

# QST

Devoted Exclusively to

# Amateur Radio

*Published by The American Radio Relay League*



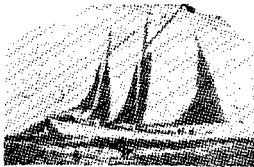
SEPTEMBER, 1925

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# MacMillan demands Cunningham RADIO TUBES

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and Death  
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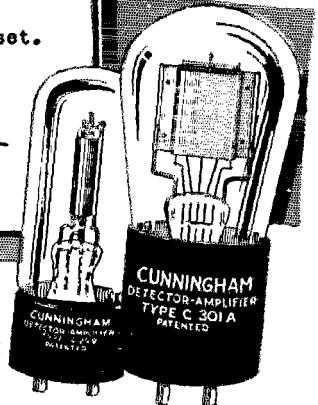
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*In the Orange  
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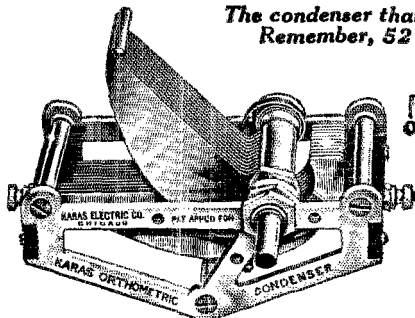
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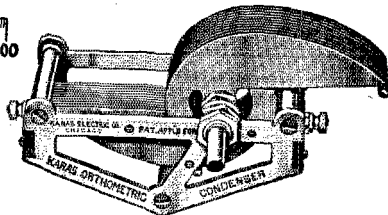


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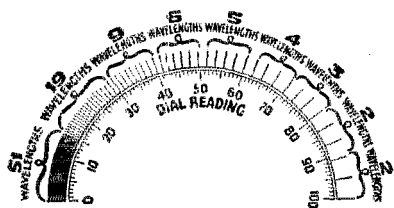
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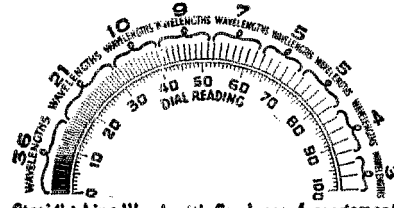
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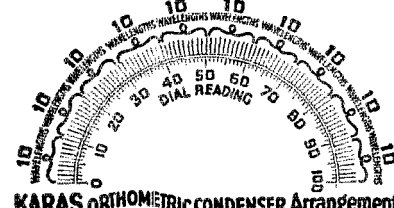
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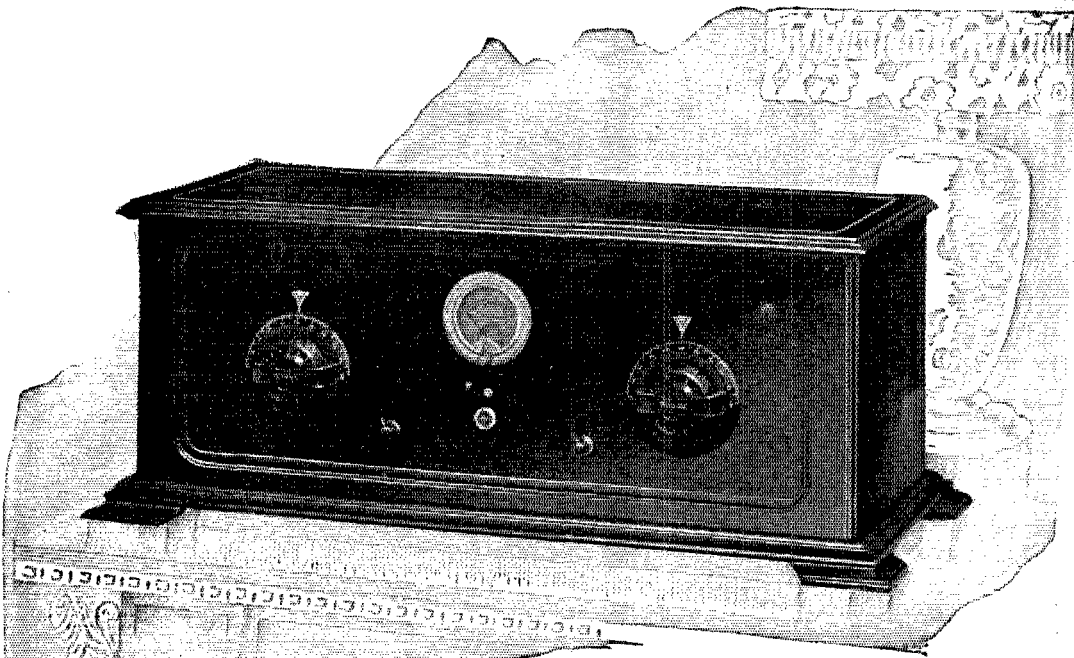
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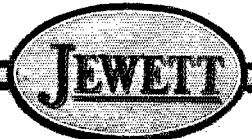


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# QST



## The Official Organ of the A.R.R.L.

VOLUME IX

SEPTEMBER, 1925

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QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A.

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Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, \$2.00 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, \$2.50 per year, postpaid. Remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1105, Act of October 3, 1917, authorized September 8, 1922. Additional entry as second-class matter, acceptable at special rate of postage provided for above, at Springfield, Mass., authorized September 17, 1924.

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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

## Election Time

EVERY year the members of the American Radio Relay League elect seven directors to their governing Board for a term of two years. Thus there are fourteen elected members on the Board, at least half of whom have always had at least a year's acquaintance with League business.

The membership depends upon this Board to manage its affairs, to select its officers, to determine League policies in all important matters. At the meetings of the Board of Directors, each director speaks for his territory and it is the duty of the director to know what the amateurs "back home" want. The Board is the most important part of League government, the actual governing power established by the members and through which the members express themselves in the decisions of League action. It is therefore of supreme importance that able representatives, men of vision and judgment and of experience in administration, be selected. In this issue of *QST* a notice appears, soliciting nominations for director from the territories in which an election will be held this November. It is the privilege and the duty of every member to think seriously on this subject and express himself, that our A.R.R.L. government may continue to be representative of the membership.

## Fish About a Bit

THE coming of cooler weather is certain to see an increase in the amount of international DX working, which continues to be one of the most fascinating sides of amateur radio work. It is important for the American amateur to remember that amateurs of foreign countries will not often be found operating within bands assigned by the U.S. government for amateur operation—they are wise enough to know they would have no chance of being heard through our local smother. Yet many American amateurs interested in international DX continue to listen only within the bands in which they are equipped to transmit, and a great horde of foreign signals continue to go unanswered. The place to look for foreign DX is out of the U.S. bands! Most of it is just below and just above our so-called 40 and 80-meter bands. In particular there is a beehive of activity between 32 and 37 meters, good fellows calling their

heads off for A.R.R.L. Tune about a bit, you chaps, and give these fellows a shout. There are many new countries getting on the air now, and it's going to be a great winter.

—Kenneth Bryant Warner.

## We Ask—

THIS issue of *QST* marks the passing of Summer, with its QRN, vacation-QRM and other obstacles to the uninterrupted enjoyment of radio. Perhaps it is just as well, for September and cool Fall weather find us all rested and rarin' to go.

The radio industry has had more than its share of troubles these past six months. From various causes there has been a great slump in nearly all branches. While hardships have resulted, as for instance the drop in advertising in the radio publications, yet in a larger sense it has been a good thing for the industry as a whole as well as for the consumer. This summer has seen the elimination of many "gyps", two-by-four concerns putting out medium-to-punk apparatus and sets. And the reputable firms whose finances and stability have enabled them to stand the gaff have taken time to replan their merchandising and production policies for more efficient operation.

The situation now, at the beginning of the season, is that the industry has been purged of much undesirable apparatus and many such firms. In general those remaining are geared up to a higher standard of service and reliability of products. Their field of prospects is widened through the decrease of competing concerns.

What does all this mean to you, the consumer? It means that you can buy with more confidence than before, secure in the knowledge that what you buy will be well-made and properly sold. It means that you can bring your set or station up-to-date more quickly and perhaps more cheaply than in the past.

So go to it, O.M. Now is the time to get on the air. And in doing so remember to patronize *QST's* advertisers, mention *QST* when writing to manufacturers or buying over the counter, and boost *QST*-advertised products to others. Thus you will not only be getting reliable apparatus for yourself but you will increase its distribution to your friends, and thereby become not only a potent factor for the advancement of the industry but a valued and valuable booster for *QST* as an advertising medium. Without advertising, no *QST*; without *QST* no A.R.R.L.!

—Edwin Adams.

# Reviewing the Receiver

By Wm. H. Adams\*

**A**N investigator of radio who does not sometimes dream and imagine wonderful circuits quite beyond his power of accomplishment is rather deeply in the rut; and commercial designers of apparatus particularly have a tendency to follow the beaten path.

I have been dreaming. I have been trying to imagine myself a radio wave rambling through various radio circuits, and my imagination leads to some conclusions which I will state as briefly as I can.

The point of all radio reception is *first* to receive a signal *without* interference and then to amplify it to taste.

Amplifying a non-selective signal really makes confusion worse confounded, and about two-thirds of the reception obtained nowadays consists of amplified interference.

## How Shall We Do It?

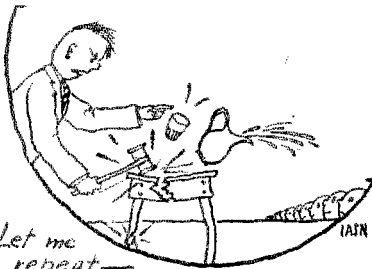
No radio circuit of high resistance can tune sharply. This is only vaguely understood, only half-believed. Let me repeat and emphasize "NO radio circuit that is of high resistance can tune sharply."

What is meant by high resistance? Not only the copper circuit; indeed, the copper circuit in itself is not supremely important. Metals of lower conductivity sometimes may work acceptably, though copper is best, next to silver.

What is meant is the *unappreciated* resistances that clog most circuits.

## The Antenna

Why put all the responsibility on the set? Consider the antenna circuit. Realize that



"Let me repeat—  
"No radio circuit of high resistance can tune sharply!!"

it always inclines toward high resistance and that this resistance is undesirable.

Anything (whether conductor or insulator) that comes near the antenna will increase the resistance of the antenna and broaden its tuning. This is true of the

outside house wall, of the inside plastered wall, of the trees in the yard, of metal roofs and wire nearby, of anything that comes close to the antenna.

Keep the wire distant from the inside and outside walls.

Make twice as good a connection as ever before to the antenna circuit. Solder it. Run it as straight to the set as may be,

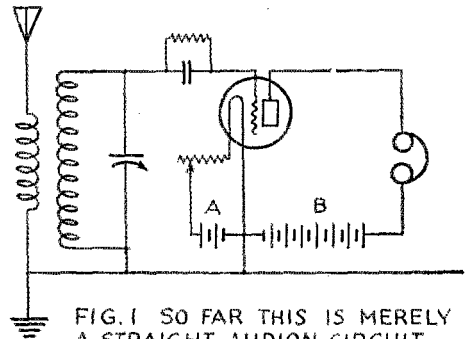


FIG. 1 SO FAR THIS IS MERELY A STRAIGHT AUDION CIRCUIT

and if humanly possible carry the antenna wire itself straight to the binding post of the set without any joints whatever. Now go over the ground and make it twice as good as it is now. Even if it takes time one cannot get too little resistance, and every imperfection in the ground circuit gives a two fold imperfection in selectivity. Note please that these resistance reductions do *not* greatly increase the signal, but instead they sharpen the tuning.

## Coupling

The antenna circuit, even at its best, inclines toward high resistance. If it is coupled closely to the secondary circuit this high antenna resistance will also be "coupled into" the secondary circuit, thereby broadening the tuning. Use the loosest possible coupling. Do not be afraid because the signal is weaker. The point, as has been said, is *first* to receive a signal uninterfered with by other signals and *then* to amplify it. Under these conditions successful amplification is possible.

## The Tuner

The general principles of good tuner design are the same for all types of tuners. However, the "loose coupler with a tickler" is a simple and well-known type, therefore it will be used as an example.

A receiving circuit cannot have too low resistance.

Begin by using large-diameter coils of large wire, keeping them at least 2" from

\* Eastern Finishing Works, Kenyon, R. I.



any other parts of the set, avoiding all metals and dielectrics in their fields. For the secondary coil especially use no wire smaller than No. 16 or 18, and avoid windings that have high distributed capacity.<sup>1</sup>

Put the secondary tuning condenser (which should be the best on the market) straight across the secondary coil, the rotary plates being connected to the filament end of the coil. Make the coil wire itself continue to the rotor terminal of the condenser and thence to the filament. Make the other end of the coil wire continue to the condenser stator terminal and then to the combined grid-leak-and-condenser which should be mounted on the detector tube socket.

Do not introduce any switch or loose contact whatever.

So far this is merely a "straight audion circuit" (Fig. 1) without any regeneration control and with a good fix-tune antenna circuit loosely coupled to a secondary circuit of extremely low resistance. However, the selectivity will be amazing.

### Adding Regeneration

Now for regeneration, for we assume that no one will be satisfied without some attempt at this form of radio-frequency amplification.<sup>2</sup>

A low loss variometer in the plate circuit can be used. Most of the so-called low loss variometers are not truly described, because they contain considerable quantities of dielectric, have considerable distributed capacity, poor contacts and so forth. Some variometers of the lattice coil type

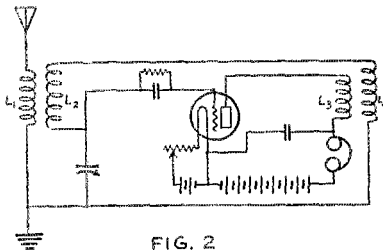


FIG. 2

are much better, but even these have a certain amount of dielectric and metal in the field.

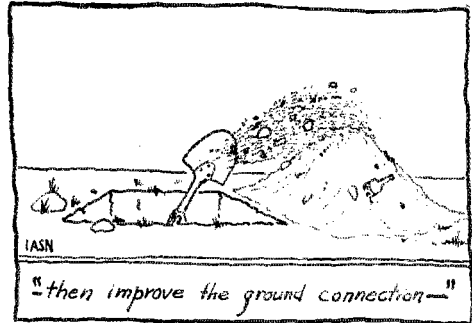
The writer does not like variometer plate circuit tuning, believing that a properly designed tickler coil for regeneration is more satisfactory and more flexible.

<sup>1</sup> See the article by R. R. Batcher in the present issue of QST.

<sup>2</sup> The Technical Editor especially likes this statement. Regeneration is certainly the thing that makes the detector "go out and hunt them". But that isn't all—regeneration is also the thing that makes radio frequency amplifiers work. I have seen very few sets that actually had non-regenerative r.f. stages—and they weren't worth the powder to blow them up.

Suppose that something just a little different be tried. All the secondary inductance is not needed in a single coil, and it is possible to gain some definite advantages by dividing it into two coils connected in series. The antenna circuit is loosely coupled to one of these coils, and to the other is coupled a suitable tickler coil in the plate circuit.

Most of the difficulty with the conventional three coil tickler circuit comes from



the varying reaction of the tickler through the secondary and to the primary which makes it necessary to retune the other two adjustments when any one of the three is altered. Therefore, in the present tuner, the two secondary coils are installed at right angles to each other and well apart so that variations of tickler coupling will not react inductively through to the first coil and antenna circuit. Now what have we? A simple, well-known circuit built along logical and theoretically accurate lines in such a manner as to eliminate all possible losses and to obtain the greatest selectivity and sharpness of tuning *without* especial regard to signal strength. It has excellent control over antenna coupling and regeneration with the least possible interaction between these controls and the secondary tuning control.<sup>3</sup> If theory counts for anything, such a combination may well force many of the much touted ingenious and complex circuits now so popular to look to their laurels; moreover, such a circuit is an applicant for admission to the Golden Rule class, as its very loose and non-resonant antenna coupling, and the possibility of ample regeneration without oscillation (permitted by the low resistance secondary circuit), minimizes radiation.

### Construction

In order that these ideas might be tested and full advantage be taken of all selectivity possible, some experimental tuners were built. In the final one the primary coupling

<sup>3</sup> The sending amateur will at once recognize these advantages as they occur in exactly the same way when one changes the terrible "3 coil Meissner" sending set to the real 4-coil Meissner circuit.

coil is made of a small number of turns of large wire mounted at  $45^\circ$ , on a fibre shaft turning inside the first secondary coil, held fixed at an angle of  $45^\circ$  to the base and two inches distant from it, while the plate tickler coil is similarly mounted on a shaft at  $45^\circ$  and the second portion of the secondary coil is mounted like the first but at right angles to same, the first coil, for instance, tipping toward the front and the second one toward the rear. This brings them on the same longitudinal axis, but at  $90^\circ$  to each other and, hence, not coupled; and this arrangement of the coils permits the rheostat, condenser and tube to be located between with the shortest possible wiring.

It was necessary to use a very small amount of white lacquer made of celluloid or gun cotton dissolved in amyl acetate to exclude moisture, thinned with at least an equal amount of solvent and as light a coat as possible was put on. Paraffine, silicate of soda, shellac, varnish or paint of any kind absolutely should not be used on coils or base. No avoidable metal or screws were used. Soldered joints were used except in battery leads. No frictional contacts were employed, and great effort was made to get absolutely perfect circuits, but the effort was very well worth while.

The signals are of unexpected volume and very good tonal quality and the tuning is sharp.

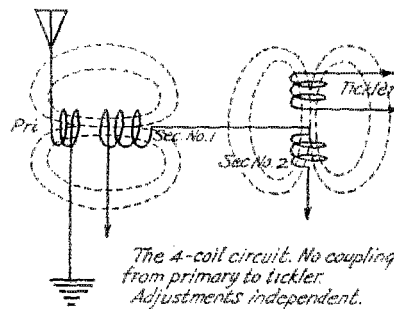
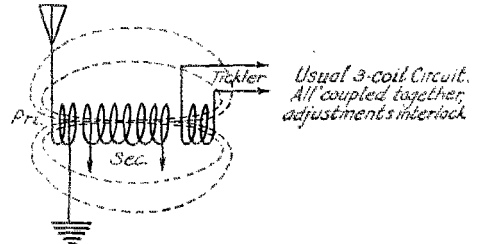
### Reviewing

Now let us set all this down as briefly as possible, telling all of the things that have been done in making our simple tuner as good as possible.

1. The avoidance of all metal and nearly all dielectric in the fields of the coupling coils and throughout the set.
2. The very loose coupling to the untuned antenna circuit.
3. The large wire used, winding to reduce distributed capacity and radio frequency resistance to the minimum.
4. The directness of the wiring and the avoidance of all switch connections or loose contacts or unsoldered joints.
5. The separation of the antenna coupling control from the regeneration control by means of the split secondary circuit.
6. The extremely loose coupling variations permissible by use of  $180^\circ$  variable coupling arrangement.
7. The large range of regeneration control and the very low resistance of the plate circuit.
8. The use of an extremely low loss condenser to tune the secondary circuit.
9. Micrometer filament control.
10. Insulation of all wire contacts from wooden supporting members.

11. The almost complete avoidance of radiation due first to the extremely loose antenna coupling, and second, to the extremely low resistance of secondary and plate circuits which makes it necessary to force regeneration and makes possible satisfactory operation below the oscillation point of the tube.

Isn't this worth trying out before wan-



dering off into the maze of neutrodynes, heterodynes, acmedynes, superdynes and other "pseudodynes"? Let's get back to basic principles in a simple circuit that is really of low resistance. After that will be a good time to start building more complex sets on the same "low loss" principles.

There is nothing about the theory or mechanics of the circuit that cannot be applied to tuned radio frequency amplification. Perhaps later I will have a further word about this.

<sup>4</sup> The term "Low Loss Tuner" was manufactured in the QST office therefore we feel entitled to have something to say about the way it is used. Just now we wish to know who started the idea that a "low loss tuner" must be a loose-coupler-with-a-tickler. There isn't the least excuse for that idea—QST has shown low-loss neutrodyne, low-loss superheterodynes, etc. "Low loss" isn't a circuit—it is a quality that appears when the designer understands radio design.

**Strays**

7QD reports ANE whose QRA we would like to know.

# Practical Lecher Wires

By Eugene C. Woodruff\*

**L**ECHER wires are permanently set up at 8CMP with the accessory devices for tuning the wires and locating the voltage nodes at any time. One can make a wavelength determination with the wires almost as quickly and conveniently as with a wavemeter, certainly more accurately. Preliminary experiments with neon tube indicators and thermogalvanometers worked just as was stated in the October, 1925, and May, 1925, numbers of *QST*, but the operation was slow and fussy if satisfactory accuracy was attempted. After some struggle, the apparatus described herewith was developed, eliminating the unsatisfactory features of the other indicators.

Referring to Figure 1: Two parallel wires 23 feet long and spread eight inches apart are hung between pyrex insulators about six feet six inches from the floor of the cabin. Under one end of the wires is a shelf on which is mounted the indicating apparatus as shown, to wit, a UV-199 receiving tube, the plate circuit of which includes a five milliamper meter. The grid is connected to one of the Lecher wires through a fixed condenser having a capacity of 200 micro-microfarads, the other wire being connected to the tube filament. The grid leak connects grid and filament directly. This device not only indicates with precision when the wires are in tune with the transmitter, but also shows when the bridge is at a voltage node on the wire. The short-circuiting bridge, S.B., is made to travel along the wires by an endless rope looping from wall to wall through pulleys.

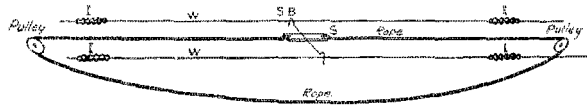
The operation of making a measurement is as follows:—

With bridge unhooked, couple the transmitter to the Lecher wires and tune with either the transmitter, or the wires, (or both) until the milliammeter in the indicator plate circuit shows a minimum. This tuning is very sharp as the plate current of the indicator shows a large, abrupt, change as the circuits come into tune. If one man is working alone he observes the milliammeter through field glasses while tuning the transmitter. The bridge is now placed on the wires and the operator, standing near the indicator, shifts the bridge by means of the rope until the milliammeter again shows the same abrupt

drop in reading. When this condition obtains the bridge is at a voltage node. Two or more voltage nodes are located in this manner, a chalk mark being made on the floor underneath each node, using a plumb bob. The distance between the chalk marks is one-half wavelength.

