELECTRIC COMMISSION ON SHORT WAVES. 3NI CRASHES INTO BRASS POUNDERS LEAGUE BY HANDLING 102 MESSAGES. MUCH ACTIVITY SHOWN IN DIVISION; MANY NEW STATIONS OPENING UP.

NORTHERN ONTARIO: W. M. Sutton, ADM—Sad word is received from 3BG of the Soo. The doctor orders a lay off, so he is putting the pajamas on the bottles until summer. 3GG has a son who is building up a short wave low power transmitter, to take into Northern Ontario with a geological survey party. Here is your chance to keep these fellows in touch with the outside world. Watch for him on the new Trans-Canada wave. Sudbury is showing some light in 3UL who is coming on with a fifty soon. 3HP is back with all kinds of pep, turning in a nice total. Eastern stations please write 3HP and arrange schedules. 3NI has a busy month. Although

radio weather has been fierce, schedules have been kept with Toronto, with the result 8NI again is found in the Brass Pounders League. At the request of the Hydro-Electric Power Commission, 3NI transferred his equipment to Cameron Falls, where tests were conducted with 9AL and 9BJ in Toronto. 3NI's other op, "AB" and 3HP went into the wilds with the set, although the weather was excepionally poor, the Hydro were well satisfied with the results obtained.

EASTERN ONTARIO: F. A. C. Harrison, ADM—3EN has changed his call to 3JW, and has been reported from "aussie-land." 3BN, a new station in the Ottawa Valley is universally QRK with batteries for plate supply. 3DO has returned home and making good use of the Trans-Canada wave. 9CC has been seen coaching 3AFP in the art of skiing, and held a ski party to celebrate the reception of AFP's signals in N. Z.

SOUTHERN ONTARIO: J. A. Varey, ADM—3DH continues to do good work an all waves from 80 down, and this month hands in the best total for this division. 3KA is an OWLS and is right on the job with the "fifty-two-point-fivers." 3KP still pushes R9 sigs around this little old continent, but seems to prefer the "hay" to the real DX. 3FU clicked with f8YOR. 3GY reports things slow in London. No report from Sarnia, but old 3XI has been heard working almost every foreigner going. The Southern Division has reason to be proud of him. At St. Thomas, 3ABG and 3IA are heard occasionally. Why no report, OM's? 3ZB QRW filter and new gutter-pipe antenna.

CENTRAL ONTARIO: A. R. Williams, ADM—3AZ has been bothered considerably by BCL's lately. They are just beginning to connect the light in his antenna with the ether-buster below. However, he is still carrying on picture transmission work with 3BR. This latter station now has a new 250 watt lantern perking and working great daylight DX. 3FC is busy conducting 24 hour tests with 3NI, and is conducting schedules with 1DJ, 3DH, 3NI and 4CB. 3MR is the local DX reception hound. He hears everything hearable, and is on the air with two battery-operated low power WE tubes. Toronto boasts

CANADIAN GENERAL MANAGER WITH HIS ASSISTANT, DAVID KEITH RUSSELL

two new stations in 3BY and 3YE. 3BY is using a NE fifty Hertz antenna and is getting real results in spite of local induction troubles. 3YE is making his fiver groap with Kenotrons behind it, but keeps around 40 meters. Jump in with the gang on "fifty-two-five" OM. By the time this appears in print, 9AL will be on with his rebuilt transmitter. 9AL, 9BJ and 3FC were kept on the jump testing with the Hydro-Electric Power Commission station that was installed by 3NI at Cameron Falls. 3VH will be on again as soon as he is through building 9AL's new set.

Traffic: 3NI 102, 3FC 55, 9AL 48, 9BJ 46, 3HP 28, 3DH 16, 3KA 13, 3BR 12, 3VH-9CS 10, 3BY 9 3GJ 9, 3AFP 8, 9CC 6, 3JW 6, 3CK 5, 3ZD 4, 3AZ 4, 3FU 5, 3BE 2, 3KP 2.

PRAIRIE DIVISION
F. E. Rutland, Manager

MANITOBA—The majority of the gang are now working on 40 and it is perhaps for this reason that traffic is somewhat scarce, as this wave is NG for short distance relay work except in daylite. 4DE is working on 40 and 52 and handled a bunch of traffic for the Pine-to-Palm tourists. 4DY is on 40 most of the time using third harmonic transmission. 4EA has little time for radio. 4FZ, the other op at 4EA, tries hard to get EA on the air but without much luck so far. 4AW is going strong on 52 and 80. 4DF is experimenting with crystal control. 4EH has difficulty in getting a good antenna in his poor location. 4DW is trying hard to find the wabble in his note. 4LC and 4DF are new ORSs. 4AE is very QRW with school work. 4DU is a new station operated by "Bill" Duffield. 4DB reports increased activity in his district.

Traffic: 4AW 7, 4DY 8, 4DE 25, 4DW 8, 4EA-4FZ 4, 4DF 4, 4LC 5.

SASKATCHEWAN—The gang in this district have been going strong this month especially in Moose Jaw. 4AO and 4HH are both rigging up for a 250 watter. 4FC is still plugging as usual. 4FV seems to be QSO the whole world. 4AA is keeping his town on the map and is on fairly consistently. 4EZ is likewise busy and is now using an M. G. 4GH and 4FN are both on tip-toe and are to be heard most any night. 4CB has resigned the ADM and says he can't keep an ORS due to heavy QRW.

QUEBEC DIVISION
Alex Reid, Manager

2BE, 2BG, 2AX, 2AL, 2CB, 2AU have been hammering at DX of late. 2AX worked 11 different foreigners in 4 days. 2CG has been off the air. 2BT is coming to life again and has his twenty watts perking on 40.

The DM, J. V. Argyle, resigned his position due to his feeling that he was unable to give the time nor had the facilities for holding the office with the effectiveness it deserves. 2BE, Radio Inspector and President of the local BCB club, was elected to succeed 2CG as DM. All ORS and other appointments are automatically cancelled as from Feb. 28th and Mr. A. Reid will appoint good hams to all these offices as quickly as possible. Send your applications in to him.

(I wish to thank the boys who have so ably assisted me during two years as DM and to ask that at least as much backing be given to Alec Reid, so that he can get more swing into the Division. Cheerio, gang and 73 to all—J. V. A.).

VAN-ALTA DIVISION
A. H. Asmussen, Manager

THE BCL's are now in the same frame of mind as the Hams; i. e. DX conditions are the BUNK. Vancouver and Calgary report very bad power leak QRM. The new six-weeks-old BCL in Calgary now three hundred strong, have assured the local hams of better conditions in the near future. The new DS appointments are 5GT, 5BM, 4CL and the old stand-by, 4IO; now that we are all set, "let's go" and remember gang this space is too valuable to be used as a "Casualty list" for the benefit of the Dead Ones. 5GO heads the list for Vancouver in traffic and DX having worked Bz and Ch. 5BM qualifies for the DS job by working Hu6AFF with one VT 2 and hopes to be a Com. opr. soon. 5AN has a schedule with Doc Sawbones at the local hospital but hope he has a big traffic total next month. 5HS *still* moving to a new shack. 5CR is doing good work with a fifty. 5GF makes the old heap perk despite bad power QRM. 5HF and 5HP have sold out. 5AG is doing good work on low power. 5BJ is now R. I. attention, gang! 5HK rebuilt xmitter but thinks the old pile-o-junk was best. 5AS is stepping, having worked Hawaii. 5CT has some new ones lined up. 5GT also primises new stns on soon. 4CL reports a revival of the gang in Edmonton with some new ORS. 4AH is a live wire with a fifty watter and finds time to help 4AR on the 80 band. 4HF pounds brass when business allows. 4AK is a new stn and promises another new stn there soon. 4DQ has an ORS ticket agn. 4AL works all districts; hollerin for traffic. 4AF, a new ORS and a good opr, wants some more schedules. 4AX is QRW business but hopes to make up for lost time. 4IO keeps the 80 band open for Calgary traffic. 4GT has not been able to locate the intermittent pwr leak QRM in his immedliate vicinity and is at times forced to QRT even a stn with a strong sig.

Traffic: 4AF 10, 4AL 5, 4DQ 5, 4AH 7k, 4IO 6, 4GT 28, 4AS 4, 4BM 7, 4CR 4, 4CT 8, 4GF 4, 4GO 29.