It was found best in general to adjust the Lecher wires roughly to seven times the wavelength desired and depend on the transmitter for the fine adjustment.

The natural period of the Lecher wires was determined by coupling a calibrated receiver to the input end of the wires with the indicator in place but with batteries disconnected. With receiver oscillating one hears the familiar click as wires and receiver are brought into resonance. The coupling should be as loose as pos-



ARRANGEMENT OF WIRES AND BRIDGE

- W W—The Lecher wires.
- I I—Pyrex insulators supporting the Lecher wires.
- S—Insulating strip to which the ends of the rope are ties.
- S.B.—Short-circuiting bridge used to locate voltage nodes on the wires. This bridge is carried by the strip S and is moved with the aid of the rope. This avoids the need for touching the system or coming close to it.
- V.T.—Vacuum tube used as an indicator. (The A battery has been omitted to simplify the diagram).
- M.A.—Plate milliammeter which shows resonance. Any meter will answer if it will give a reading when put in the plate circuit.
- R—Grid leak.
- C2—200 micro-microfarad condenser.
- C3 and C3 two-plate variable condensers used to tune the system.
- L.—One-turn or two-turn coupling coil used to pick up energy from the sending set.

sible, of course, or the calibration of the wires will be in error by a large percentage. This testing served to determine the dimensions of the wires and their accessories so the wavelength range would include waves seven times the length of those for which the transmitter was intended.

It is especially convenient to have an adjustable grid leak on the transmitter as the response of the Lecher wires and the indicator can be made much more definite and precise by adjusting the leak to the best value. This value is readily found by observing the behavior of the indicator during test. In adjusting the wires to different wavelengths it is important to keep any loading with coils and condensers symmetrical. UV-199 tubes served very well in the indicator when the transmitter used five-watters or 201-A tubes. If larger

\* 8CMP, 234 West Fairmont, State College, Pa.



transmitting tubes are used it may be necessary to use larger tubes in the indicator. In any case select a tube for the indicator that has a rather large plate current, say one mil or more, when supplied with the rated filament and plate voltages. A tube that had become perfectly useless in a receiver, refusing to oscillate, was found to work better than a "good tube" in this connection. The bridge instead of being a continuous conductor across the pair of wires may to advantage include a small condenser. Indications seem to be a little sharper when

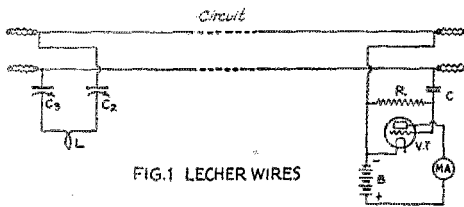


FIG. 1 LECHER WIRES

such a condenser is used. Under certain conditions it is not necessary to tune the Lecher wires at all. If the first response is to a wavelength at the lower end of the transmitter condenser scale and the wires are tuned for that, then one may find that for all longer waves one can leave the wires at this tuning merely setting the transmitter condenser to the de-

mitter was tuned, reaching a rather low value at one hundred. Data for the table in Figure 2 were then obtained and the calibration curve of the transmitter plotted as shown in Figure 3.

As an interesting check on this measurement the following was done. A wavemeter having a wavelength range from about 100 to 220 meters was checked several times against the standard waves transmitted by the Bureau of Standards station WWV. A receiver was assembled having a range from about 30 to 50 meters and calibrated using the above wavemeter. With the transmitter condenser set at seven, resonance was obtained in the receiver at 43.9, 40, 36.3, and 32.4

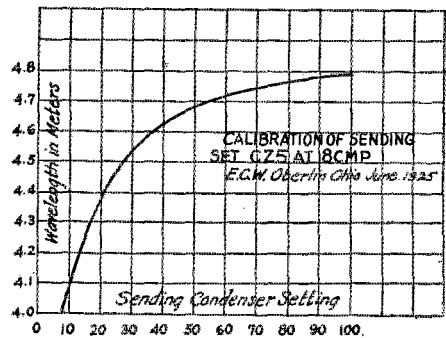


FIG. 3

Calibration of Transmitter C25

Condenser setting of sending set	Spacing between nodes on Lecher wires			Average	Wavelength as shown by standard spec.
	1 to 2	2 to 3	3 to 4		
7	76-1/4"	75-3/4"	75-5/8"	75.87"	4
10	80-1/8"	79-1/8"	79-1/2"	79.58"	4.05
20	85-1/8"	86"	.....	86.06"	4.35
40	91"	90-5/8"	.....	90.81"	4.62
60	93"	92-5/8"	.....	92.81"	4.72
80	94-1/8"	93-1/8"	.....	93.62"	4.76
100	95-3/4"	93-5/8"	.....	94.15"	4.79

Fig. 2.

sired series of values and proceeding with the location of the nodes. In the illustration herewith given this procedure was followed. In this case it was found that with the transmitter coupling coil L (Fig. 1) directly connected to the wires with no condensers or inductances, the response was sharp and decided for a reading of seven on the transmitter condenser scale. The plate current of the indicator changed from 1.2 mils to 0.3 mils and back for a movement of the condenser dial of one scale division. For scale readings larger than ten the plate current of the indicator began to fall off again gradually as the trans-

mitters. The transmitted wave was the 11th, 10th, 9th, and 8th harmonic of these respectively, giving the wavelength of the transmitter 3.9, 4.0, 4.03, and 4.05 meters. The average value is 3.995 meters. The wavelength found by direct use of the Lecher wires was 4 meters. Considering the roundabout methods this agreement is remarkable.

### Strays

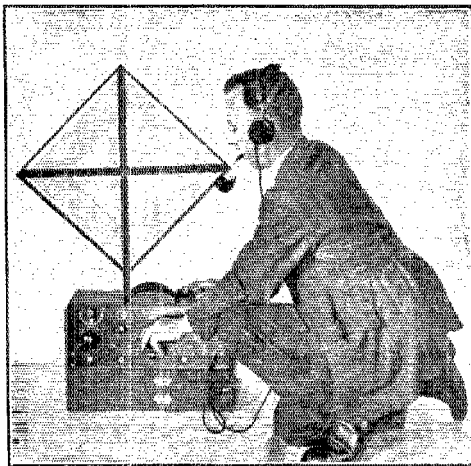
8KS says that an ordinary dimming socket which has several adjustments makes a good primary rheostat for controlling the filament transformer. You have only to avoid pulling the dimmer to the high side as the final jump eliminates the resistant entirely. The dimmer socket is shunted by a 100-watt lamp which carries most of the load and has a fuse plug in itself, to close the circuit.

g2OD has tied with mBX and Argentina. He reports that Australian signals seldom if ever come through in the morning whereas the N.Z. stations are most generally heard then.

## Locating "Power Leaks" by Radio

WE have talked a great deal about the ways of locating power leaks that cause radio interference. We are about to go into the subject again because it is very important to dealer, transmitter, receiver and electric distribution man alike. This does *not* mean that we are trying to blame all radio noises onto power leaks. That would be just as silly as the old (meaning a year since) habit of blaming all noises onto amateur sending sets.

The power leak is not always guilty. One



J. A. MITCHELL OF THE HARTFORD ELECTRIC LIGHT CO., operating trouble-locating set. The loop has practically never been useful but is used simply as a pickup. The point of trouble is found by touring the suspected region and listening for the loudest signal. The set rides in the front seat of the trouble-shooter's Dodge car, ample socket cushioning being provided, so that it is possible to listen as the car is running.

large generating company has found that of 125 complaints 29 started right in the house of the man complaining, 20 took care of themselves before they could be reached and only 33 of the entire 125 proved to be honest-to-goodness "power leaks" that the company was responsible for and could therefore do something about.

The noises that started in the complainants' homes were mainly inside the sets themselves — poor battery connections, defective tubes, loose contacts, damaged audio transformers, etc. In addition to this there was the usual crop of noises from household appliances—"violet ray" machines, washing machine and vacuum cleaner motors, electric fans, bad sockets, etc. This sort of thing should not be blamed on the light company and it is a good idea to begin hunting

the "line leak" by pulling the cutoff switch in your own home to see if there isn't something wrong right at home.

If it isn't in the house it still may not be a line leak—9 of the 125 complaints above were traced to other things — street cars, telegraph lines, etc.

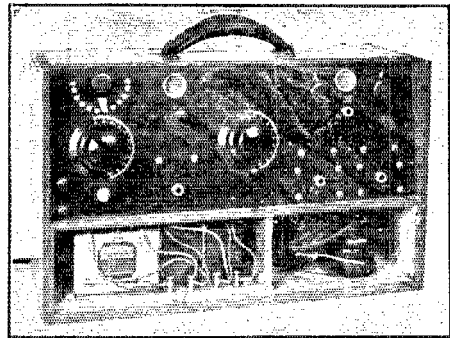
### The Real Line Leaks

If you are sure that the racket-factory isn't in the home, are pretty sure that it isn't the "plop-plop-plop" of passing trolley cars, then maybe it really is a power-line trouble. Now the Generating and Distributing company gets into the picture. An indignant customer calls and says that the power company is manufacturing a fiendish noise and must stop it at once. He does not know where the noise is, how many miles from him it may be located, not even in which *direction* the thing is from him. He knows only one thing—it **MUST STOP AT ONCE.**



### The Trouble Shooter

Then it's up to the radio trouble shooter. He cranks the Ford, puts the radio receiver



The Hartford set showing battery and fone compartment. The fone compartment also contains pliers, screwdriver, tape and a flashlight. The set complete weighs 30 pounds, measures 19" x 12" x 7½" and is amply sturdy. The loop measures 21½" along the wooden diagonals and there are 17 turns. The circuit is a perfectly straightforward one, a regenerative detector with two stages of audio-frequency amplification. This has been found to be a more reliable arrangement than the more complex circuits. The supposedly fragile UV-199 tubes stand up for months at a time.

aboard and goes to the neighborhood where the most noise reports have been arising. Then he goes up one street and down the next, listening for the place where the

noise is loudest. If the power doesn't go off and the leak keeps on leaking he will find it 9 times out of ten. Then he reports to the repair crew and moves on to the next complaint. The repair crew gets out and fixes the break.

It is fast work—but even this does not

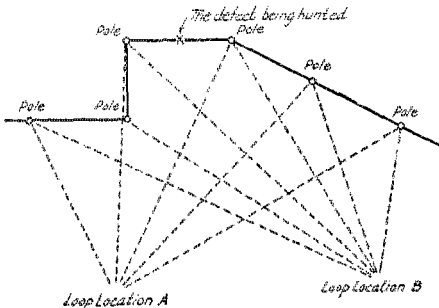
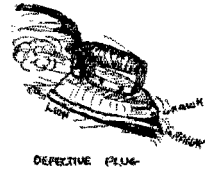


FIG. 1 A COMMON FAILING OF THE RADIO COMPASS THE DOTTED LINES ARE LOOP "LINES OF SIGHT"

dyne to a plain little set with a detector and a single stage of audio amplification. There are sets with loops and sets with antennas, but mainly the loop seems to be the favorite. This isn't because the loop is used for compass work—most of the trouble shooters seem to agree that the loop is useless as a compass, serving only to give the senseless results indicated in Fig. 1. Occasionally though the compass will work and then it does save time. Meanwhile it is compact and always the same if it was decently built.



There seems to be a fairly general agreement that too sensitive a set is worse than useless, therefore the tendency is toward simple sets with few tubes. Good representative sets of this sort are shown in our photographs.

The Things That Are Found

Every one will at first think of arcing grounds, bad joints and swinging contacts between two wires or a wire and ground. These things are found occasionally. The

suit the radio men who did the complaining. They can't understand why it wasn't all done in 36 minutes by the Ansonia clock—why couldn't the company drop all the thousand details of a business reaching almost every person in town, drop all these things and come running to fix one defective joint that wasn't interrupting service, wasn't endangering anyone—but was simply disturbing the amusement of a few dozen people. It is ridiculous—yet that's what the generating company is up against. In spite of this wholly unfair public attitude the companies are almost without exception doing everything that can be thought of, are employing men solely to run down these things and—are making money thereby. That's the pleasant part, it pays to make friends of the public (even when that is inclined to snap at the company) and it pays to run down little leaks by radio before they become bad enough to attract attention to themselves in other ways.



The Trouble Man's Tools

So much for the background; now for the way the thing is done. In the splendid report issued on "Radio Interference" by the National Electric Light Association all manner of sets are shown as used by different power companies. There is everything from a mahogany cased superhetero-

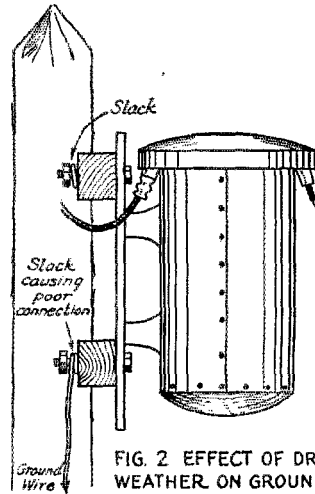
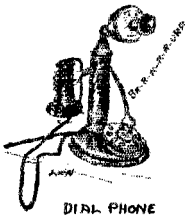


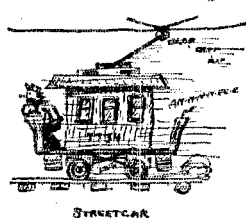
FIG. 2 EFFECT OF DRY WEATHER ON GROUND CONNECTION AT CROSS-ARM

Arcing From Transformer Case to ground wire. Several cases of this kind are reported by R. W. Shoemaker, Superintendent of the Electrical Department of the Turlock Irrigation District, Turlock, California. The line operates at 11,000 volts.

radio trouble shooter is more likely to find less visible things: loose transformer fuses, defective transformer bushings, a loose transformer-case grounding wire, a defect inside a pole transformer or manhole transformer—or a vibrating charger or a fan

motor right in the room from which the complaint came.

The high-tension line is usually very well behaved; certainly up to the time when the insulators are beginning to "age" badly.



There are notable exceptions to this, perhaps the worst being the famous New York - Westchester and Boston electric line (which gets as far as Westchester) which makes life miserable for a goodly part of

the Bronx on rainy evenings. There may be other lines that create fully as much "rookus" but they don't do it in such thickly populated neighborhoods.

When a bad defect does develop on a high-tension line the effects are usually very severe and extensive as the R. F. energy created by the arcing discharge travels along the line and is radiated off as it goes, especially when it comes to an insulator or any other irregularity in the line. Mr. Owen Millar of Reward, California, reports one case that was found 125 miles from the point at which interference was first heard.

Mainly though the noises start in the lines of moderate voltage, those below 2400 volts. These lines are more complex. It is harder to maintain them carefully and minor difficulties can develop unobserved. When anything does develop it is heard at once for such lines are invariably surrounded by radio receivers.

### The Household Appliance

Although it has been said in several ways, one more repetition will be attempted—*look first at the electric devices right in the home.* A "violet ray" machine will raise Cain for half a mile around and should never be used in the evening. An electric fan with brushes makes a merry mess of the ether for a few yards around and its big brother the vacuum cleaner is rather worse.

A defective socket will raise incredible noises while the lamp in it seems to be burning all right.

The well-known warming pad with its chattering thermostat frequently keeps up its noise for weeks before detected.

The battery charger and defective plug on the flatiron out in the kitchen also escape un-noted.

Therefore again—*start by pulling the main switch for the house.* If the noise does not stop then call in someone who can read radio telegraphy. If he assures you that it isn't a radio station then it's time to call the light company, remember

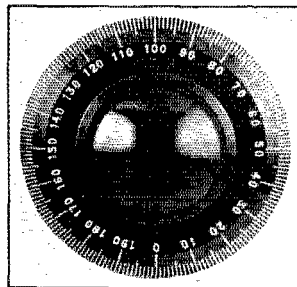
ing that they are human and deserve pleasant treatment, also that there is no industry which more prides itself in doing the utmost to improve its work in every way.

### Acknowledgment

Much of the material for this article has been contributed by Mr. J. A. Mitchell of the Hartford Electric Light Co. We are also indebted to Messrs R. H. Wohlford (American Gas and Electric Co., New York) and F. C. Manson of the Indiana and Michigan Electric Co. as well as Mr. R. W. Shoemaker, Electrical Department, Turlock Irrigation District, Turlock, California. In particular there should be mentioned the courtesy of Mr. R. W. Lovell of the National Electric Light Association from whom we received the report of the Radio Interference Committee. This report is so excellent and so complete that any reader of QST will find it very greatly worth the 60c asked for a copy. The address is 29 West 39th Street, New York City.

### A 360° Vernier Dial

FOR use with the Quam, Remler and other condensers requiring a dial graduated in a complete circle, the National Company have brought out their popular Velvet Vernier dial with 200 divisions occupying 360 degrees of the dial. The vernier movement is similar to the regular 180 de-



gree Velvet Vernier control. In addition to use on the above mentioned condensers, this new dial should find use in a variety of radio appliances which require a vernier operating throughout one complete revolution. The dial is 4 inches in diameter and the knob is large enough to comfortably grip and hold.

### Strays

When 8DDU was reconstructing his antenna and counterpoise a neighbor remarked, "I see you have two aerials, one for the high waves and one for the low waves!"

# Designing the Secondary Coil

A Simple Chart for Measuring Inductance and Wavelength

By G. H. Burchill\*

**L**ABORATORY accuracy is not required when we figure in advance the physical dimensions and wire sizes of a coil which is to be used as the secondary of a receiving tuner. We usually have enough leeway between theoretical design and practical construction to make it perfectly feasible to use a calculating chart to determine the constants of our secondary coil. By means of the chart shown, the inductance of a coil whose length (actual linear space occupied by the wire itself) and diameter is known can be determined almost instantaneously. The wavelength at which the coil will be resonant with any of five capacities in parallel to the coil can also be readily determined from the chart, or the correct length of winding in a coil (whose diameter and wire size is known) to be used with any of the usual size variable condensers to cover the broadcast wavelength band can be accurately approximated very rapidly. This chart assumes the use of wire with *double-cotton-covered insulation*, each turn of wire being drawn tightly against its adjacent turn. With other types of insulation the spacing between turns will vary and the chart will not hold good.

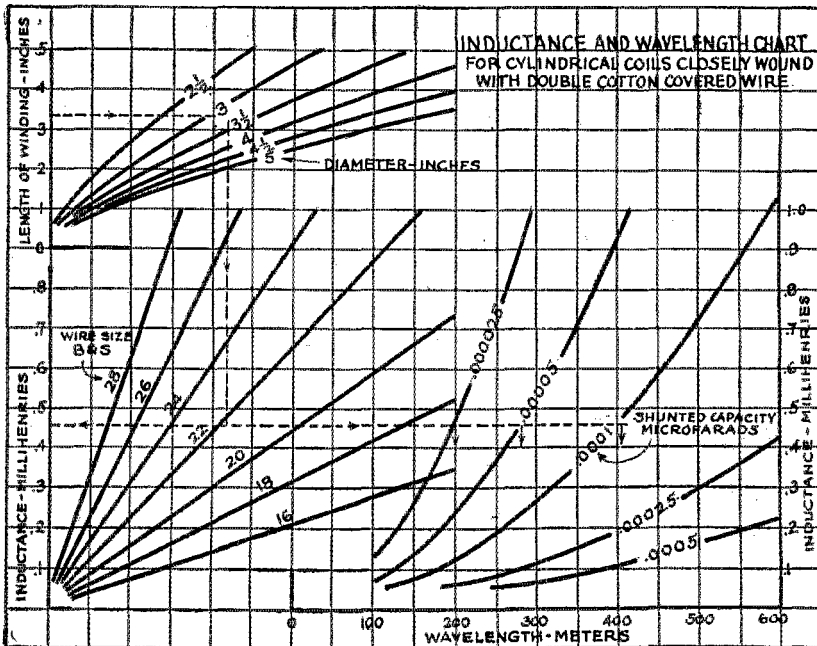
the wavelength for which it is suitable it is necessary to know the length and diameter of the winding and the size of wire. Locate the  $\dots$  on the upper left-hand scale and follow the horizontal line through it to meet the curve which corresponds to the diameter of the coil. From this point run vertically downward to meet the line marked with the size of wire used. Opposite this point, on the lower left hand scale, read the inductance of the coil. The wavelength to which the coil will tune with any value of parallel capacity is found by following the horizontal line through this point to the right to intersect the curve corresponding to the given capacity, the corresponding wavelength being read directly below this intersection on the bottom scale.

The dotted line illustrates the use of the chart to find the characteristics of a coil 3.4 inches long, 3 inches in diameter and wound with No. 22 D.C.C. wire. The inductance read on the lower left hand scale is .46 millihenries and the wavelength with a .0001  $\mu$ f.-shunt condenser is about 405 meters as determined by the lower right hand set of curves.

The minimum capacity of a receiver using a 11 plate condenser is about .000025  $\mu$ f. (25  $\mu$ f.d.) and this curve on the chart may be used to determine the lowest wave which

### How to Use the Chart

To determine the inductance of a coil and



\* Alternating Current Engineering Dept., Canadian General Electric Co., Peterborough, Ont., Can.

can be reached with any of the coils. It is well, however, to operate with a little more capacity than this in shunt and the .00005  $\mu$ f.d. curve should therefore be used to find the minimum working wavelength. Similarly, the .00025  $\mu$ f.d. curve gives the highest wavelength that can be reached (with the average 11 plate condenser) and the horizontal distance between these two curves may be taken as the working range of the coil under consideration. The range of the coil mentioned above is from 290 meters to something over 600 meters.

To design a coil for a certain wavelength range proceed as follows: locate the lowest wavelength required on the wavelength scale, follow the vertical line through it to meet the .00005  $\mu$ f.d. curve and read the inductance opposite on the right hand scale. Check this value of inductance by using the curve corresponding to the maximum value of your condenser to show that the highest wavelength desired can be reached. If it cannot it will be necessary to use a larger condenser or interchangeable coils. When the value of the inductance has been determined follow the horizontal line through it to the curve for the size of wire to be used, upward to a suitable diameter of winding and horizontally to the left to find the length of the winding.

With a little practice it may be found convenient to work from the wavelength to the size of coil required without reading the value of the inductance, this being only an intermediate step which it is possible to omit. For example: Find the length to which a 4 inch coil must be wound with No. 20 D.C.C. in order to tune to 300 meters with a .0001  $\mu$ f.d. condenser in shunt. Locate 300 on the wavelength scale, follow the vertical through it to meet the curve marked .0001, then horizontally to the line marked 20, vertically to the 4 inch diameter line and lastly horizontally to the left to the length required—2.1 inches. Simple, isn't it?

## The Hoosier State Convention (Central Division)

**N**O one who attended the 2nd Annual Convention of the Hoosier State Amateurs will deny that the reception given the visiting "Hams" was very warm—the temperature average 96 during the two days—and the cordiality of the "native" was of the best.

Under the efficient management of the A.D.M., D. J. Angus, and that of the Chairman, A. S. Burns, the convention opened promptly and the register soon showed visitors from Kentucky, West Virginia, Ohio, Michigan, Illinois, California and, of course, a large delegation from Indiana.

The fact that the State Commission had an injunction against all busses did not hinder the committee in charge of "trips"

as was shown when a big truck pulled in front of the Hotel Severin promptly at 2:30 p. m., and with the cry of "all aboard" it soon was filled to overflow. The first stop was made at the plant of the Allied Magnet Wire Co., and every one under the guidance of several good guides was given an opportunity to see how magnet wire is made. The next stop was at the Lenore Substation of the Central Indiana Power Co., where our reception was most cordial. At this place every one was given an opportunity to see "Wired Wireless" in operation, and the completeness of the system cannot be appreciated without such a visit and expressions of wonderment and pleasure was heard from all sides. The Broadcasting Station WFBM operated by the same company and in the same building was also visited;—for a remote control station it appears to be one of the best.

After a bite to eat the evening meeting was opened with a good address by Prof. A. M. Wilson of the University of Cincinnati. Mr. John H. Miller, Chief Engineer, Jewell Electrical Instrument Co., who has done so much in the developing meters for our use, again showed himself our good friend by coming from Chicago to lecture on the proper uses of meters. A most interesting address was given by Mr. P. D. Scott of the A. T. & T. Co., on "Transmission of Pictures" over telephone lines, and their kindness in distributing actual photographs of such transmission was much appreciated.

Saturday the 11th opened bright and early with Radio Inspector Turner on the job, and quite a number passed the examination successfully for both commercial and amateur tickets.

The afternoon was spent in listening to Treasurer Hebert, from A. R. R. L. Headquarters, and as usual he told us enough about our League to make us feel proud of being members. Mr. E. T. Flewelling also gave us a good talk on "Receivers," being followed by an old amateur in the person of Fred Marco, 9ZA, who is always interesting with his discussions.

The closing event was the banquet, and it was quite a departure from most affairs of the kind in that there were no speakers, thanks be, but interesting, nevertheless, by the time used for such purposes in distributing the prizes won at the different contests. A little skit was sprung at the last moment which made everybody laugh.

Our thanks to the prize donors—we wish we could name them all here but there were too many of them—and to Angus and the Indianapolis Radio Club for their successful efforts.

Look out for next year "gang". The South Bend fellows will have it.

—A. A. H.



# Adding Punch to Your Neutrodyne

By A. L. Budlong\*

**I**N the original article on the Hazeltine neutrodyne published in the April, 1923, issue of *QST*, the circuits were shown for the straight neutrodyne amplifier and non-regenerative detector, shown in Fig. 1, and also a neutrodyne with regenerative detector, as shown in Fig. 2.

Of the two systems, the one in Fig. 2 will give noticeably greater signal strength under most conditions. The reason is this: When we neutralize the R.F. amplifier tubes, the adjustment is made to keep the tubes some distance below the oscillation point. This means that the greatest possible signal strength is not being obtained because greatest sensitivity maintains when the tubes are just on the edge of oscillation. On the other hand, with a regenerative detector, we can pull the system right

three dials, and go through the agonizing indecision of wondering which two of the three you will work together, and which hand is to be used for the third one later.

## Adding the Punch

*Method No. 1* is the one shown in Fig. 2,

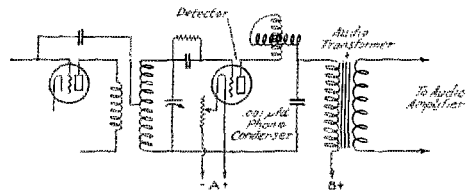
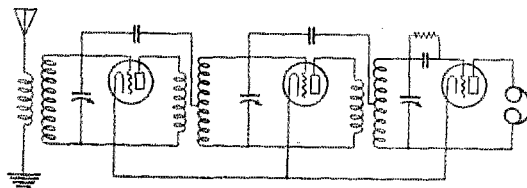


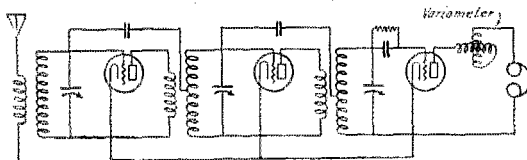
FIG 3

whereby we break the detector plate circuit and insert a variometer for obtaining regeneration. When you do this, it is advisable to put a .001 microfarad fixed phone condenser across the phones or audio transformer primary, as shown in Fig. 3. Many people will not want to tear their sets apart, or add instruments, so we will resort to a simpler method, shown in Fig. 4. This is a dead cinch. All you do is to take the neutralizing condenser off the second stage of amplification. This allows this stage to operate up to, and even in oscillation, but does not do any harm, since the first neutralized stage prevents radiation.



Neutrodyne without detector regeneration.

FIG. 1



Neutrodyne with detector regeneration

FIG. 2

up to the point of oscillation, thereby getting the most out of the receiver.

The commercial styles of present-day neutrodynes do not use the regenerative detector system. The reason for this is probably that such an addition means another control. However, since practically all of the neutrodynes (there are a few notable exceptions) have three controls, making one more control than the normal person has hands, I don't see why four controls are any worse. It's easier, as a matter of fact, to work on two pairs of dials, shifting both hands, than it is to work on

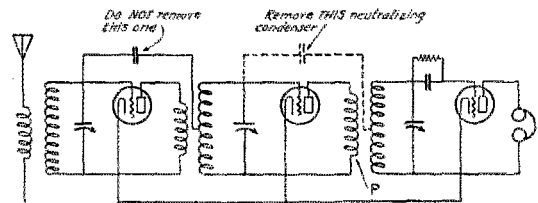


FIG 4

This method is extremely satisfactory, enabling a noticeable gain in signal strength to be obtained. Not only that, but you have not added any controls, and furthermore, haven't had to tear the set apart or crowd other instruments into the set.

\* Asst. Traffic Mgr., A.R.R.L.

So far as I know, there is only one disadvantage. You can't log the dial settings as you used to. With the method shown in Fig. 2, the settings of the first two dials may be logged, but the third will be off. With the method in Fig. 4, the setting of the first dial may be logged, and perhaps the second, but not the third.

It may be that, after removing the neutralizing condenser of the second stage, as shown in Fig. 4, you will still not be able to get oscillation with the third dial. This means one thing: Your R.F. transformers are not what they should be, and are not giving you full amplification. The trouble is nine times out of ten that the transformer primary has too few turns. Two remedies are possible. One is to re-wind the primary ("P" in Fig. 4), putting on 20 or 30 turns of wire; the other is to leave the transformer alone, and add a plate variometer in the detector as shown in Fig. 3. You do not need to put the neutralizing condenser for the 2nd stage back in place, as the fact that the set would not oscillate without it proves that it was just camouflage in the first place.

## Misplaced Power

By Malcolm H. Romberg

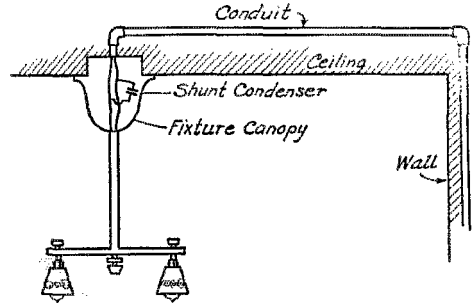
WHEN I became tired of 200 meter stuff some months ago I decided to go down on 80 meters. After reading a lot of QST's I was all ready to begin. After tuning and trying I finally got the tube running somewhat cooler than the sun. Of course I proceeded to call at once. After the sixth or seventh call somebody tapped on the door. I had to drop everything and answer. It was the woman who lived on the third floor. She said that her lights were going up to half brilliancy every once in awhile although the switch was off, and wouldn't I please come up stairs and take a look. I did it, but the lights were acting just as they are supposed to. I told her that she must have been dreaming, but that if they did it again she was to call me. Then I came down and started to call where I had left off. "Tap, tap, tap" at the door again. This time I had her hold the key down, and sure enough I was doing the lighting of the lights for her with my radio transmitter.

Now the set uses a single UV-203A with 1100 volts on the plate. The antenna and counterpoise were the same ones that I had used on 200 meters, but nothing in particular had ever happened to the lights. What was I to do?

Some of the gang suggested that I go down to 40 meters, but I didn't feel that way about it. What was the sense of going down to 40 meters as long as I had

a perfectly good mystery unanswered at 80 meters.

It was easy enough to see why the thing was happening. My counterpoise is about 4 feet above the roof of the three story building and the antenna is 50 feet above that. Consequently the wiring on the third floor was in the counterpoise field, and there didn't seem to be much of anything



to do excepting to move the house out from underneath the counterpoise. I did not want to ground the lighting line because that would probably mean that the radio frequency power would go to ground without improving things particularly. Besides the wiring is run in conduits and the conduit is grounded now.

The fixture that was most enthusiastic had five 25-watt lamps in it. I thought of a brilliant idea; I would tune this fixture to some other wavelength. At least at that time I thought that was what I was doing. I secured three small 1,000-micromicrofarad condensers, put them in parallel and connected them across the line. The wavelength of the line went to 452 meters where it did no harm.

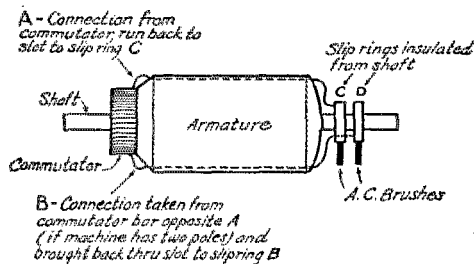
Now unfortunately people don't want funny things hanging from the light fixtures to satisfy some nut with a transmitter. Therefore I got some very small condensers and taped them up compactly so that I could put them up under the canopy of the fixture where nobody could see them. Since then I have bought a couple of dozen small mica condensers of 10,000 micromicrofarads capacity each and have shunted every light fixture in the house.

Perhaps some of you may think that all of this performance required a very large antenna current, but it didn't. I have a 5-ampere antenna meter and with the aid of a large magnifying glass I know for certain that it does not move. I have tried a 14-volt Christmas tree light in series with the antenna and it lights fairly brightly, therefore I suspect that there are others who don't have a great deal of power but who do have some trouble. That's why I am writing this to help them.

# Making a Synchronous Converter

By W. H. Raring, 8LH

**F**OR plate supply, the logical thing to my mind seems to be a small single phase converter. The first cost is relatively small (merely the cost of a two-pole D.C. motor of suitable voltage) and the operation simple. Almost every one has a small plate transformer or one can be easily built, as the required A.C. voltage is small. Due to competition, fractional horsepower motors have excellent characteristics and are very well built.



They will stand double voltage safely without excessive sparking. Double speed is also safe, and an 1800 R.P.M. motor can with a fair safety margin be used at 3600.

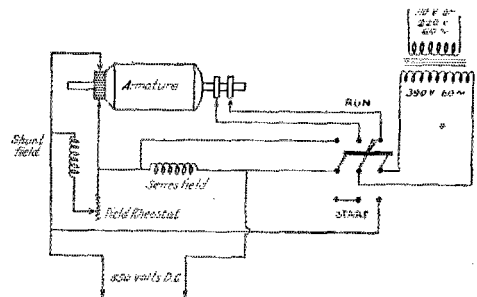
The change from a D.C. motor to a rotary converter is simple and easy. Slip rings must first be provided. A blown cartridge fuse (with the brass ends filed down to permit of insulating them from the shaft) was used at 8BRL with fine operation. It would be better for the ham to use his own judgment on these constructional details. The slip rings should be connected as shown in Fig. 1 to commutator segments as nearly as possible directly opposite each other. An unbalance here will cause a slight change in D.C. voltage and a little sparking. We advise knocking out the wedge on top of the armature coils *carefully*, placing the lead wire in and pressing the wedge back. Generally there is plenty of space for the wire.

Next examine the machine for a series field winding. If it has one, disconnect the leads and bring them out. Also bring out the shunt field leads or brush leads. The shunt field leads may now be brought out and tagged. If the machine under question is shunt wound it will be necessary to provide a series winding. Wind about 6 turns of No. 18 annunciator wire or electric fixture wire over each field coil. Connect the coils so the current will flow in *opposite* directions in every other coil. Now connect the machine as shown in Fig. 11.

When the switch is thrown to "start" the

converter will run as a series motor. Allow the machine to pick up in speed for a few seconds, then throw the switch to "run". A two pole switch could be used, but it is best to short circuit the series winding, as its field will add to the shunt field and vary the power factor a good deal under load. The machine is now running as a synchronous converter and supplying D.C. at the commutator. The voltage at no load is the transformer voltage divided by 0.707.

If an A.C. ammeter is obtainable place it in series with the transformer *primary*, and by placing a rheostat in series with the shunt field the current may be varied until a minimum is reached. This is the point of highest power factor and will be near unity. The rheostat will vary in motors according to the shunt field current, but several lamps can be used in series and parallel arrangement to give best results. We are interested in power factor for two reasons. First, a low power factor will mean a high transformer current and heating. Second; high armature current will mean armature-heating and low voltage (D.C.) output. Some small converters run best with no field current. It should be noted that if we reach minimum armature



alternating current input by increasing the shunt field *resistance* there will be a point where current will again rise.

Do not try to get 1000 volts out of a converter using a 230 volt D.C. motor. If 1000 volts is desired, use a 550 volt D.C. street car ventilating motor. These motors can often be "picked up" cheaply and will stand 1100 volts D.C. output continuously.

**Strays**

Mosul, Turkey, uses the call HH1 which has been mistaken for gHH1 because the English intermediate "g" is used.



It is not difficult to calculate regulation.

As a beginning we can give the rule that if the resistance drop (the so-called IR drop) in the windings is 1% then the copper loss will also be 1%. A more exact statement is: The resistance drop in the windings, both primary and secondary, is the same percent of the full load voltage as the IR is of the volt-amperes output.

#### The Windings

The resistance of transformer-windings is usually calculated from elementary

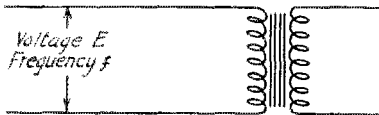


FIG. 3

principles in which it is considered that the resistance of a piece of wire one foot long with a cross section of one square mil has a resistance of 8.5 ohms. (See Fig. 2). The resistance of the winding is then determined by multiplying the length in feet by 8.5 and dividing by the cross sections of the wire in square mils or 1,000,000 times the cross section in square inches. The length of wire is determined by calculating the average length of one turn from the geometrical proportions of the transformer, multiplying this length by the total number of turns. The copper loss in each winding is then the square of the current in that winding times the resistance. The total copper loss in the transformer is the sum of the copper losses in both windings.

We now have the copper loss, which we need in calculating efficiency. Express-

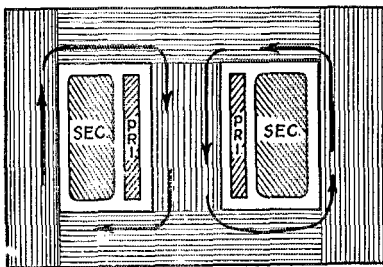


FIG. 4 THE MAIN FLUX

ing the copper loss as a percentage of the total volt-amperes output gives us the IR drop in percent of full load voltage, which is the figure we need in calculating regulation.

#### Exciting Current and Core Loss

Both of these characteristics are func-

tions of the flux density in the core. The exciting current never can be calculated with great accuracy. In designing it is found from curves based on experience, but there is always a wide variation from the average because the core joints are not uniform.

Core loss is determined from curves showing watts-per-pound plotted against flux density.

Flux density is calculated from the primary voltage, number of turns in the primary winding, and the frequency, and from the dimensions of the core in accordance with the following formulas:

$$\phi = \frac{E (10^8)}{4.44fN} \quad \text{and} \quad B = \frac{\phi}{A}$$

Where  $\phi$  is the total flux flowing in the core,  $E$  is the primary voltage,  $f$  the frequency,  $N$  the number of primary turns,

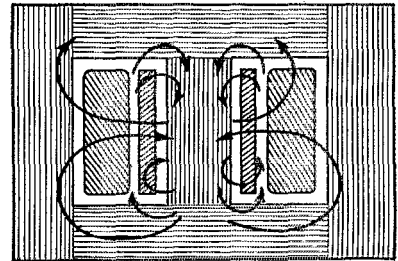


FIG. 5 ROUGH SKETCH TO SHOW NATURE OF "LEAKAGE FLUX" OR "MAGNETIC LEAKAGE." THIS LEAKAGE CAUSES BAD REGULATION.

$B$  the flux density in the core, and  $A$  the cross section of the core. These formulas assume sine waves, and the voltage is expressed in R.M.S. value, while the flux and flux density are expressed in peak values. Dimensions are in inches and square inches.

To explain the use of these formulas we will consider for a moment the general theory of the transformer.

Consider a transformer, as in Fig. 3, with the primary coil connected to a line of alternating voltage  $E$  and frequency  $f$ . Now the first tendency when the connection is made is for the primary coil to receive current from the line. This current causes a flux to build up in the core. The building up of the flux induces a voltage in the coils of the transformer in both the primary and the secondary. The condition of balance will be obtained in each coil. The direction of this induced voltage in the primary is such as to oppose the flow of current from the line. The condition of balance will be obtained when the difference between the voltage

induced in the primary and the line voltage causes just enough current to flow to create the flux which produces the induced voltage, which is called the "counter-E.M.F.". In a practical transformer the difference in voltage required to maintain the flux is so small as to be entirely negligible. We therefore consider that the counter-E.M.F. is equal to the line voltage and so the flux is dependent on the line voltage in our formulas, although actually what we mean is it is determined by the counter-E.M.F. generated in the primary. The formulas given above may be transposed to solve directly for flux.

$$E = 4.44fN \phi \quad (10^{-8})$$

I should say that if any amateur radio

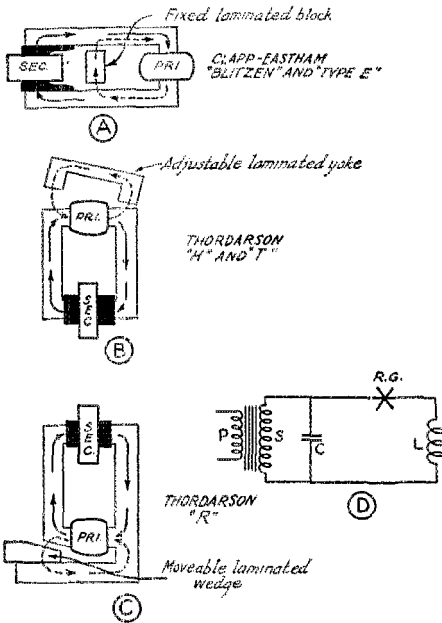


Fig. 6

Spark transformers, purposely built to have very high leakage and bad regulation.

The reason for wanting bad regulation is that it is necessary for the secondary voltage to drop as badly as possible whenever a spark jumps across the spark gap R.G. in Fig. 6D. This spark is a short-circuit across the transformer and if the secondary voltage did not fall a heavy arc would be drawn, heating the transformer and burning the spark gap.

In Fig. 6A, 6B and 6C the magnetic flux ordinarily follows the black arrows but when the secondary is short-circuited by a spark the flux shifts over to the other path shown by the dotted arrows. This removes the flux from the secondary and the secondary voltage drops sharply. When the spark has cleared away the flux goes back and the secondary voltage rises.

enthusiast attempts to build himself a transformer he might as well forget the core loss and exciting current, because it would be nearly impossible to obtain data on the particular kind of core steel he

might obtain, but he would be safe if he kept the core flux sufficiently low, that is, value  $B$  in the above formula should not exceed 70,000.

### Leakage Reactance

There are various ways of describing leakage reactance in a transformer, but the

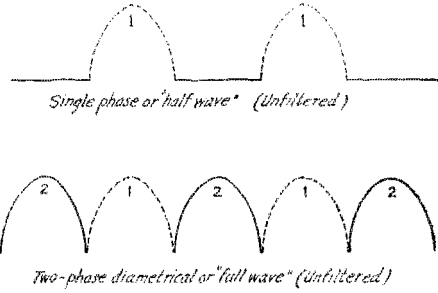


FIG. 7

simplest way is to consider each coil as a separate reactance coil.

In Figure 4 you see certain lines of flux around both coils. These have nothing to do with leakage reactance, because they affect primary and secondary alike, inducing the same number of volts in each turn of both windings. There are, however, as in Fig. 5, certain lines of flux which pass between the coils or through part of one of the coils so that they do not surround all turns of both coils. These are the lines of flux responsible for the so-called leakage reactance. A correct picture of the leakage reactance of the transformer is obtained if you consider the primary coil alone as a separate reactor or choke coil with a magnetic path represented by all the leakage paths which can surround the coil (or a portion of it); and then consider the secondary as a separate choke coil in the same way.

Any amateur designing a transformer for his own use will do best not to calculate reactance but to keep in mind the things that will help him minimize the reactance. These things are keeping the paths of the leakage flux long and the cross sections of these leakage paths small; keeping the number of turns in the primary and secondary relatively small.

It is seen from the formulas which I have given that after choosing the flux density we can either put in a big core with a few turns or a small core with many turns. The big core with the few turns results in the lowest reactance and best regulation. There is, of course, a limit to cutting down on the number of turns because beyond a certain point it is bound to result in unnecessarily high cost and prohibitively high core loss and exciting current.

The final design is the result of balancing all of these various factors.



### Transformers for Rectifiers

In transformers for full wave rectification (whether for single phase or three phase) the secondary winding is always in two sections, and when one section is

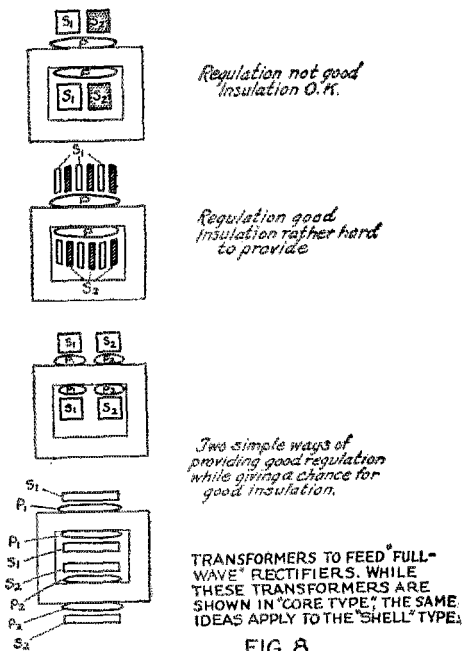


FIG. 8

delivering current the other is idle. See Fig. 7. It, therefore, always happens if the coils are arranged as shown in Fig. 8 that the portion of the secondary which is active at any instant only covers half of the primary. You can see that by leaving out one-half of this secondary coil you have a bad arrangement so far as reactance is concerned, because there are lots of opportunities for leakage flux to surround certain portions of the primary. The remedy may be either one of the arrangements shown in Fig. 8.

### Strays

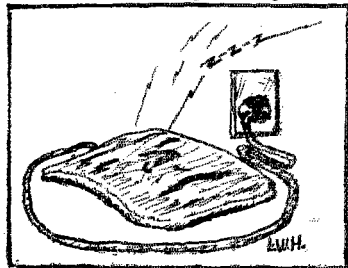
SACM reports communication with Argentinian BF3. BF3 is located at Rawson, 700 miles down the coast, south, from Buenos Aires.

Brazilian ZSP reports that rather liberal radio regulations recently became effective in his country. Five wave bands were assigned; 100-150, 75-80, 40-45, 18-24, and 4-6 meters. The power limit is 500 watts. ZSP reports his wave as 67 meters with a couple of fifty-watters feeding the antenna. The QRA is L. Y. Jones, Jr., Rua Frei Caneca 22, Sao Paulo, Brazil, S. A.

### Interference From Electric Heating Pads

WHEN the electric heating pad was invented and first placed on the market, little did anyone believe that some day it would be a source of trouble to people all over the neighborhood! However the fact remains that the ordinary everyday variety of heating pad makes the best little form of radio transmitter there ever was. When you have run out of possible sources of interference when trying to run down that noise which is coming in on your aerial, just quietly slip around to all your friends in your neighborhood and find who has an electric pad in use. Nine times out of ten we will bet that when the pad is turned off the interference ceases.

You have noticed, perhaps, that when an electric light is turned on near your receiver you hear a click in the receiver head-set. This is due to the miniature spark which is formed as the circuit is "made". This click will be much more pronounced if the circuit is broken—that is the light turned off. In an electric heater pad there is a thermal regulating device which automatically breaks the circuit when the temperature of the pad has reached a certain point. Quite obviously this regulating device is necessary. No one wants a pad that is red hot! When the current is cut off the pad, by means of this automatic switching arrangement in the pad, a click is heard in the receiving sets all over the neighborhood. This click is more vicious than the electric light switch click, because the pad carries more current than the light, and the spark at the switch contacts on the pad is greater. This



would be well and good. We all could put up with an occasional click, but the main trouble is that when the current is cut off by the automatic switch the contacts of the switch will vibrate and the current will be rapidly turned on and cut off and the spark at the contacts will turn into a miniature "arc" such as is visible at the contacts of an ordinary bell buzzer. It is this arc that causes loud continual buzzes in receivers.

Some day all electric pads will be sold with a statement attached which certifies to their non-radio radiating ability. They should radiate heat and not radio waves!

—J. M. C.

# A Simple Audio Oscillator

By William S. Halstead\*

A SIMPLE audio frequency oscillator may be of some value to those readers of *QST* who are members of radio clubs or other organizations in which code practice is given. It may also be used for measurement work.

The one tube "squealer" will operate about a dozen phones, or any loud speakers. By adding a stage of audio frequency amplification an extremely loud signal may be generated.

The tube employed should be of the "hard" variety. A 201-A, or any other tube with a high degree of vacuum, functions perfectly in this circuit.

The oscillator described was used for two months on the code practice table at Camp Walkkill, New Paltz, N. Y., and proved to be much better, in every respect, than the

an exact duplicate of a C.W. signal; there are no annoying mechanical "make" and "break" clicks as with a buzzer. The latter feature is especially valuable if the device is used with an omnigraph or other automatic transmitter. Lastly, the tone is very pleasing to the ear and code students find it much easier to increase their receiving speed when this type of oscillator is used.

The device also has interesting applications in many other fields where a buzzer is ordinarily employed.

I trust that the information will be of some service.

## ELECTION NOTICES

To all A.R.R.L. Members Residing in the Atlantic, Dakota, Delta, Midwest, Pacific (including Hawaii) and Southeastern (including Cuba, Porto Rico and the Isle of Pines) Divisions:

1. You are hereby notified that an election for an A.R.R.L. Director, for the term 1926-1927, is about to be held in each of the above Divisions, in accordance with the Constitution. Your attention is invited to Sec. 1 of Article IV of the Constitution, providing for the government of A.R.R.L. affairs by a Board of Directors; Sec. 2 of Article IV, defining their eligibility; and By-Laws 12, 13, 14 and 15, providing for their nomination and election.

2. The election will take place during the month of November, on ballots which will be mailed from Headquarters in the first week of that month. The ballots for each Division will list the names of all eligible candidates nominated for the position by A.R.R.L. members residing in that Division.

3. Nominating petitions are hereby solicited. Ten or more A.R.R.L. members living in any Division have the privilege of nominating any member of the League in their Division as a candidate for Director. The following form for nomination is suggested:

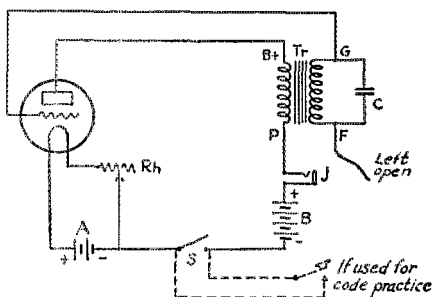
(Place and date)

Executive Committee,  
A.R.R.L. Headquarters,  
Hartford, Conn.

Gentlemen:

We, the undersigned members of the A.R.R.L. residing in the ..... Division, hereby nominate ..... of ..... as a candidate for Director from this Division for 1926-1927.

(Signatures)



A SIMPLE AUDIO OSCILLATOR

- A—Filament battery, be sure the polarity is right.
- Rh—Filament rheostat. This must have fine adjustment such as provided by a Bradleystat.
- Tr—Audio-frequency transformer. The All-American (Rauland) 10/1 is good.
- B—90-volt B battery.
- S—Switch. If the oscillator is used for code practice the switch is replaced by a key or omnigraph.
- J—Jack. A loudspeaker, a dozen headsets or a wheatstone bridge may be plugged in.

best buzzer obtainable. As the campers did not favor the idea of wearing hot phones during the summer months a loud speaker was substituted with very satisfactory results.

The advantages of the oscillator described are evident: the pitch may be adjusted by simply varying the filament current a trifle, and once the desired tone is obtained it will remain constant if the batteries do. The intensity of the signal may be reduced or increased at will by varying the plate voltage, or if a very loud signal is desired it may be attained by adding a stage of audio frequency amplification; the tone is

\* President, Haverford College Radio Club, Haverford, Pa.

The signers must be League members in good standing. The nominee must be a League member in good standing, and must be without commercial radio connections. His complete name and address should be given. All such petitions must be filed at the headquarters office of the League in Hartford, Conn., by noon of the first day of November, 1925. There is no limit on the number of petitions that may be filed, but no member shall append his signature to more than one such petition.

4. Present Directors from these Divisions are as follows: Atlantic, Dr. Geo. L. Bidwell, Washington; Dakota, Prof. C. M. Jansky, Jr., Minneapolis; Delta, Benj. F. Painter, Chattanooga; Midwest, L. Boyd Laizure, Kansas City; Pacific, Allen H. Babcock, San Francisco; Southeastern, Harry F. Dobbs, Atlanta.

5. This is your opportunity to put the man of your choice in office as the representative of your Division. Members are urged to take the initiative and file nominating petitions immediately.

*For the Board:*

K. B. WARNER, Secretary.

Hartford, Conn., 25 July, 1925.

**To All A.R.R.L. Members Residing in the Dominion of Canada, Newfoundland, and Labrador:**

1. You are hereby notified that an election for an A.R.R.L. Canadian General Manager for the term 1926-1927 is about to be held, in accordance with the Constitution. Your attention is invited to By-Law 26, defining the policy of the League in Canada; Sec. 1 of Article IV of the Constitution, providing for the government of A.R.R.L. affairs by a Board of Directors, of which the Canadian General Manager is a member; Sec. 2 of Article IV, defining the eligibility of Directors; By-Laws 23 and 24, specifying the duties and authority of the Canadian General Manager; and By-Laws 20, 21 and 22, providing for his nomination and election.

2. The election will take place during the month of November, on ballots which will be mailed from Headquarters in the first week of that month. The ballot will list the names of all eligible candidates nominated for the position by League members residing in Canada, Newfoundland and Labrador.

3. Nominating petitions are hereby solicited. Ten or more A.R.R.L. members living in the Dominion of Canada, Newfoundland or Labrador, have the privilege of nominating any Canadian member of the League as a candidate for Canadian General Manager. The following form for nomination is suggested:

*(Place and date)*

*Executive Committee,  
A.R.R.L. Headquarters,  
Hartford, Conn.*

*Gentlemen:*

*We, the undersigned members of the A.R.R.L. residing in the Dominion of Canada, Newfoundland or Labrador, hereby nominate .....*  
*of .....*  
*as a candidate for A.R.R.L. Canadian General Manager for 1926-1927.*

*(Signatures)*

The signers must be League members in good standing. The nominee must be a Canadian member of the League in good standing, and must be without commercial radio connections. His complete name and address should be given. All such petitions must be filed at the headquarters office of the League in Hartford, Conn., by noon of the first day of November, 1925. There is no limit on the number of petitions that may be filed, but no member shall append his signature to more than one such petition.

4. Mr. A. H. K. Russell of Toronto, Ont., is the present Canadian General Manager.

5. This is your opportunity to put the man of your choice in office as the Canadian member of the A.R.R.L. Board. Members are urged to take the initiative and file nominating petitions immediately.

*For the Board:*

K. B. WARNER, Secretary.

Hartford, Conn., 25 July, 1925.

**Strays**

The Scandinavian Radio Relay League has just been formed. Its debates were held by radio.

An amateur in Wisconsin masqueraded as z4KA recently as a practical joke. He caused some unnecessary trouble and confusion that resulted in the matter being brought before the Supervisor of Radio. This amateur's license was suspended as a consequence. This should be a warning to others who have used or might use a false call.

9DYW avers that Flivver grease cups can be cut into nice even brass rings for making the small cages used for leadins from counterpoise or aerial. The cups are brass and can be easily soldered to.

Belgium licenses no stations at present. For that reason all communications or QSL's should be addressed to Henrotay, T.S.F., Verviers, Belgium, no matter the station they are supposed to go to. Mr. Henrotay is President of the Belgian Radio Club.

# High Ratio and High Amplification

By Robert S. Kruse, Technical Editor

**A** LETTER just received from Mr. Melville Eastham of General Radio suggests that many of our readers do not understand why high ratio transformers (both audio and R.F.) so often fail to give high amplification.

Without attempting to cover the question in detail it may be interesting to consider a few of the possible causes for such a failure.

First of all let us consider the audio transformer. Suppose we begin by connecting one of Thordarson's 2/1 audio transformers between a pair of C301A tubes and measure the amplification (of the second tube and the transformer) at, say, 2000 cycles. In this case we are using a transformer with a very good iron core of ample size and with the windings on the same center leg of the core. Therefore the coupling is very close and we know that the ratio-of-transformation is practically the same as the ratio-of-turns, that is to say 2/1. Putting this in simpler form, if the secondary has twice as many turns as the primary then the secondary voltage will be twice the primary voltage. The transformer-and-tube combination will give us a voltage amplification that is somewhere near the amplification factor of the tube multiplied by 2/1.

Now let us remove 3/4 of the primary turns, making the ratio 8/1 instead of 2/1. When we try the circuit again the amplification will be much *less*, except perhaps at some particular frequency where it may stay almost as high as before. What has happened? How can we get *less* amplification with a *higher* ratio of turns?

Remember that we are still working with the same good iron core and that the windings are still very closely coupled. Therefore, the ratio-of-transformation is really 8 and the secondary voltage is really 8 times the primary voltage.

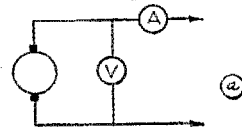
The only possible explanation is that the *primary* voltage has gone down. That, indeed, is what has happened.

The next question is, "Why has the primary voltage gone down?" To answer that question one has to go a very little ways into the theory of vacuum tubes. The easiest way of approaching the explanation is to compare the tube with an ordinary direct current generator, the thing that the high-school text books still call a "dynamo."

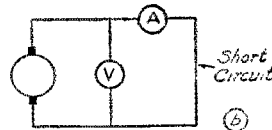
There is a general rule that the output of a direct current generator is greatest when the load resistance is equal to the machine resistance. This isn't the condition for the best *efficiency* but it is the condition for the greatest *output* and that's what we want in vacuum tubes. At first this rule sounds a bit doubtful. Perhaps it can be made to

seem a bit more reasonable by changing the load to see what will happen.

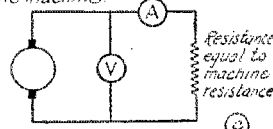
In Fig. 1a we have a generator operating with no load, in other words with full voltage but no current. Very evidently we have no output. In Figure 1b we have the same machine running on short circuit. The current is now very large but the terminal voltage is zero and again there is no output



**OPEN CIRCUIT**  
Full voltage at terminals but no current, therefore no output



**SHORT CIRCUIT**  
Very large current but no voltage at machine terminals therefore no output, although much power is being used up inside the machine.



**LOAD FOR MOST OUTPUT**  
Half the generated voltage at machine terminals, heavy current, large output.

**NOTE:** Conditions (b & c) shown above are impractical for generator operation, however for vacuum tubes we want largest possible output.

**FIG 1 VARIATION OF OUTPUT AS LOAD RESISTANCE IS CHANGED.**

altho plenty of power is being used up *inside* of the machine. Finally in Fig. 1c we have the load resistance equal to the machine resistance, which gives us the greatest possible output.

This is interesting, but what does it mean when we are talking about audio amplifiers at 2000 cycles? Simply this; the tube will put the most power into the transformer primary if the transformer is so built that its impedance (measured from the primary side) is the same as the plate impedance of the tube.

To do this requires a great many primary turns. Very well, let us put on many primary turns. As soon as we do this we lower the transformation ratio because the secondary turns stay the same. If we increase the number of secondary turns we make the whole transformer bigger and

- b—A ratio-of-turns around 3.5/1 with no amplification to speak of. (This is the commonest cheap variety this year.)  
c—A construction so badly skimped that there isn't much amplification, regardless of the ratio.

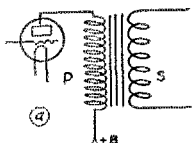
#### Picking the Good Ones

The moral is easy. Either pick a transformer with a ratio of 2/1 or perhaps 2.5/1 or else pick a big brute with a large core, many primary turns and a ratio up around 5/1 or 6/1.

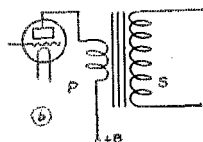
#### Radio Frequency Transformers

The same rules apply to tuned R.F. transformers such as are used in practically all broadcast sets using more than 3 tubes.

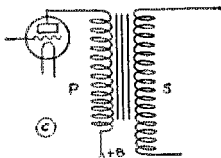
Suppose we take the neutrodyne as an example and consider the examples of Fig. 3



*Good Low-Ratio Transformer*  
Primary has many turns therefore the tube has a chance to put energy into the transformer



*Bad High-Ratio Transformer*  
with skimpy primary which does not give the tube a chance to put much energy into the transformer, therefore the high ratio is not effective



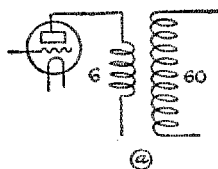
*Good High-Ratio Transformer*  
As many primary turns as in type (a) above, core large enough to permit use of many secondary turns and give high ratio. Tube can put power into the transformer and the high-ratio becomes effective

FIG. 2 AUDIO TRANSFORMERS

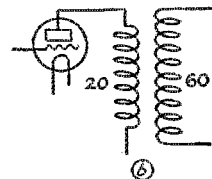
more expensive. We then have a transformer like the Rauland "Lyric" or the new type General Radio Transformer. If we do not wish to make the transformer quite so expensive we cannot make the secondary larger and we do the next best thing—leave the secondary alone and run up the number of primary turns until the ratio is 2/1. An excellently built example of this practice is the Thordarson 2/1 transformer which actually amplifies more than the 3½/1 of the same type.

Cheaply made transformers do not do any of these things, they skimp the primary turns and the size of the core and in consequence get one of three possible combinations.

- a—A ratio-of-turns around 5/1 with terrific amplification at one frequency and none elsewhere, creating terrible distortion. (Last year's cheap stuff did this.)



*Poor R.F. Transformer*  
Ratio is high but primary has too few turns and tube has no chance to put energy into the transformer. Amplification very poor



*Good R.F. Transformer*  
Ratio only 3/1 but tube has good opportunity to put energy into transformer. Much more effective than the high-ratio type above

**NOTE:** Do not take the exact number of turns too seriously. They apply pretty well to the usual R.F. transformers in broadcast receivers sold during the winter of 1924-25 but with other constructions the number of turns for the 200-600 meter range would be different

FIG. 3 R.F. TRANSFORMERS

In Fig. 3a we have a transformer with 6 primary turns and 60 secondary turns. The ratio-of-turns is far below that because of the very loose coupling of the untuned primary to the tuned secondary. This thing will amplify very poorly because the pri-

mary impedance (at wavelengths between 200 and 600) is far below the impedance of the tube.

Suppose that we increase the primary turns to 20. We now have the arrangement of Fig. 3b. The ratio-of-turns has dropped to 3/1 yet we will get considerably more amplification, partly because the primary "fits the tube" better and partly because we are now able to make the primary-secondary magnetic coupling closer. It is fair to warn the experimenter that the *capacity* coupling should not be made closer at the same time because this sort of coupling upsets the neutrodyne principle. The way out of that is to make the primary of a very small wire and wind it between the slightly spaced secondary turns, after the manner of the Grebe "Synchrophase."

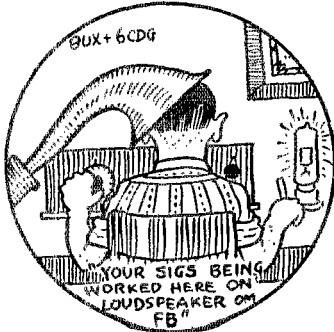
#### Regeneration

Every amplifier, either radio or audio, is regenerative unless some circuit-trick is used to make the thing anti-regenerative. This includes resistance-coupled amplifiers. Heaven knows where the notion has come from that they are *not* regenerative, for they most certainly are. They not only regenerate, they may also oscillate at any frequency from 10,000,000 cycles per second to 3 per second—the latter situation being hard to distinguish from "audio blocking" since either condition will cause the phones to make a noise like a hen announcing a new egg.

However, that's off the subject. What I started to say was that the amplification of a transformer-and-tube depend on the regeneration as well as the transformation-ratio and the tube constants. It happens that regeneration is strongest when the primary is largest, therefore the large primary gains from this effect also.

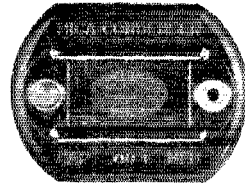
In the same way an R.F. transformer will work much more favorably if it has at least 20 primary turns—but it will have to be neutralized more carefully.

In general one can say that the audio transformer will be best if it has a very large primary, even tho the ratio be low, but that three stages will probably be more inclined to howl than would a poorer transformer.



## Good Mica Condensers

At last we can obtain mica fixed condensers which are guaranteed to be accurate within ten per cent of their rated capacity under *all* temperature and humidity conditions. These condensers are made of mica and brass ribbon moulded under high pressure in brown bakelite. The bakelite moulding completely excludes all moisture and protects the condenser from capacity changes due to pressure. One of the 250  $\mu\text{f}$  size was soaked alternately in hot and cold water for three weeks, taken out and immediately placed in the primary circuit of a 40 meter transmitter with 1 3/4 amperes flowing through it. After being used in this fashion steadily for ten minutes



nothing happened and the condenser was used as the grid condenser in an oscillating receiver. There was absolutely *no* noise and apparently the condenser was as healthy as ever.

These condensers are provided with brass bushings which are moulded into the bakelite. The bushings extend through the condenser and are tapped to take a machine screw. The connecting wires can be fastened under the screws or can be soldered directly to the brass bushings. The soldering iron will not affect the condenser at all.

They are available in capacity ranges from 50  $\mu\text{f}$  to 6,000  $\mu\text{f}$ , and at a slight additional cost they can be obtained with accuracies guaranteed to be within 2 per cent of their rated value. For ordinary work no one wants a better capacity guarantee than this. They should find immediate favor in the hands of receiving and transmitting experimenters as grid condensers, by-pass condensers for both transmitting and receiving sets, plate blocking condensers in low power transmitting sets and tuning condensers in input transformers for superheterodyne receivers where the accuracy must be fairly high.

These condensers are manufactured by the Sangamo Electric Company of Springfield, Illinois. They fill a long felt want.



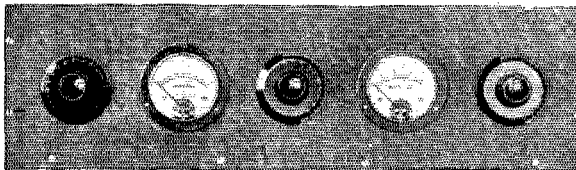
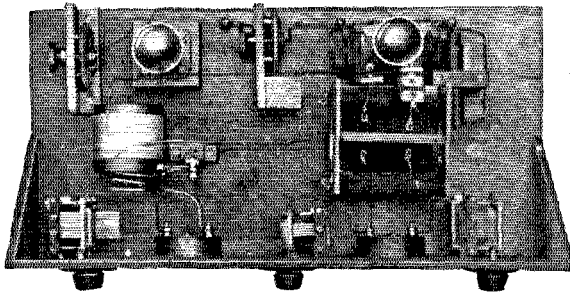
# A Power-Amplifier Transmitter for the Low Waves

By W. H. Hoffman\*

**T**HE transmitter described herewith has been designed on the same general and basic principles as the longer wave sets in government and commercial use, however, it makes use of a number of principles that have heretofore found little or no space in popular radio publications. Before pointing out a few of its high spots, a word concerning tests made in actual service will be added. It has been in operation over periods of from 1 to 6 hours daily for the last few months and has proven its capability of operating consistently day in and day out. Reliable daylight communication can be carried on to points within a radius of 250 to 300 miles from 9EK, Madison, Wisconsin, and at night time all districts have been worked as well as points in Canada.

## Circuit Arrangement

The circuit arrangement is shown in the wiring diagram and photographs where each piece of apparatus has been marked and described.



TOP AND FRONT VIEW OF THE 9EK POWER-AMPLIFIER SET

## Flexibility

The set has a number of advantages when operated as a power amplifier as shown in the wiring diagram but may be easily and quickly changed to a coupled oscillator by removing the amplifier tube from its socket and coupling the antenna coil to the oscillator inductance instead of to the amplifier plate coil.

\* Radio Laboratory of the C. F. Burgess Laboratories, Madison, Wisconsin.

## Simplicity

The oscillator circuit is of the Colpitts type and is as simple as the schematic drawing itself. The only additional apparatus required by the addition of the amplifier is the tube, its socket, filament rheostat and plate coil. It should be noted that the amplifier requires no choke coils, bi-pass condensers, "C" batteries, grid leaks nor coupling capacity. Its grid is connected directly to the grid of the oscillator tube. With this type feed, the amplifier tube has never shown a tendency to self oscillate.

## The Power Amplifier

The advantage of the power amplifier arrangement lies in its ability to maintain a steady signal even when the antenna is swinging badly. This is due to the fact that the degree of coupling between the antenna and the oscillator tube circuit is very much less than with even a loose coupled oscillator system. It has been pointed out repeatedly that a loud signal is of no use unless it is held sufficiently steady for copying. A tube used as an amplifier for C. W. signalling can be worked at higher efficiency than when used as an oscillator, if the grid excitation is sufficiently increased.

## The Colpitts Oscillator

When properly arranged, any of the well known oscillating circuits will work on the shorter waves, at least down to the 20-meter band. However, the Colpitts circuit appears to have some distinct advantages, which are favorable to the extreme high frequencies where circuit constants become small.

The capacities of the Colpitts oscillating circuit are in parallel with the internal capacities of the tube elements and if connecting leads are kept sufficiently short this offers two advantages. First, grid and plate resonant circuits are not present due to internal tube capacity bridging a portion of the oscillating inductance as in other circuits therefore the tendency toward the troublesome spurious or parasitic oscillations is greatly minimized. Sec-

only, there is always a relatively large capacity bridging the input elements of the tube. This is of great value in stabilizing a tube against frequency changes due to changes in filament temperature or plate voltage.

### Tuning Range

With apparatus as listed with the circuit diagram, the oscillator adjustments for 3 of the lower wave bands are as follows:

Wavelength	Coil turns	Grid Cap.	Plate Cap.
77	14	90°	90°
40	6	75°	75°
20	2	50°	50°

For the 75- to 80-meter band, 24 turns are used on the amplifier plate coil. Data on this coil for the other wave bands is not available at this time but proper adjustment may be found for any wavelength by following the instructions for power amplifier operation as published on Page 20 of *QST* for June, 1924.

### Keying Arrangement

The keying resistances and the plate milliammeter are external to the set. The grid leak resistance is connected to the negative H.V. supply end of a resistor that is in series with the negative H.V. supply, instead of directly to the filament.

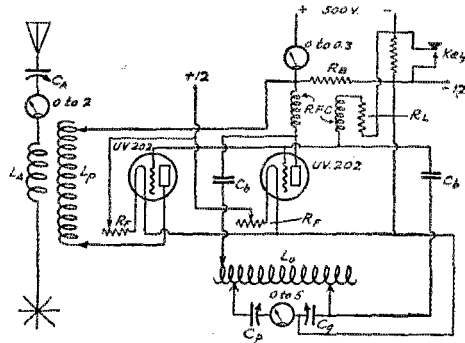
When current flows through this resistance the grids of the tubes become highly negative with respect to their filaments stopping the flow of plate current. In order to keep a continuous flow of current through the resistance, a resistance of high value is connected between negative filament and plus high voltage. Keying is effected by the shorting out of the resistance that is in series with the negative H. V. This system has 3 distinct advantages. First, the supply voltage is not disconnected from the tube elements when keying. Second, there is no audio noise when the key is open due to high negative grid charges, as with grid keying. Third, the keying thump is reduced to a point where it cannot be picked up by any broadcast receiver having a reasonable degree of selectivity. No sparking at the key contacts can be seen even in a dark room.

### Operating Adjustments

In tuning up any oscillator circuit for the first time, it is always well to move the plate tap so as to include a large number of turns and to use reduced plate voltage until it is learned that the circuit is functioning properly. Condensers  $C_g$

and  $C_p$  should be kept at equal dial settings. This gives a capacity ratio across the grid to filament and the plate to filament element of the tube of 2 to 1, which will be found to always work well for either 5-watt or 50-watt tubes. For any given wavelength it will be found well to keep the capacities relatively large and the number of turns in the inductance relatively few. After the approximate wavelength adjustment is found, the plate tap should be moved toward the center of the coil until the rated or desired plate current is taken by the tube at the maximum plate voltage that the set will be worked. Exact wavelength adjustment can always be made by slight changes in the settings of  $C_g$  and  $C_p$ .

The power amplifier plate coil adjustment is made with the antenna circuit open. Place a milliammeter in series with the amplifier plate and with the oscillator tube going at the desired wavelength. Change the number of amplifier plate turns until a place is found where but little plate current is taken. The antenna circuit may then be closed and coupling to the plate coil tightened until the amplifier tube takes the rated or desired plate current.



CIRCUIT OF THE POWER AMPLIFIER TRANSMITTER

- $C_a$  = Cardwell variable air condenser .0005 mfd.
  - $C_g$  = Cardwell variable air condenser .0005 mfd.
  - $C_p$  = Cardwell variable air condenser .00025 mfd.
  - $C_b$  = Two .002 mfd receiving type micadons in series.
  - $L_o$  = 24 turns  $\frac{1}{4}$ " flat copper ribbon wound edgewise 7 turns to inch 3" dia. Substitute for  $L_o$  may be 20 turns No. 12 bare wire wound 5 turns to inch on  $3\frac{1}{2}$ " dia. cardboard tube.
  - $L_a$  = 5 turns self supporting No. 8 bare wire coil 4 turns to inch  $2\frac{1}{2}$ " dia.
  - $L_p$  = 56 turns No. 22 D C C wire tapped every 2 turns for 8 turns, then every eight turns 3" dia.
  - RFC = 300 turns No. 30 wire machine wound  $\frac{1}{4}$ " wide. Substitute for RFC may be 2-5 and 10 store spider web forms each wound with 50 turns No. 28 D S C wire, and connected in series spacing forms  $\frac{1}{4}$ " apart.
  - $R_l$  = 10,000 ohms (one RCA 5000 leak may be used, two in series are better.)
  - $R_k$  = 5000 ohms RCA leak resistor (increase to 10,000 ohms if set radiates with key up.)
  - $b$  = 60,000 ohms, 5 crescent lavite 12,000 ohm resistances in series.
  - $R_f$  = Remler heavy duty 3 amp. rheostat 15 ohms.
- For 77 meters 14 turns are used on  $L_o$  and 24 turns on  $L_p$ .  $L_a$  and  $L_p$  are coupled together tightly.

### Summary Notes

The transmitter has been operated at 9EK using dry cell "B" batteries for plate supply and a 12 volt storage battery for the filaments, however, it is believed that it should operate equally well using A.C. on the filaments and Rectified A.C. on the plates.

The tuning range of the oscillator circuit may be extended upward into the 150 to 200 meter range by making  $C_g$  and  $C_p$  twice the values shown and adding a few turns to the inductance. The ammeter shown between  $C_g$  and  $C_p$  is only for convenience in making adjustments and checking the set's operation and may be left out if desired. Besides usefulness where a simple and efficient low power transmitter only is desired; such a set might easily be kept in readiness for emergency work where the main transmitter may normally depend on outside sources for power to operate.

### Concerning Tube Sizes

(It will be noted that the master oscillator is of the same rating as the power amplifier. This is not an accident. Experience at many short-wave stations has shown that a master oscillator is very little steadier than ordinary circuits unless the master is made about as large as the amplifier. A little thought will show why this is reasonable and the use of the idea at such stations as NKF1 and 9EK will serve as the best proof of its practicability. A weak signal from these stations can be copied regularly because it is steady.—Tech. Ed.)

### It Can't Be Done!

FROM half a dozen different places we have had news of a remarkable stunt for working "with the antenna only and no counterpoise or ground." The scheme is simply to disconnect the ground and counterpoise leads of a short-wave sending set and then to juggle things until the set oscillates on the desired wavelength.

Fair enough—but the ground is being used just the same. The difference is that a first-rate counterpoise has been thrown away to make room for the high-resistance path to ground via the capacity between the filament-transformer-secondary and the 110-volt winding of the same transformer. This is a pretty poor way to ground a set. If any amount of power over 250 watts is being used a burned-out filament transformer will be the prompt result.

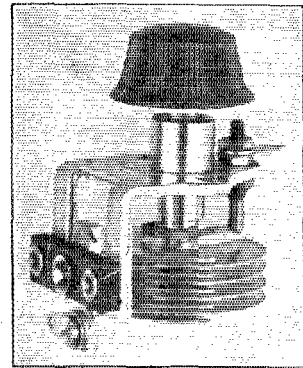
With less power the result will only be efficiency that isn't very good. Any station that works this idea to better advan-

tage than the former counterpoise has proved one of two things—either that the old counterpoise was criminally poor or else that the set was terribly out of adjustment.

Meanwhile—let's admit that oscillators have two ends and that if there's R.F. on the antenna top and the antenna comes down to the set we will have to provide a counterpoise or ground.

### A Good Low Capacity Variable Condenser

FOR use in those radio circuits requiring a variable condenser having an extremely low minimum capacity, the new "Hammarlund, Jr." midget condenser is very useful. Unlike other "vernier condensers", the Hammarlund is not simply cut down from larger stock sizes. The condenser has a minimum capacity of only 4  $\mu$ fd and a maximum of 32  $\mu$ fd. The plates are of brass and are soldered, the bearings are cone shaped and the pig-tail is a phosphor bronze spring. The insulation is properly placed and is a small strip of high grade hard rubber. One hole panel mounting is provided, and table mounting can be used



by means of bracket mounts which can be obtained. The condenser has a variety of uses; as an antenna condenser in short wave receivers, as a neutralizing condenser in a neutrodyne set, as a vernier in parallel to a larger variable condenser, and last of all as the main tuning condenser in a short wave receiver. When used for the latter purpose it should be excellent, having very low losses, an extremely high capacity range and a maximum capacity just about right to cover one amateur band with one coil. Being very small, its external field should be small, and for that reason its field should not get mixed up easily with the coil field. An excellent job.

## Experimenters' Section Report

### Is There a Heaviside Layer?

**T**HE radio press of today is showing an irritating tendency to take the Heaviside Layer for granted and to make all transmission effects fit into that theory. It will be far more instructive if we consider transmission effects entirely apart from anybody's theory. If this leads to a new theory of transmission we have made real progress, much more real than by attempting to work our observations into an existing theory.

The application of this thought to the matter of radio transmission has been beautifully worded in a letter just received by Assistant Technical Editor Clayton from Dr. Greenleaf W. Pickard.

"Science has aptly been called the growing edge between the known and the unknown. Around and head of this advancing edge we build a scaffolding or falsework of hypotheses, which are torn down one by one when the inner structure of truth is complete at any point. But we must not mistake the scaffolding for the building inside; the hypothesis is not necessarily or even usually like the truth.

"There are three elements in radio communication; the transmitter, the receiver and the waves in the intervening space. All that we *know* to day about radio transmission is what we can measure at the transmitter and at the receiver; the way of the waves between is purely a field for speculation, and must so remain until we know our own atmosphere. Up to about 35 kilometers atmospheric composition, temperature and pressure are known, and up to about 10 kilometers something is known about the amount and distribution of ionisation. Above these levels the twilight glow, the shooting star and the aurora tell us simply that there is a high level atmosphere of unknown composition and ionisation; there our real knowledge ends.

"When, nearly a quarter century ago, radio signals were received over an arc of 45° and seasonal, diurnal and short period fluctuations in reception began to be observed, the present hypothetic era began for our art. Clearly the waves were in some way bent out of their normal rectilinear propagation, or they would not get around the curvature of the earth. And if the waves were bent, whether by reflection, refraction or otherwise, it was soon seen that plural path transmission, and consequent interference at the receiver, would explain fading. The first serious attempt at an explanation, was the Kennelly-Heaviside Layer hypothesis, which assumed that at the auroral level, about 100 kilometers above the surface, there

existed an intensely ionised stratum of highly rarefied air, which was so good a conductor as to form a mirror surface for radio waves. The idea of a high level conducting layer is actually older than radio, and was originally invoked by Schuster as an explanation of certain phenomena of terrestrial magnetism.

"For so long as our measurements of radio transmission phenomena remained qualitative and sketchy, and our ideas about the relation of waves and ions vague, this hypothesis stood, despite the fact that it called for a very unlikely degree of ionisation. As our knowledge grew, modifications in this hypothesis became necessary, until today our views bear little resemblance to its original form. Eccles, and later Larmor, made the important step of substituting refraction for reflection; instead of reflection by a conductor they assumed a change of velocity in an essentially dielectric medium. Very recently Nichols and Schelling have suggested that the earth's magnetic field may be an important element in radio transmission, particularly at high frequencies.

"The fundamental objection to any hypothesis involving reflection is that ionisation acts primarily to damp out the wave, and only secondarily to reflect. The imaginary Kennelly-Heaviside layer (if it had real existence) would act toward radio waves very much as lampblack acts toward visible light; it would absorb and damp them out, with but negligible reflection.

"I believe the Eccles-Larmor hypothesis, with the possible addition of the Nichols-Schelling effect, to be far more likely than the assumption of any reflecting layer. Refraction or change of velocity requires but a few electrons per cubic centimeter, whereas, reflection calls for many millions. Refraction does not require any sharp boundary between atmospheric layers, while reflection involves a mirror-like surface. Refraction, at least at levels where the mean free path of the electron is long as compared with its movements under the alternating wave-field, does not damp out or attenuate the wave, while reflection is probably entirely masked by absorption of wave-energy.

"From our transmission data, it appears that the radiation from a transmitter is split into two paths; one direct or low level, and the other indirect or high level. The direct or low level path becomes ineffective at a distance which is some inverse function of the frequency, while the high level waves come back to earth at a distance which is some direct function of the

frequency. At frequencies in the broadcasting band, these two sets of waves overlap; that is, there is usually no zone of zero reception. At transmission frequencies of several megacycles the direct wave seems to die out at a relatively short distance, then comes a zone of zero reception, and finally the indirect wave comes back to earth. As the frequency is farther increased, the zone of zero reception increases; it is quite possible that at some rather high frequency the indirect wave would never come back to earth."

#### Starting Anew

It would be healthier for the entire art if many more of us were to spend a great deal more time in saying, "I wonder if this really is so?" In that remark *QST* is included. Don't believe a thing is perfect just because you saw it in *QST*. Just as a scientist is only a trained observer who has his limitations so too this magazine is only a clearing house between its readers and it too must not be taken as being inspired.

#### Are We Gaining on "static"?

Radio progress, when viewed close by, seems discouragingly slow. Perhaps that is why the Technical Editor has been so much disappointed in the very small attention the membership of this Section gave to trying out the various static eliminating devices that have been presented in *QST*. Just two men have done anything of the slightest consequence and both of them have been extremely short of time in which to do their work.

Such static elimination as we know of has not been accomplished directly but has been done by moving to other wavelengths or by the use of higher power so as to swamp the undesired disturbances.

This is not true static elimination and this is not where our future lies.

#### The Organization of the Section

Repeating again, for those who have not seen our past numbers, we wish to explain the nature of this Experimenters' Section.

We are a group of loosely knit experimenters whose only bond is a common interest. Most of us have little laboratory equipment, all of us are limited as to time and finances. Therefore, the Section has no complicated organization nor does it attempt to assign work. It simply issues at intervals of six months a revised list of those engaged in experimental work so that each man may hunt up his kindred spirits from the lists and write to them directly. In addition to this The Technical Editor and the Assistant Technical Editor of *QST* attempt to outline certain problems and to coordinate them so that no work is wasted beyond what is unavoidable. Much of this cannot be done as fast as one would wish,

mainly because *QST* itself keeps us about as busy as can be.

Joining the Section is extremely simple. It is only necessary to address a letter to "Experimenters Section, American Radio Relay League, Hartford, Connecticut" requesting the blanks. Do not put anything else in this letter excepting only the request.

#### Portable Transmitters

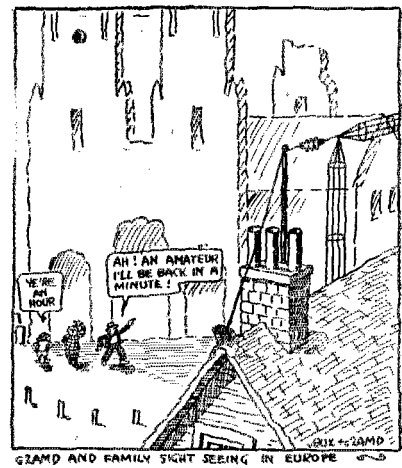
Why is the portable transmitter so entirely neglected? In the old days one had the excuse that it took a big storage battery to drive a powerful spark coil and that even then the range was very limited. But that argument is not much good any more. In the first place we get our ranges without burning so much power and in the second place the country swarms with cars that carry good enthusiastic six-volt storage batteries which will drive dynamotors, light filaments and so on. If one wants to do the simplest thing what is the matter with lighting the filaments from the battery and supplying the plate by means of a spark coil also driven by the battery. For small sets a spark coil taken from the well-known "Michigan corn popper" will answer, for larger sets one can use an Amrad spark coil or something of that sort.

Those that feel prosperous can use battery plate supply in the shape of dry cells and are then in position to add phone to the transmitter.

Low antennas, temporary single wire antennas, loops, can all be used. Why doesn't somebody do something along this line? Nothing ever seems to happen excepting in the Sunday newspapers.

And that isn't the only need for portable sets, consider the requirements for mine emergency work.

Come on now, let's see the famous American amateur perform on a job he has been overlooking.



GILK AND ZAMP AND FAMILY SIGHT SEEN IN EUROPE

# TRANSMITTING HINTS

### Grid Meters

When the efficiency of a tube set is all wrong it is almost a certain thing that the grid current is too large. Of course the way to find out is to use a meter. One with a scale of about 100 mils will do pretty well although the deflections will be small. The real thing is a meter with a scale about 10% of the one used in the plate circuit.

If the set is adjusted so that the plates are cool and the grid current is small the efficiency must be somewhere near right.

### Transmitting Grid Leaks

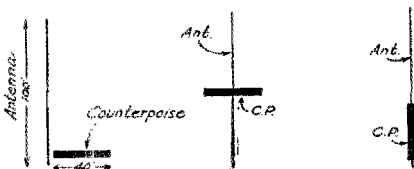
SPL of Shawnee, Ohio has been operating satisfactorily with an ordinary receiving Bradley leak and a tube of 50 watt normal rating.

That would seem to be crowding the poor "eak" rather hard.

### Counterpoise Arrangement

W. H. M. Watson of 5BX, 5AQS, 5DT and 5XAY (there may be three or four other calls we may have overlooked) has been doing some work on the business of putting the counterpoise underneath the antenna.

"We suspected that this business about the counterpoise necessarily having to be underneath the antenna and longer than the antenna was hokum. Tests have been made at three different stations with the same transmitter and the results are so nearly the same that one report will tell about all of them. Our experiments were made with the counterpoise run at right angles to the antenna and also with a 40-foot counterpoise under a 100-foot antenna but at right angles to it. The nodal point was easily found and the transmission was perfect. Reports from distances were



### 5XAY COUNTERPOISE TESTS

*Showing arrangements as seen from above*

as satisfactory as before. This seems to indicate that having the counterpoise directly under the antenna was not of any particular importance.

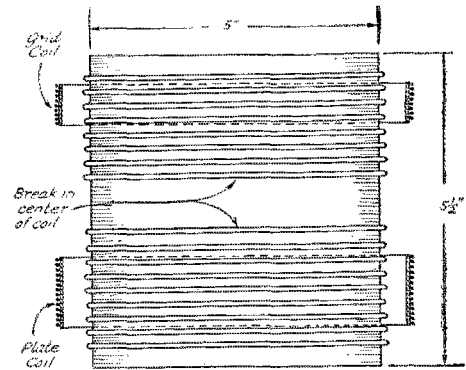
"After reading the Italian (ACD) that used one antenna and two counterpoises, or vice-versa, we made frequent tests to

see what the advantage of so many radiating systems might be. We found that the antenna current would rise from 20 to 40 percent when an extra radiator was used, but the reports from distant stations were generally not as good as before."

Why all the excitement about getting the c.p. right under the antenna? Anyway 9RR has told us about 9DXN and 9FM which stations work very well, although the c.p. is *not* right underneath the antenna —also you have certainly heard of 1ARE who has his out on the other side of the house.

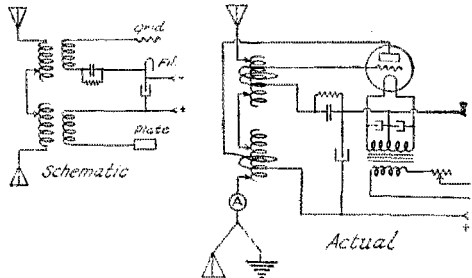
### "Meissner Coils"

The sketch below is so somewhat unusual arrangement of the 4 coil tuned Meissner circuit which was laid out by Mr. L. C. F. Horle, Chief Engineer, Federal Telegraph



GRID COIL - 15 turns No 28 D.S.C. wound closely and tapped at 1, 2, 3, 4, 5 and 10 turns

PLATE COIL - 30 turns No 28 D.S.C. wound closely and tapped at 1, 2, 3, 4, 5, 10, 15, 20 and 25 turns



and Telephone Company. The design was intended for C-302 tubes in the 150 to 200 band, using two, three or four tubes.

### Special Generators

The Electric Specialty Company of Stamford, Connecticut, will, on special order, wind any of their generators for a higher voltage, about 50% above the catalogue voltage. Of course there is an extra charge



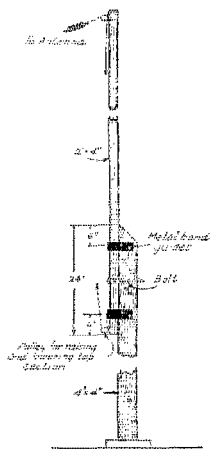
and extra delay on such work. However this may be of interest to those of us who delight in using a small plate current at high voltage.

### The Loose-coupled Meissner Circuit

In the special Meissner circuit described in *QST* for Oct., 1923, there was no variable condenser across the grid coil. W. K. Francis of 8PL finds that it helps greatly to add such a condenser, even though there is one more thing to adjust.

### Masts for Cramped Spaces

When cramped for space at 5TK, G. E. May managed to get up a mast by the scheme shown in the sketch. The lower section



MASTS FOR CRAMPED SPACES

was set up as usual, but with metal straps screwed to the sides to act as guides for the topmast. A tackle was then rigged and the mast was equipped with U-shaped metal strap guides near its upper end and the topmast was slipped into these guides while the whole thing was on the ground. The two were then set up together and guyed into place. Next a tackle was rigged between the top of the lower section and the butt of the topmast after which the topmast went right up and nothing remained except to secure the top guys?

### Variable Transmitting Grid Leaks

The "Bradleyohm" which goes to 10,000 ohms can be used for a transmitting grid leak on one or two "five watters". Now if we had another thing like this that went down to 1,000 ohms and up to 10,000 we would have a beautiful grid leak for our larger sets, excepting only those that use the UV-204. But then the owner of a 204 is rich anyway and can buy Radio Corporation leaks..

### "Filtering the Motor Generator"

Mr. M. G. Nicholson, Jr., of 4FG says he has found it to be extremely important to use radio frequency chokes in addition to the filter when the plate power is supplied by a generator.

This is found to increase the effectiveness of the filter enormously, a previously bad note becoming quite clear. A tuned radio frequency trap was found very effective and incidentally gave greater freedom as to the position of the nodal point. It is

now possible to get the nodal point a turn off the filament clip without having disaster following immediately.

### Small Pyrex Lead-in

Where the regular Pyrex cup lead-in is a bit large, the following suggestion from our old friend, M. B. Lowe, (DZ) will come in handy.

**WANTED:** A good lead-in insulator that is within the means of the average amateur.

**SUGGESTION:** Secure at the favorite hardware store two of the standard "custard" cups made from pyrex glass and then proceed to the local plate glass dealer who will for the sum and total of fifty cents proceed to bore the two holes in the bottom of the cups. Place one cup on each side of the window board and run threaded brass rod through, fasten said antenna on outside and the noise maker to inside.

Total cost: 2 cups ....@ .35c ea... \$ .70  
Drilling cost .....@ .25c ea.... .50  
Brass rod (generally lying around)....

\$1.20

Value: Undetermined but very high.  
—"DZ"

### Wooden Spreaders

5XAY of Dallas calls attention to the fact that wooden spreaders in the average aerial will lower the radiation after a rain because they make high resistance connections between the wires. With a metal spreader the wires will always be connected and rain will not change the radiation.

According to tests at 8AQO and 1XAQ the same results can be had by running a jumper along a wooden spreader connecting the various wires together.

### Counterpoise Wire

5XAY suggests that since the resistance of the wire in the antenna is not worth fretting about anyway, galvanized guy wire can be used to make counterpoises that will be strong and permanent at small expense. We believe he is right. The resistance introduced into the antenna circuit by junk in the neighborhood is a hundred times more important than the kind of wires used,—unless you fool with stranded and corroded wire.

### Filter Parts

Again we hear from 5XAY. He calls attention to the useful flivver coil. Even when damaged it is usually possible to get out of these things a primary condenser or some parts of a secondary. These things are particularly useful in filters. When more current is to be used than the secondaries will carry try the primaries, using several in series.

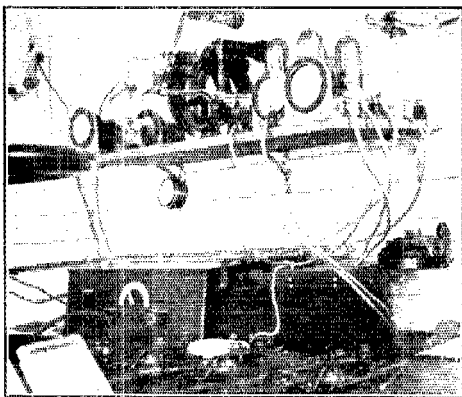
## The Month With NRRL

By A. L. Budlong, Asst. Traffic Mgr., A.R.R.L.

**W**ITH but comparatively few reports from the A.R.R.L. membership as to the activities of NRRL and NEPQ, and with the absence of a log of "heard" and "worked" stations from Schnell, this month's report of the SEATTLE's activities is rather meagre.

At the time this is being written, NRRL has just arrived at Melbourne. Complete silence from the SEATTLE's short-wave sets for the week or so preceding the arrival in Australia led to some speculation as to whether or not the signals were reaching this country. The explanation for the silence came when 6CGW worked a2CM on July 28. Schnell was at the key at 2CM, and explained that NRRL was out of commission temporarily with a burned-out generator, while NEPQ, the RELIEF, was also off the air with a shot transformer. The trouble was evidently cured almost immediately, since 5UK reports working NRRL on July 30. On August 1, the signals were reported again by 2WC. 1BES heard them R8 on August 2, and worked him on August 3 at 6:11 a. m., with signals varying between R8 and R6.

In general, the 40-meter wave still continues to be heard extremely well in all parts of the world. The best reports on this wave during July were from Belgian 4RS, who, on July 19 heard NRRL's signals



THE RECEIVER AND TRANSMITTER AT NRRL

with an audibility of R8, and remarkable steadiness. The next morning, July 20, they were again heard R8. Since NRRL at this time was nearing Australia, this makes the distance something like 11,000 miles! British 6JO, at Cornwall, England, also reports reception of NRRL on the 19th, with an audibility of R5.

Twenty-meter work is apparently improving. On this wave both NRRL and NEPQ, the U.S.S. RELIEF, of which Ed Willis, 6TS, is the operator, have worked U. S. stations while approximately 5000 miles from the Pacific Coast. Some of this work was done with daylight practically all



Ed Willis, 6TS Now Operator on the U.S.S. Relief NEPQ

the way, and good readable signals were reported by 6AGK, 6CGW and 6BUR, who accomplished the communication.

In conclusion, we wish to urge everyone who has any record of reception of NRRL or NEPQ during July and August to send it to both League Headquarters, and to the Naval Research Lab., at Bellevue, D. C. No matter how small this report may be, send it along. Twenty meter reports especially are desired.

### Log of NRRL

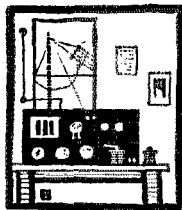
No log received from Schnell; the following calls represent only those who have reported to Headquarters as having worked, or heard, NRRL and NEPQ. QRH 40 meters unless otherwise specified.

**WORKED:** 1bes, 1ka, 1py, 5uk, 6agk, 6agn, 6aii, 6awt, 6bjd, 6bsn, 6bur (20m), 6cgw (20m), 6chz, 6clp, 6enc, 6dz, 6zd, 7cl, 7aek, 8apw, 8agn, 8en, 8pl, 9bht, 9bxa, 9ded, 9dfh, 9uc, 9zt, m9a, a2vi.

**NRRL REPORTED BY:** 1axa, 1bes, 1qm, 2apy, (20m), 2wc, 3bwi, 3bz, 3lw, c3xw (20m), 5apq (40 and 20m), 5auc, 6ajz, 6auf, 6bze, 6clz, 6ctp, 6cwy, 7aci, 8biq, 8bkm, 8bnn, 8ccq, 8zt, 9ahd, 9att, 9bpf, 9brq, 9ccy, 9rz (20m), g6jo, Belgian 4rs; D. Cuthbert, Onchunga, N. Z.; J. R. Hall, Pittsburg, Pa.; J. Smith, New Denver, B. C.; E. H. Vignoles, Montevideo, Uruguay; D. H. Gustafson, Denver, Colo.; W. J. Cooper, Los Angeles, Calif.; J. Coulter, Peach Creek, W. Va., (20 meters).

### Log of NEPQ

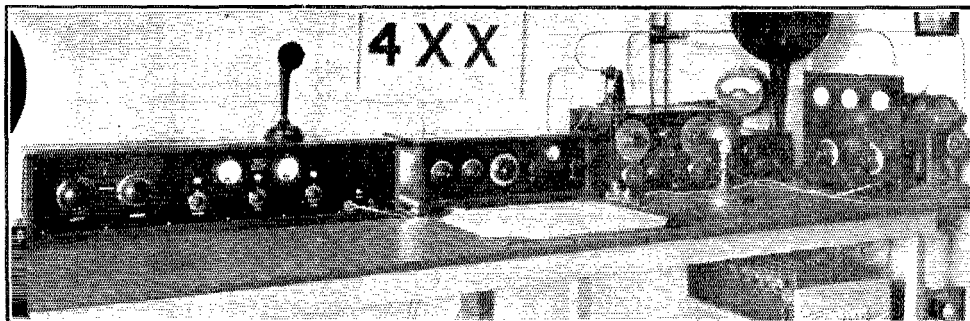
**WORKED:** 6cgw and 6agk, both on 20 meters. No other reports received.



# Amateur Radio Stations



## 4ZD-4XX, Savannah, Ga.



**P**RACTICALLY all of the equipment used at this station was designed and constructed by the owner, Paul G. Watson, of 1107 East 37th Street. The large set at the left of the photograph is a C-7 superheterodyne equipped with removable coils, thus covering a band of waves from 25 to 800 meters. The customary second oscillator for receiving C.W. signals is included in the cabinet and can be cut out for music reception. Although short wave superheterodynes are not in general use in ham stations, Watson has found a super to meet all of the requirements of a satisfactory DX receiver and as in the case of the usual broadcast super, gives much better signal strength than the usual regenerative set.

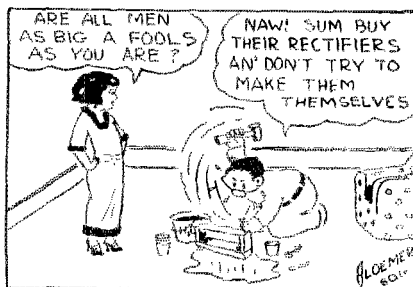
Next to the C-7 is a conventional three tube short wave tuner. This tuner is used mainly to check up the performance of the superheterodyne. The regenerative receiver uses the regular tickler feedback three coil circuit with a tuned antenna circuit. The Navy receiver at the right of the regenerative is a type CM 294 and tunes from 250 to 3100 meters. It is used for 600 meter reception and for NAA "time ticks."

The transmitter is a 100-watt affair using an inductively coupled Hartley circuit with series condensers in both the antenna and counterpoise. The indicating meters are all mounted on the panel. The primary tuning condenser and one of the

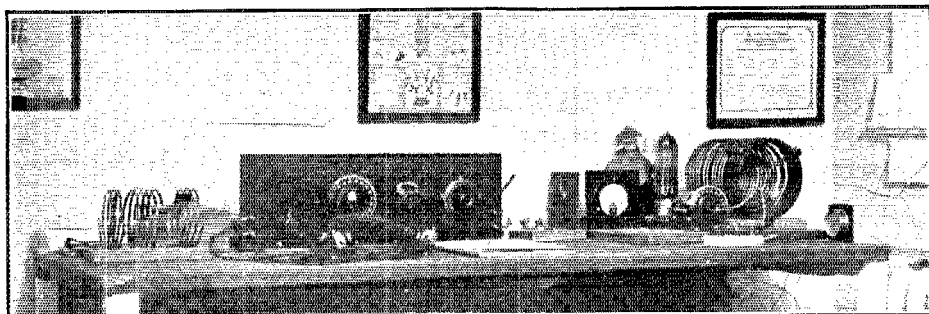
series antenna condensers are mounted behind the panel, the other series condenser being at the right of the set. All of the transmitter wiring is done with copper tubing.

The under side of the top of the operating table is wired with six No. 12 feed wires which connect to double throw switches so that any set can be cut in and all battery and other circuits disconnected from the rest of the sets. All battery circuits and the antenna leads are transferred, each set of taps coming out to a binding post strip back of the terminals on the set and from there connections are made to the set by means of short leads.

4XX has been heard in Chile, Italy, England, France, Holland and Hawaii, and in the language of Watson, "the old bus sure does mote."



## 3APV, Chevy Chase, Md.



**T**HIS station is located in one of the suburbs of Washington, D. C., and is owned and operated by B. J. Kroger. The antenna is a flat-top of the inverted L type, with lead-in taken off from the south end. The antenna consists of four wires, forty feet long on 15-foot spreaders. The average height is about 40 feet. The counterpoise is made up of six wires 110 feet long, spread in a fan shape 60 feet wide at the far end, and supported 6 feet above the ground.

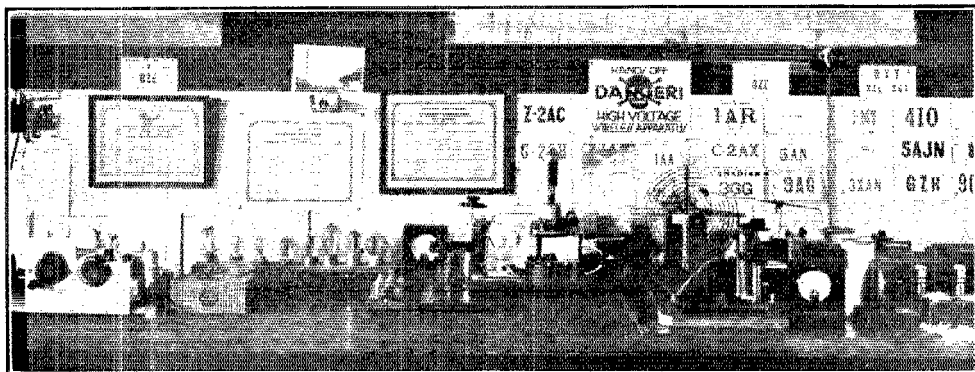
The transmitter is at the right of the photograph. It uses a coupled reversed feedback circuit with series plate supply. All tuning condensers are omitted, all tuning being done by inductance and distributed capacity of the coils. The plate and grid coils are made of  $\frac{1}{4}$ -inch copper tubing and the antenna coil is the secondary of an old Murdock O.T. The large inductance in place in the photograph is used for 40- and 80-meter work. The coils can be removed and the wavelength switched to 20 meters in about 30 seconds.

The 20-meter inductances are at the left of the receiver. On the floor under the table is the 24-jar chemical rectifier. This rectifier handles 1200 volts without heating. Above the rectifier on the shelf is that homemade filament heating transformer. On the floor and to the left of the rectifier is the plate transformer. It is a 1-K.W. pole transformer and supplies secondary voltages of 550, 1100 or 2200 volts from either side of the center tap.

The receiver uses the same reversed feedback hook-up. All coils are fixed. The antenna is untuned, the grid coil shunted by a 250- $\mu$ fd variable tuning condenser and the phones and B battery by another 250- $\mu$ fd variable which controls regeneration. The tapped switch on the receiver panel is a remnant of bye gone days.

3APV is known for his consistent operation, and says that he has never received a report from New Zealand or Australia.

## 8ZE-8GX, Oberlin College, Ohio



**R**ADIO station 8ZE-8GX is operated under the Department of Physics of Oberlin College. Since September,

1924, the relay transmitter has been operating on 78.0 and 38.5 meters. For experimental work the station has a license

with call letters 8XT. The transmitter is necessarily arranged for experimental work. The inductances are copper ribbon pancakes wound on cardboard supports. The antenna series condenser is a Cardwell. The series condenser is not used when operating in the 40-meter band, as the transmitter is operated on the 3rd harmonic for 40-meter work. The tube is a W.E. 50-watt type minus socket and base. Thereby hangs a tale—for while attempting to remove the base of the tube one of the lead wires was broken off beneath the surface of the glass. Contact to the broken lead wire is made by means of small mercury cups constructed around the lead. The terminals of the leads to the power supply and to the inductance are simply immersed in the mercury cups. Plate supply is obtained from a Radiocorp power transformer which gives 1500 volts on either side of the center tap. A 48-jar chemical rectifier (in a box under the operating table) and a filter consisting of one microfarad on each side of a large audio frequency choke give the note a piercing quality which seems to carry very well through QRN.

The receiver at the left of the photograph is of the 1BFG type and tunes from 10 to 125 meters. One stage of audio frequency amplification is all that is used. The coils are suspended by thread from the glass rod supported above the panel. The entire tuning system is mounted back from the panel in order to avoid any body capacity effects. The condenser and coupling control are connected to the dials by means of glass rods.

For receiving, a small indoor antenna is used in connection with a one-wire counterpoise 60 feet long. A wavemeter calibrated from WWV and a set of resonance coils are visible to the right of the power switch. Due to QRM from the powers that be, it has been impossible to use the large smokestack of the College heating plant as a transmitting antenna mast. A three foot cage is swung between two of the college buildings at a height of 55 feet. It is 40 feet long and has a 6-inch cage lead-in 20' feet long. The counterpoise is a two-wire fan 60 feet long and 15 feet high. The operating staff is morally certain that the forbidden smokestack has its purpose. The fact that the signals from 8ZE are consistently reported as having a strength of R-9 in Australia and New Zealand must be due to the wave pulling up the east guy wires and sliding head-first down the west side of the stack, thus getting a good start toward Australia.

E. W. Thatcher, "GX", is Chief Operator at the station, and it is an active O.R.S. 8ZE has done some wonderful DX work and can always be counted on for a QSR.

## New Coil Forms

THE American Hard Rubber Company has just made available some Radion tubing which will fill a long felt need in many amateur circles. This tubing takes the form of ribbed moulded pieces in stock lengths of six inches. The tubing has an



outside diameter of three inches and the ribs, which are integral parts of the tubing, are  $3/32$  inch high. There are twelve ribs extending horizontally along the length of the tube. Very solid space-wound coils can be made by cutting shallow notches in the ribs and winding the wire in these notches. The wall thickness of the tubing is such that with ordinary handling the coils will hold their shape (and calibration) indefinitely. Having actual contact with solid dielectric at only twelve points, coils wound on tubing of this sort should be almost equivalent (electrically) to air supported coils while at the same time being vastly superior mechanically.

## Strays

If Calls Heard are sent in indicating reception on different wave bands please head each group "20 Meters" or "40 Meters" and run the calls in each group in numerical and alphabetical order. Don't forget the double spacing, please.

There will shortly be a transmitting station in Macoa, China with the call p9MC. A second is planned with the call p9MC4 also.

OJSP and OJAI of Johannesburg, South Africa, are on 84 meters. QSLs should be addressed to Mr. Arthur Sydney Innes, 47 Rockey St., Bellevue East, Johannesburg. Another link in the "round the world relay."

A rich man had a thousand watts,  
And a special call had he,  
But the poor man had two two-oh-twos  
And made 'em work, by gee!

—2FU-SACM.

Another country is on the air. PKX at Malabar, Java, is on 84 meters with apparently plenty of power.

# Who's Who in AMATEUR WIRELESS



## Three New Canadian Division Managers

### W. M. SUTTON, "NI" OF c3NI

W. M. Sutton, Manager of the Ontario Division, came to Montreal from Engand early in 1918. He started his radio career in 1919 with the call 2AU and a 1 K.W. spark which never reached out very well. In April of 1922 he moved to the Fort William station of the Pacific Cable Board at Port Arthur where he opened up with 3NI as a call and a 20 watt c.w. as the punch behind the call. From that date on, improvements were constantly made until 3NI has acquired a lot of excellent DX records. In the summer of 1923, Sutton was made Radio Inspector for Fort William, Port Arthur and District. Last July 3NI and 3WS combined. Sutton signs NI as his personal part of the 3NI call.



### W. R. POTTLE, c4PA

The new manager of the Winnipeg Division is Walter R. Pottle. Wallie was one of the first to stick up an antenna out on the Prairies. By 1913 he had an old rock-crusher on the air. The spark was soon junked in favor of a C.W. outfit and 4AO has been going strong ever since. Pottle says he has never done anything startling in the way of super-dx but 4PA is always ready to QSR and always has time to yarn with the gang. In 1921 he was President of the Moose Jaw Amateur Radio Association; he was City Manager for the A.R.R.L. in Moose Jaw during 1922 and District Superintendent of the Winnipeg Division for 1923-1924. He is government Radio Inspector for Moose Jaw and District, and a keen A.R.R.L. supporter.



### WM. ROWAN, c5GF

Bill Rowan, c5GF, who manages the Vancouver Division first fell for radio way back during the war days. Along came the BC rage and Bill decided that he wanted to make CJCE the best broadcasting station on the map. Bill soon found out that the BC game is not the game so he quit in favor of a ham outfit. This was in May, 1924. Ever since then c5GF has been on the air constantly. The set now uses one 50 watt tube in an inductively coupled circuit, operating on 75 to 85 meters.

Rowan is president of the British Columbia Amateur Radio Association and says that with the help of his co-workers he intends to bring the Vancouver Division right up to the very front.





The first general meeting of the French Section of the I. A. R. U. was held in Paris on May 30th. Mr. Jack Lefebvre, f8GL, presided. Mr. Lefebvre in a few words told of the object of the section, and reported the results of negotiations with the Post, Telegraph and Telephone administration. Two classes of amateur transmitting stations have been created. Under one class authority is granted to amateurs to transmit (private telegrams and the relaying of same being forbidden) on wavelengths between 180 and 200 meters, with an input not exceeding 100 watts. Transmission may be done at any hour of the day or night. The other class permits transmission on all wavelengths from 0 to 180 (with a few restrictions on several waves which are reserved for other classes of communication) between midnight and 10 a.m. and between 3 p.m. and 4 p.m. Additional power can be used with this class of license which is granted for a period of six months. Upon application for renewal of such a license, the amateur must furnish complete details of the work done and the results secured by means of the excessive power.

The "Journal des Huit", managed by Mr. Veuclin, was chosen as the official organ of the French Section. Mr. Maxim was unanimously nominated an honorary member of the French Section. Mr. Richard James, who will be in France until September 1st, presented an elaborate program for two-way transmission which he plans to conduct next winter during his sojourn at Saigon, Indo-China. Mr. Sa-cazes, f8SM, reported a series of communications which 8SM had had with foreign amateurs on 10, 20 and 40 meters during the months of May and June. 8SM has been QSO bz1AB a number of times and with the U.S. gang regularly. He is reported as having an audibility of R-7 at z4AG. Mr. Perroux, f8BV, although located right in the center of Paris and having his antenna surrounded by tall buildings, has secured some splendid results on a wavelength of 40 meters. He has been QSO New Zealand a number of times. A number of French amateurs are doing good DX work on the shorter wavelengths. Among these particular note

should be made of the work of 8DE, 8AR, 8BQ, 8JE and 8EN all of Marseille, and 8SM of Toulon. Transmissions are carried on on wavelengths between 14 and 16 meters every Friday from 20:30 to 21:20 GMT. Any of these stations will be ready to test with any U.S. amateur upon request.

In Spain amateur transmission is growing rapidly, coincident with the forming of the I. A. R. U. At the time of the April Congress those who had official licenses limited themselves to local work and looked forward to the definite inauguration of international traffic. Among these are EAR1, EAR2, EAR6, EAR9 and EAR10. Official licenses are given to all applicants who have, in the judgment of the administration, credentials which will guarantee the proper operation of the transmitter. There is an annual tax of 2 pesetas for each watt in the generator, and a limit of 100 watts input. All wavelengths between 0 and 120 meters are authorized for amateur use. The engineers of the Director General of Communication in charge of the granting of amateur licenses and the inspection of amateur transmitters have shown a spirit of tolerance worthy of great praise. All the EAR's are members of the I. A. R. U.

For years we have dreamed of a round-the-world relay. We have talked of the day when we would be QSO all the way around and have even planned how we hoped the thing would be done. Then when International relay work became a fact we forgot our round-the-world relay. Then without any prearrangements or schedules of any kind, Windom of 8GZ at Columbus, Ohio stepped in and gave g2CC a MSG on May 18th, addressed to A.R.R.L. headquarters. This was on 20 meters. From g2CC the message was given to g2OD who QSR'd it to a2CM in daylight. 2CM in turn gave it to u6CIX from whom it came to Hartford via U.S. mail. On May 21st 8GZ started another one—"Fm Columbus, Ohio May 21 nr 67 to A.R.R.L. Headquarters, Hartford, Conn., U.S.A.—BEST REGARDS BY ROUND THE WORLD RELAY—(sig) Windom, 8GZ". This one went to z2AC, f8QQ,

g2NM, uIARE and thence to Hartford! Fine Business, OM's. All credit to you all!

The U.S.S. Pillsbury, NUQG, while at Chefoo, China recently held two-way communication with ch1EG. The Pillsbury was using one 50 watt tube on 40 meters and was QSO on July 13th, 14th and 15th. Previously, on the morning of June 10th NUQG and n6BUR were in communication. At that time NUQG was using a single W.E. "E" tube with an input of 37.5 watts.

1LJ reports reception of PCUU who gave his QRA as The Government of the Netherlands, Colonial Department, Technical Department, The Hague, Holland. This was on June 22nd. Anyone heard PCUU since then?

On July 10th 6HU-6AAF heard a two way communication between m1AA and a new station, yDCB whose QRA was given as Colombo, Ceylon, India. We would appreciate details on yDCB from anyone who works him again.

### Hi!

The I.A.R.U. Congress in Paris, as seen by the editor of an English B.C.L. paper, "Popular Wireless and Wireless Review": "Mr Marcuse . . . held up his end very well indeed by giving the Congress a speech which lasted exactly two minutes, whereas Mr. Maxim dealt with platitudes for close on an hour, with M. Deloy standing by to translate from American into French . . . Briefly reviewed, the Congress appears to have been carefully stage-managed by the American delegates, who, as the reader will see, have secured the reins of government. The fact that one dollar is charged for entrance fee, that the headquarters of the Union are in America, etc., etc., and that the Union is primarily concerned with radio transmitting work, will, I think, allow the ordinary amateur in this country, who is chiefly concerned with reception, to decide whether the Union is worth joining or not."

On the morning of June 30th u8RY at Sullivan, Ohio hooked FX1, an Army set at Fort Shafter, Honolulu. FX1 is on 38 meters and has been heard all up and down the East coast with an audibility of about R5.

The transmitter at POX which operates on 26 meters with LPZ is located in the immediate vicinity of the high power station at Nauen, Germany. The transmitter is a 2 K.W. affair. The second transmitter, POW, uses a 10 K.W. water-cooled tube on 25 meters. The antenna of this

set is 130 meters high, and is strung from the towers of the high power station. POY is the experimental set housed in the main Nauen station house. It is similar to POX, but uses a variety of different wavelengths.

Although subject to change without notice, the following list of "N" calls together with their QRA and wavelengths will prove of interest to the gang. The wavelengths stated are only approximate and may vary somewhat.

Call	Location	Wavelength
NKF	Belevue, D. C.	20, 41.6, 54.4, 71.5, 81.5
NPM	Honolulu, T. H.	49
NPB	San Francisco, Calif.	40, 43, 81
NPU	Tutuila, Samoa	53
NBA	Balboa, C. Z.	54
NPO	Cavite, P. I.	70
NAJ	Great Lakes, Ill.	76
NEL	Lakehurst, N. J.	80
NFV	Quantico, Va.	77.4
NPL	San Diego, Calif.	71.7
NQG	San Diego, Calif.	70.5
NAL	Washington, D. C.	20.0, 30.6
NRRL	U.S.S. Seattle	40
NEPQ	U.S.S. Relief	20
NDF	U.S.S. California	119 to 149
NIRX	U.S.S. Canopus	75
NERM	U.S.S. Los Angeles	70 to 84.5
NQW	U.S.S. Mexico	40
NUQB	U.S.S. Pope	75
NERK	U.S.S. Shenandoah	—
NITZ	U.S.S. Sturgeon Bay	150
NEDJ	U.S.S. West Virginia	119 to 149

For the first time communication was established between Italy and New Zealand when, on the morning of May 31st, i1ER worked z2XA. 2XA is the station of Mr. E. A. Shrimpton at Wellington, N.Z. We all know i1ER. Then on June 14th i1RG, the station owned by Il Radiogiornale at Milan was QSO z4AK operated by Mr. W. L. Shiel of Dunedin, N.Z.

We have received a great many requests for the QRA of the following South American amateurs who can be heard almost every night around 36 meters. bz1AB, Alvaro S. Freire, 46, Rua Oswaldo Crus, Icarahy-Nitheroy, E. do Rio, Brazil and bz2SP L. Y. Jones, Jr., Rue Frei Caneca 22, Sao Paulo, Brazil.

A number of the West Coast fellows have been QSO pi1HR. 6AWT, 6EA, 6EB, and 6BUR have been working him regularly. His QRA is Lieutenant Hayden P. Roberts, Fort McKinley, Manila, Philippine Islands. 6BUR is working him on schedule regularly and is ready for Philippine Islands traffic in any quantity. pi1HR is on 40 meters, RAC, and can be heard on the West Coast between 3 and 6 A.M. PST.



Although amateur transmission is still prohibited in Holland the amateurs there are making a most strenuous effort to get Government recognition. With the co-operation of the principal radio society of the country, Nederlandsche Vereeniging Voor Radio Telegrafie, it is hoped and expected that Governmental action in favor of the transmitting amateur will soon be forthcoming. There are over 40 members of the I.A.R.U. in Holland, now.

From Mr. W. G. Dixon, Secretary of the British Section of the I.A.R.U. we have a report on the following British activities:

As the organization is still young an account of the work done in June is necessarily meagre. Through the activities of a comparatively small "summer group" all foreign countries that were worked during the winter months are still being communicated with. g2OD has been working regularly with a2CM on special schedules to collect data on aerials and different wavelengths from 20 to 45 meters. 2OD has worked z2AE on 40 meters and bz1AF on 20 meters. The Challenge Cup donated by Mr. Marcuse for the best season's DX has been awarded to g2OD for 1925. g2LZ is doing splendid work on 40 meters, having been QSO z2AE, z2XA, and z2AC and also a2YI and a3BQ. On April 18th g5NN was heard in Melbourne, Australia on 18 meters in daylight. This one way work preceded g2OD's two-way work by one day. g5NN was also the first Britisher to log NRRL. g2KF is reported to have worked NRRL, although this report has not been confirmed. 6LJ, despite the fact that he is taking a rest from super-receiving, has heard u6AWT and u4SA in daylight recently. 6UV has left the 90 meter band and has gone down to 40 meters on which wavelength he has been QSO all but three of the U.S. districts.

The Bristol hams have formed a transmitters section of the Bristol & District Radio Ass'n. g6RY is working on 46 and 23 meters and has an experimental 10 meter set in operation. In the northern section g6YR has been heard in New York when his input was only 3½ watts. g2CC has been very active on low power on 23 meters and has bagged a number of U.S. hams.

m-GHH1, the call used by Captain Durrant at Mosul, Mesopotamia has been changed to m-1DH. ex g2JO is in Borneo and as no details of his exact QRA are available anyone hearing him somewhere around 45 meters will please pass the news along. The British I.A.R.U. secretary will be glad to enter into correspondence with secretaries of Colonial Clubs and will be

pleased to arrange schedules of operation with any foreign amateurs or radio clubs. He can be reached at Dipwood, Rowlands Gill, Co., Durham, England.

### Correction

Last month, on page 43, we published a list of short-wave stations which looked very much like the list below. But it wasn't! It was badly "shot" with errors. We think this one is correct. Please use it for reference and not last month's; and accept our apologies for last month's mistakes.

Wave length	Call letters	Location
20.0	POX	Nauen, Germany
25.0	2YT	Poldhu, England
25.0	POY	Nauen, Germany
26.0	POX	Nauen, Germany
30.0	2XI	Schenectady, N. Y.
32.0	2YT	Poldhu, England
35.0	2XI	Schenectady, N. Y.
36.0	LPZ	Buenos Aires, Argentine
38.0	2XI	Schenectady, N. Y.
40.0	1XAO	Belfast, Me.
43.0	WIR	New Brunswick, N. J.
47.0	POZ	Nauen, Germany
50.0	NKF	Anascotia, D. C.
56.0	KFKX	Hastings, Nebraska
58.79	KDKA	East Pittsburgh, Penna.
60.0	1XAO	Belfast, Me.
60.0	2YT	Poldhu, England
62.0	KDKA	East Pittsburgh, Penna.
67.0	8XS	East Pittsburgh, Penna.
70.0	POX	Nauen, Germany
71.5	NKF	Anascotia, D. C.
74.0	WIR	New Brunswick, N. J.
75.0	SFR	Paris, France
75.0	WGN	Rocky Point, L. I.
76.0	POX	Nauen, Germany
83.0	RDW	Moscow, Russia
84.0	NKF	Anascotia, D. C.
85.0	SFR	Paris, France
85.0	8GB	Paris, France
86.0	NQC	San Diego, Calif.
90.0	6XO	Kahuku, T. H.
90.0	1XAO	Belfast, Me.
92.0	2YT	Poldhu, England
94.0	2YT	Poldhu, England
95.0	SFR	Paris, France
96.0	8XS	East Pittsburgh, Penna.
99.0	6XI	Bolinas, Calif.
100.0	---	New Orleans, La.
100.0	POX	Nauen, Germany
100.0	2XI	Schenectady, N. Y.
100.0	NAM	Norfolk, Va.
103.0	WGH	Tuckerton, N. J.
105.0	WHU	S. S. "Big Bill"
107.0	2XI	Schenectady, N. Y.
112.0	1XAO	Belfast, Me.
115.0	FL	Paris, France
120.0	1XAO	Belfast, Me.
146.0	6XO	Kahuku, T. H.

# Calls Heard



### 1AZK, 128 Grove Street, Chelsea, Mass. 150 to 200 meters.

1abj, 1awq, 1bcd, 1bgu, 1bjk, 2ahe, 2aiz, 2ali, 2ams, 2amw, 2bdo, 2cqd, 2ll, 2lz, 2sq, 3afk, 3acu, 3aid, 3aso, 3ctn, 3fu, 3ld, 3ako, 3aqb, 3bdj, 3bdo, 3bga, 3cew, 3egu, 3civ, 3agk, 3fo, 3hb, 3dmm, 3fg, 3ud—80 meter band 2adk, 2ach, 2ebk, 2cgh, 2cy, 2ff, 2kg, 2lm, 3aai, 3af, 3afu, 3hg, 3sm, 4it, 3ayb, 3aye, 3bbe, 3bsm, 3buh, 3ekt, 3cja, 3cnx, 3rd, 3adz, 3dfo, 3rt, 3av, 3adz, 3baz, 3bss, 3cja, 3cb, 3cvm, 3emd, 3ox, 3tm—20 and 40 meter bands 3afq, 3av, 3rd, 3adz, 3qs, 3aji, 3auk, 3cgv, 3zac, 3xby, 3aqb, 3ayy, 3jj, 3bna, 3pl, 3ry, 3sg, 3diw, 3zwa, 3sh.

### 1PY, Longmeadow, Mass.

4aa, 4aee, 4af, 4ask, 4cp, 4cu, 4er, 4kw, 4kt, 4mf, 4nj, 4oa, 4oi, 4pz, 4qy, 4rn, 4ra, 4sa, 4tv, 5ac, 5agn, 5ail, 5aln, 5ac, 5dn, 5ox, 5uk, 5va, 5vv, 6amm, 6awt, 6u5ar, 6bgo, 6bmw, 6cuh, 6cgv, 6ers, 6cto, 6dah, 6lr, 6sb, 6akf, 6aot, 6apa, 6bbj, 6bdu, 6bpt, 6bmx, 6bkr, 6cjs, 6civ, 6elo, 6ery, 6esh, 6cyr, 6cxa, 6dmj, 6dpl, 6dax, 6eiz, 6ek, 6ff, 6hp, 6mm, 6og, 6ug, 6zk, 6cm, 6zds, 6zsa, 6zaf, 6iac, 6agt, 6vch, 6fg, 6zfk, 6zsz, 6zvj, 6iaa, 6af, 6mb, 6ln, 6ve, 6nrl, 6ap, 6wp.

### 1ACI, Attleboro, Mass.

g2cc, g2kf, g2nm, g2od, g2sz, g5dh, g5lf, g5ma, g5nn, g5nf, g5ym, f8bf, f8ct, f8di, f8dp, f8fg, f8gq, f8sm, f8ok, f8wg, f8yor, m1aa, m1b, m1bx, m1af, m1k, m1a, p1aj, p1kt, p1oo, p1rx, p1sa, ber, earl, ear3, ear6, bowjs, bzlab, noba, nonl, nonr, npeuu, g2ic, g2mk, g2by, smxa, d5ca, d7ec, iler, ilmt, ilno, irr, llwb, b4yq, b4vz, bw3e, ab7c, a2cm, a2ds, a2ae, a2yi, z2ac, z2ae, z2xa, z2aa, z2ag, z2ar, rcb3, Czescoslavkian okl, hu3ac, hunpu, o1aa.

### 1AQW, Waterbury, Conn.

#### 40 Meter Band.

3auv, 3bco, 3bua, 3bwj, 3dvw, 3oq, 4bt, 4fm, 4kt, 4pz, 4rr, 4rl, 4tv, 4xe, 5afd, 5am, 5nj, 5nk, 5ajn, 5akn, 5aul, 5bc, 5cgn, 5bhj, 5blg, 5bpl, 5bna, 5boy, 5bpl, 5bg, 5br, 5bt, 5bz, 5caz, 5cdv, 5cyl, 5dae, 5dem, 5don, 5dv, 5ag, 5kw, 5lf, 5mc, 5nt, 5ry, 5sf, 5up, 5ado, 5bbj, 5bbv, 5bdw, 5bge, 5bhe, 5bh, 5bht, 5ble, 5bjp, 5bmv, 5bvh, 5cul, 5cxa, 5cet, 5dk, 5dmj, 5dpl, 5dvw, 5eac, 5eiz, 5ejy, 5ek, 5es, 5kq, 5mm, 5og, 5ug, 5lar, 5aa, 58be.

### 2CTH, Watervliet, N. Y.

4ua, 4sa, 4oa, 4bl, 5lg, 5ame, 5ng, 6ajm, 6bbv, 6cel, 6cgc, 6cgv, 6cix, 6cns, 6cpl, 6cra, 6esa, 6cto, 6cwp, 6cu, 7uv, raf2, ber, balab, bz2sp, f8gq, f8fg, g2cc, g2kf, g2lh, g2nm, g2sz, noba, npeuu, iler, ilno, j1aa, m1aa, m1af, m1b, m1x, m9a.

### 2CRB, Ferndale, N. Y.

4af, 4cu, 4eg, 4er, 4fk, 4ll, 4fu, 4mf, 4mi, 4oa, 4oi, 4rl, 4sa, 4tv, 4ux, 5ac1 5acy, 5ail, 5ame, 5dn, 5atu, 5ox, 5sd, 5uk, 6cgo, 6cgv, 6cix, 6cto, 6dab, 6fa, 6vc, 6aot, 6adk, 6ata, 6azc, 6bbj, 6bkr, 6bmv, 6bna, 6bol, 6bwx, 6cap, 6cbe, 6cca, 6ccc, 6cuk, 6cuo, 6dhk, 6diw, 6dka, 6dpr, 6dvw, 6dk, 6cc, 6eex, 6efa, 6ey, 6ei, 6es, 6fk, 6ut, 6lar, 6zax, 6cen, 6c3v, m1k, m1af, ber, a2yi, z2ac, nr1, naj, npg, kfuh.

### 3BVA, York, Penna.

5aj, 5in, 5ph, 5ng, 5ox, 5nj, 5vl, 5uk, 5kc, 5atv, 5aom, 5zal, 6ak, 6afg, 6gsk, 6aiv, 6aji, 6aiv, 6awt, 6au, 6bbz, 6bkc, 6bof, 6bve, 6cal, 6cge, 6cgo, 6chs, 6chz, 6cdv, 6cnc, 6cra, 6cix, 6cgv, 6cpl, 6cto, 6csw, 6cso, 6dah, 6dao, 6js, 6ll, 6nx, 6ve, 6wr, 6zd, 6xad, 6xap, 6xsk, 7oo, 7bj, 7fd, 7it, 7j, 7k, 7n, 7nx, 7uz, 7rl, 7ya, 9amb, 9caa, 9ded, 9dfh, 9efy, naj, nas, nkf, hpg, nve, nr1, kfuh, kfvm, wap, wnp, pr4kt, pr4oi,

pr4rl, pr4sa, m1aa, m1af, m1b, m1g, m1k, m1n, m9a, rebk, raf2, bzlab, bz2sp, ber, q2by, g2lz, g2nm, g2za, g5dh, g6ym, g2kf, f8alg, f8aj, f8bf, f8bv, f8ct, f8sm, f8gq, f8yor, d7ec, iler, a2bk, a2cm, a2ds, a2yv, a2ym, a2yi, a3bd, a3bq, z1ao, z2ac, z2ae, z2aa, z4aa, z4ak, z4ag, c1aa, c1ac, c1am, c1ar, c1dd, c2gw, c2cg, c5er, c5ef, c9ch.

### 6CWP-6BUX, Pomona, Calif.

1aep, 1ar, 1anq, 1cak, 1fx, 1rr, 2ah, 2bbx, 2brb, 2cty, 2mu, 2jw, 4gy, 4sl, 5acd, 5acc, 5ail, 5aom, 5apm, 5atv, 5ed, 5ek, 5hi, 5lg, 5ls, 5mi, 5nj, 5ou, 7ay, 7dd, 7fd, 7kg, 7ku, 7lu, 7rl, 7rr, 7ul, 7w, 7wu, 7cyi, 8dij, 8dnr, 8eg, 8pl, 9amm, 9aad, 9dfh, 9dfj, 9oms, 9eak, 9ecc, 9ek, 9ell, 9oo, 9wo, 9zoo, m1aa, m9a, c5eu, c9ck.

### 6CIX, Whittier, Calif.

a2bc, a2bk, a2cm, a2ds, a2lj, a2rl, a2tm, a2yi, raf2, hu6asr, hu6ct, hu6def, hu6tg, kfuh, nr1, apm, j1aa, m1b, m9a, Samoan 6zac, z1ao, z2ac, z2ae, z2ak, z2xa, z3dt, z4ar.

### 6CUB, Venice, Calif.

1aao, 1ajx, 1are, 1aac, 1ber, 1bqg, 1ccx, 1my, 1oj, 1ot, 1ow, 1pl, 1xu, 1ar, 2bec, 2brb, 2rm, 3bmz, 3ot, 3ws, 4af, 4dm, 4ku, 4rn, 4rr, 5act, 5atu, 5ef, 5ew, 5kg, 5oq, 5ox, 5ast, 6zac, 7aek, 7af, 7af, 8afs, 8apn, 8apw, 8bf, 8ck, 8dgv, 8doo, 8er, 8eg, 8jj, 8u, 8ux, 8qd, 8xi, 9av, 9aim, 9amb, 9aps, 9bbh, 9bdz, 9bjp, 9bpb, 9bwp, 9det, 9ek, 9mm, 9zt, c4bv, c9al, m1af, m9a, reb3, z2ac, z1ag, a2ds.

### 6JP, San Francisco, Calif.

#### 40 meter band.

1aa, 1aac, 1are, 2aag, 2epa, 2cq, 2qh, 3afg, 3bdo, 3wo, 4ak, 4cj, 4rn, 5an, 5bk, 5br, 5ox, 5uk, 5ch, 5ux, 5jj, 5h, 5oa, 5ry, 5zh, 5ado, 5afe, 5afg, 5afi, 5bed, 5bml, 5bk, 5dvw, 5dz, 5kd, 53xa, 53ba, 53bc, 53be, 53bk, 53yl, j1ae, hu, ya.

### 7NQ, Hoquiam, Washington

1af, 1ed, 1tr, 2by, 2z, 2kj, 3bau, 3ccy, 3gg, 3oe, 3ws, 4dy, 4hh, 4ll, 4ss, 4lj, 5af, 5al, 5am, 5apq, 5asd, 5bz, 5cg, 5fr, 5ql, 5rg, 6abg, 6aoz, 6atu, 6aum, 6ben, 6bgb, 6bge, 6bis, 6bnh, 6brn, 6bsf, 6bsj, 6bdc, 6fg, 6fm, 6je, 6jj, 6ml, 6sl, 6sz, 6tl, 6uci, 6uo, 6gd, 6xg, 6zbt, 86a (qra?), 7kn, 8bm, 8cye, 8ju, 8xas, 9ace, 9act, 9adr, 9baz, 9caa, 9ca, 9ckh, 9cko, 9coo, 9cuo, 9cuv, 9ev, 9cvm, 9evo, 9dbg, 9dd, 9dgo, 9dla, 9dmj, 9dr, 9dvl, 9eii, 9ek, 9eky, 9fp, 9ed, 9qs, 9xl, c3xi, c4dy, c4fv, c4io, c5af, c5as, c5bf, c5bh, c5co, c5cu, c5dd, c5ds, c5fk, c5hk, c5hp, c5hs.

### 7WA, Latah, Wash.

1ex, 1fx, 1rp, 1xu, 1aep, 1anq, 1ftu, 2rs, 2zv, 2afn, 2brb, 2xaf, 4fy, 5ls, 5mi, 5nw, 5wi, 5atv, 5ax, 5bf, 5eg, 5bqi, 5chk, 5dea, 5kf, 5pg, 5ve, 5iz, 5fuh, 5nrl, cxi.

### 7WL, Portland, Oregon.

1ar, 1ary, 1axa, 1er, 2adu, 2afn, 2bbx, 2cvm, 2lu, 2mu, 3ot, 3ot, 3wo, 3ym, 4av, 4ax, 4fk, 4pz, 4rm, 4sl, 5af, 5atv, 5og, 5ox, 5ov, 5ph, 5ux, 5wi, 5aj, 5al, 5alb, 5avy, 5bqa, 5bvn, 5ced, 5chk, 5cvi, 5do, 5dqn, 5jj, 5ay, 5xar, 5ado, 5aog, 5bhj, 5bhd, 5bht, 5bpb, 5caa, 5cpl, 5cto, 5dam, 5dez, 5dof, 5dum, 5duc, 5eam, 5eii, 5ew, 5eg, 5es, 5kb, 5oo, 5qd, 5ud, 5mia, m1b, m1bx, m2xt, m9a, a2ay, a2ds, a2yi, a2ym, a2zt, a3bd, a3ef, z2ac, z2aa, z1ag, c2bg, c2cg, c3ni, c4bf, c4bv, c4dq, c4eo, c4fz, c4gt, c4lo, c5as, c5ba, c5bm, c5cr, c5ef, c5hp, c5hs, c9al.

### SAVE, Buffalo, N. Y.

4aad, 4af, 4ask, 4cu, 4iv, 4jr, 4kq, 4mi, 4oa, 4oi, 4pz, 4rm, 4ua, 4uk, 5ail, 5ef, 5hi, 5nj, 5ot, 5ox, 5ph,



2br, 2ax, 2bum, 2ck, 2ev, 2fu, 2kx, 2kf, 2jl, 2zv, 3adt, 3acc, 3ca, 3co, 3in, 3lw, 3mk, 3tr, 3vw, 4fm, 4kl, 4rm, 4sv, 4t, 5ato, 6ajr, 6asr, 6awl, 6bjx, 6btx, 6ect, 6err, 6chs, 6uw, 6vc, 7ao, 7ec, 7dd, 7lq, 7ls, 7yb. Misc: a2ds, c5bz, c6re, 6a7c, 7aaz, 7jia, n1z?

9EIH, Milwaukee, Wis.

6aak, 6aam, 6afg, 6agk, 6agn, 6ahq, 6ajo, 6asv, 6avb, 6avj, 6awt, 6aw, 6bde, 6bge, 6bgv, 6bjd, 6bkl, 6bmw, 6bon, 6bsn, 6bur, 6bvs, 6cae, 6cax, 6cco, 6ect, 6edy, 6efi, 6eft, 6egw, 6chs, 6chz, 6cix, 6cjb, 6cmt, 6cnc, 6cpi, 6com, 6ers, 6ess, 6esw, 6ct, 6cto, 6cub, 6cv, 6evj, 6dah, 6dao, 6dat, 6dh, 6ew, 6ex, 6fa, 6hu, 6jp, 6js, 6km, 6ll, 6lj, 6lr, 6mp, 6no, 6od, 6ol, 6rw, 6cb, 6tx, 6vc, 6vr, 6xap, 6xm, 6zd, 6zbn, 7aek, 7ay, 7ij, 7ku, 7mf, 7ng, 7nt, 7rl, 7tv, 7uz, 7abf, 7c4v, 7c4t, 7c4io, 7c5ef, 7c9ck, 7c9il, 7mia, 7mla, 7mib, 7nk, 7mln, 7m9a, 7zcm, 7zyg, 7zyi, 7kfh, 7kio, 7np, 7nve, 7nrl, 7wpa.

ptiHR, Lt. H. P. Roberts, Ft. Wm. McKinley, P. I.

2apn, 2em, 4gt, 5una, 5ov, 5uk, 6ag, 6agk, 6ahk, 6asr, 6aws, 6awt, 6bdz, 6bgv, 6bhg, 6bz, 6bur, 6chs, 6ene, 6eto, 6ea, 6eb, 6ex, 6ji, 6ka, 6cmu, 6is, 6ut, 6vg, 6zac, 6zw, 7it, 7lac, 7pl, 7m, 7a2cm, 7abhd, 7ab3q, 7a4a, 75ac, 72yi, 7nkf, 7np, 7nl, 7pm, 7pn, 7po, 7pu, 7rr, 7nr, 7nuq, 7jia, 7kfh, 7gbc, 7kel, 7pkb, 7vis, 7hva, 7xi, 7bl, 7ous, 7x (7ra?)

oA4M, S. C. Pleass, Bramley, Johannesburg, S. Africa.

1aa, 1ab, 1af, 1awj, 1aay, 1afc, 1afu, 1afn, 1ajx, 1all, 1and, 1aon, 1aom, 1arq, 1arv, 1auc, 1axn, 1azl, 1bv, 1by, 1bee, 1bed, 1bes, 1bhm, 1bis, 1cab, 1cak, 1ekp, 1eri, 1er, 1fn, 1fs, 1hn, 1ll, 1kc, 1oj, 1ow, 1pl, 1py, 1qp, 1rr, 1se, 1sf, 1te, 1wl, 1vw, 1xz, 1xav, 1yb, 1zi, 1zs, 2af, 2ag, 2aan, 2aay, 2agb, 2aga, 2ams, 2ana, 2axf, 2azy, 2bz, 2bq, 2br, 2bv, 2baa, 2bee, 2bgi, 2bqh, 2brb, 2bse, 2buy, 2ch, 2cei, 2cdf, 2cgr, 2cgrj, 2cjh, 2cki, 2ckx, 2cla, 2cns, 2epd, 2ezc, 2evs, 2exy, 2fc, 2rk, 2ha, 2kx, 2ld, 2le, 2pd, 2rb, 2rk, 2xi, 2xo, 2xaf, 2zah, 2xam, 2ad, 2abi, 2abw, 2adq, 2adt, 2aew, 2ahu, 2alx, 2apv, 2auv, 2bg, 2hco, 2bdo, 2bhv, 2bjp, 2bnu, 2bms, 2bta, 2ca, 2chg, 2cjin, 2ckp, 2hg, 2hi, 2huv, 2kz, 2lg, 2lr, 2nf, 2oq, 2wb, 2wu, 2zo, 2ak, 2ba, 2bek, 2ch, 2dm, 2dr, 2dq, 2eq, 2fg, 2gw, 2io, 2je, 2jr, 2jy, 2kl, 2ku, 2oa, 2pd, 2sa, 2sb, 2tj, 2uc, 2uk, 2vg, 2ve, 2ac, 2ae, 2ax, 2ac, 2afu, 2agk, 2ahw, 2aic, 2ail, 2aiu, 2ajh, 2akn, 2ame, 2aom, 2asb, 2asz, 2avv, 2atz, 2bp, 2ca, 2ce, 2ck, 2er, 2et, 2dl, 2ew, 2fl, 2fk, 2fu, 2fr, 2fs, 2fq, 2fox, 2fo, 2fp, 2gq, 2fr, 2riu, 2sa, 2se, 2sk, 2trb, 2uk, 2uf, 2ul, 2vm, 2wi, 2za, 2zai, 2ad, 2afg, 2afq, 2age, 2agk, 2agz, 2aji, 2alf, 2alw, 2ame, 2apw, 2arb, 2awt, 2bab, 2bdt, 2bgv, 2bhx, 2bjk, 2bka, 2bnr, 2bqr, 2bsh, 2bsn, 2buc, 2bur, 2cc, 2can, 2cft, 2ege, 2cgo, 2cgv, 2cig, 2civ, 2cmi, 2cmu, 2cnc, 2cni, 2csw, 2cst, 2csw, 2ctn, 2cto, 2gha, 2gdf, 2ga, 2eb, 2fa, 2fz, 2im, 2ij, 2jp, 2jv, 2km, 2kr, 2no, 2oh, 2qi, 2rw, 2tq, 2ts, 2ur, 2ut, 2vc, 2xa, 2xi, 2xz, 2xm, 2xo, 2xad, 2xae, 2xap, 2xby, 2zb, 2zbe, 2fr, 2ij, 2ls, 2mf, 2ah, 2aal, 2abs, 2adg, 2aey, 2uly, 2upw, 2aro, 2atp, 2atw, 2avi, 2bi, 2bf, 2bau, 2bch, 2ben, 2buk, 2bzt, 2ch, 2cx, 2cz, 2csp, 2ccq, 2ccr, 2ced, 2cei, 2chk, 2cjb, 2cme, 2cny, 2do, 2deb, 2dfo, 2dgl, 2dgp, 2dfr, 2dme, 2doo, 2dse, 2eg, 2er, 2sz, 2xj, 2xj, 2sr, 2nb, 2nc, 2pk, 2pl, 2qr, 2ry, 2sf, 2uf, 2uk, 2v, 2vt, 2wa, 2wo, 2xe, 2xk, 2xs, 2xaf, 2xas, 2ze, 2zo, 2aan, 2ahq, 2and, 2axd, 2axq, 2bnu, 2bn, 2bbj, 2bdr, 2bfx, 2bht, 2bjj, 2bhx, 2bkg, 2bkr, 2bld, 2bmx, 2bnx, 2bpb, 2bnt, 2bpy, 2buj, 2buk, 2bvb, 2bwp, 2bvy, 2ch, 2co, 2cak, 2cem, 2cdv, 2cip, 2coo, 2cul, 2cuo, 2cvs, 2cvd, 2db, 2du, 2dx, 2dal, 2dbj, 2dbz, 2dd, 2dek, 2dai, 2dgo, 2dmi, 2dpl, 2dqu, 2dtt, 2dum, 2dvg, 2dwh, 2dxn, 2ee, 2et, 2efz, 2egz, 2ehw, 2eik, 2elu, 2hp, 2ib, 2mn, 2na, 2nxb, 2nq, 2xi, 2xw, 2za, 2zh, 2zt, 2zy, 2a8, 2rb8, 2ybz, 2rlr, 2z2d, 2z2sp, 2z9tc, 2ch2ld, 2nsl, 2mla, 2mb, 2mk, 2d7ec, 2fx, 2lr (p. 1), 2kka, 2def, 2kel, 2et, 2fkx, 2kfh, 2kio, 2pl, 2nf, 2nv, 2nk, 2nx, 2pk, 2nm, 2no, 2nr, 2nuq, 2ve, 2ctu, 2rdw, 2ur, 2vw, 2wz, 2wh.

On Board U. S. S. R-18 (Submarine) At Dock at Honolulu, T. H. 40 Meter Band.

6awt, 6omu, 6xad, 6aff, 6ip, 6etu, 6hmw, 6bhi, 6bih, 6cft, 6asr, 6xdb, 6nw, 7aek, 7ub, 7uz, 7chk, 7est, 7awt, 7kio, 7kfh, 7et, 7wz, 7nq, 7nu, 7np, 7pm, 7pg, 7nrl, 7nke, 7nkf, 7kdr, 7gbc, 7exi, 7xi.

J. R. Mohler, USS Litchfield, Honolulu to Samoa All in 40 meter band

1aa, 1aaq, 1af, 1amq, 1are, 1auc, 1awe, 1cy, 1er, 2afn, 2bbx, 2brb, 2ery, 2ety, 2ha, 2hg, 2xi, 2zv, 3hg, 3ug, 4af, 5ae, 5aj, 5akn, 5atv, 5hp, 5ml, 5oq, 5ox, 5ph, 5qx, 5uk, 5wt, 5zas, 6abe, 6alf, 6atg, 6agk, 6agn, 6ahe, 6ahq, 6av, 6aw, 6ajf, 6ajm, 6alg, 6als, 6ann, 6aoi, 6asv, 6ava, 6avj, 6awt, 6bde, 6bim, 6bkv, 6bmw, 6bon, 6bro, 6bsn, 6buc, 6bwa, 6bww, 6cav, 6cck, 6cdm, 6edy, 6ega, 6egr, 6egw, 6chs, 6chz, 6cix, 6cms, 6ene, 6enk, 6cni, 6ers, 6eru, 6ess, 6est, 6eto, 6cub, 6evj, 6cvp, 6dah, 6dao, 6def, 6dg, 6ea, 6eb, 6hu, 6jp, 6km, 6ku, 6kw, 6li, 6mp, 6nx, 6ol, 6rw, 6sb, 6tq, 6tz, 6vc, 6vr, 6vw, 6xad, 6xg, 6zb, 6zd, 7aek, 7ay, 7dd, 7de, 7gj, 7ij, 7it, 7ll, 7nt, 7ry, 7uj, 7uz, 7wu, 7ya, 7aj, 8apw, 8ayv, 8bau, 8ecd, 8eck, 8cim, 8pl, 9ado, 9afz, 9akf, 9amb, 9bed, 9bew, 9bht, 9bn, 9bvh, 9cdv, 9cul, 9cxx, 9ded, 9dfj, 9duc, 9dvb, 9dvw, 9ek, 9sec, 9hp, 9mm, 9uq, 9yd, 9zb, 9zt. Australians: 2cm, 2ds, 2yl, 2bd, 3bq, 3bz, 3ju. New Zealand: 2ac, 2xa, 4ag, Mexico: 1aa, 1b, 1k, 1n, 9a. Japan: 1aa, Canada: 4gt, 5gf, 9ek. Com.: kel, kfh, kfv, kio, wgh, wtd, wir, wiz, xda. Navai: nerkl, nivv, nkf, npf, npm, npn, npu, npx, (nrrl), ave. Misc.: fxi, wap.

Livio G. Moreira, Rua Paula Gomes 6, Curitiba, South Brazil.

1alw, 1anq, 1btr, 1ckp, 1cu, 1mv, 2adu, 2agu, 2bc, 2ber, 2bee, 2ety, 2fb, 2go, 2ha, 2mu, 2nf, 2ve, 2xaf, 2xu, 2xz, 3bec, 3cd, 3edk, 3fg, 3jw, 3kdk, 3ot, 4cu, 4tv, 5apu, 6das, 6ax, 6nk, 6st, 9bst, 9efi, 9kl, 9ddj, 9dkr, 9ek, 9es, 9mm, 9qr, 9tae, 9xw, 9xz. Argentine: a8, afl, af2, apl, ad2, de8, cb8. Australian: 2ae, Brazil: 1ab, 1af, 2sp. Chile: 2ld. Suecia: smyy. Uruguay: jcp.

hz2SP, Sao Paulo, Brazil

1aw, 1amd, 1axn, 1alw, 1emp, 1ckp, 1ckj, 1cak, 1ixn, 1ka, 1pl, 1uv, 1ve, 1wl, 1xam, 1xz, 1yb, 2als, 2acq, 2afn, 2bq, 2bee, 2bhm, 2bbx, 2bw, 2bui, 2bai(?) 2cjb, 2cyu, 2cty, 2cth, 2gk, 2ha, 2lu, 2nf, 2xai(?) 2aih, 2bva, 2cdk, 2jw, 2ll, 2ot, 2wb, 2cu, 4io, 4be, 5bj, 6awt, 6bur, 6xad, 6am, 6hsm, 6hsm, 6er, 6av, 9bht, 9xax, 9xi, 9zt, ciar, g2lz, smya, smyv, smyy, smwfv, nonl, noxf, nsaf, iler, 1lr, 1f8v, 1f8q, 1f8m, 1ciar, 2zac, 2zae, 2smyy, 2q2bz, 2g2m, 2gdh, 1f8rd.

bz1AF, Rio de Janeiro, Brazil.

1aac, 1aao, 1abf, 1af, 1acr, 1ajz, 1als, 1amd, 1auw, 1axu, 1bdx, 1bkc, 1bq, 1ck, 1ckp, 1cmx, 1my, 1qz, 1rd, 1ve, 1xam, 1xn, 1xi, 1xm, 1xru, 1xu, 1xz, 1yb, 1yy, 2aay, 2aay, 2af, 2bee, 2bhm, 2cwx, 2ze, 2gk, 2gz, 2hd, 2jw, 2ll, 2rr, 2z, 4etg, 4dm, 4io, 4sbc, 6awf, 6ad, 6bur, 7zb, 3adg, 3amh, 3bau, 3hsm, 3er, 3av, 9bht, 9xax, 9xi, 9zt, ciar, g2lz, smya, smyv, smyy, smwfv, nonl, noxf, nsaf, iler, 1lr, 1f8v, 1f8q, 1f8m, 1ch2ld, 1ch9tc, 1rafl, 1reb8, 1rpb8.

bz1AB, E. do Rio, Brazil.

18 to 45 meters.

1aac, 1aao, 1abp, 1aci, 1af, 1afn, 1amd, 1aw, 1aww, 1bcc, 1ber, 1bdx, 1bhm, 1ckp, 1emp, 1cmx, 1dq, 1ef, 1er, 1ka, 1kc, 1kp, 1oj, 1ow, 1pm, 1qm, 1rd, 1rr, 1se, 1sf, 1te, 1vd, 1ve, 1xav, 1xu, 1xz, 1yb, 1yd, 2aay, 2afn, 2ag, 2agq, 2agw, 2apf, 2bee, 2bgi, 2big, 2bhm, 2br, 2brb, 2bre, 2bse, 2bw, 2cdc, 2cl, 2ev, 2cwx, 2ds, 2gk, 2hx, 2uh, 2tr, 2vw, 2wj, 2xaf, 2zv, 2hg, 2ge, 2ig, 2js, 2jw, 2ll, 2w, 4dm, 4du, 4dx, 4j, 4m, 4tu, 4xe, 5aur, 6awt, 6xap, 6abm, 6amh, 6amh, 6awl, 6ar, 6bf, 6bgn, 6cer, 6gu, 6gz, 6jj, 6jm, 6pl, 9bht, 9bbl, 9dbz, 9dez, 9dpx, 9du, 9nv, 9rz, 9ar, 9xi, 9zt, 9ras, 9mia, 9ciar, 2zac, 2zae, 2zka, 2zcc, 2zfk, 2g2lz, 2g6m, 1f8ct, 1f8q, 1f8m, nonl, nsaf, smwfv, smyy, iler, 1vab2, reb8, rdb2, rbal, raf1, raf3, rlor, 1ch2ld, 9tc, nkf, nrrl, pl, pox, wiz, 2rde.

ch9TC, Los Andes, Chile.

1af, 1pl, 1gm, 1te, 1xz, 1yb, 2ag, 2bee, 2blm, 2by, 2bf, 2hg, 3il, 3vx, 4tv, 4xe, 5aac, 5afd, 5ajh, 5am, 5amh, 5amw, 5in, 5ls, 5nj, 5ot, 5uk, 5zai, 6ac, 6afg, 6afn, 6aji, 6asv, 6awt, 6bad, 6ban, 6bhz, 6bil, 6bjj, 6hmw, 6csw, 6cvm, 6cwg, 6ea, 6fz, 6il, 6no, 6ol, 6ts, 6vc, 7ya, 8afn, 8bf, 8bgn, 8bvt, 8jj, 8nx, 8nz, 9aot, 9arc, 9bft, 9bjp, 9cd, 9cul, 9cvg, 9dex, 9dpx, 9drc, 9dum, 9dzt, 9ek, 9hl, 9mn, 9no, 9yo, nkf, npg, nrrl, 9est, 9zxa, 9zlab, 9zaf, 9zlat, 9z2sp, Uruguay: 2ax, 2cx, 2w, 2chci, 2ch2ld, 2a15, 2raxl, 2bal, 2rdb2, 2rdb8, 2dd4, 2de2, 2fai, 2fcb, 2ff6, 2ff9, 2pa2, 2ria8,



5osw, 5eb, c5ef, 5ep, 5nq, 5ox, 5zav, 6ajl, 6ajv, 6avj, 6alf, 6amm, 6aph, 6asv, 6awt, 6aww, 6bbv, 6bj, 6bjd, 6bjl, 6bjv, 6bkv, 6bqt, 6cdy, 6cev, 6ego, 6chs, 6cmg, 6enu, 6erx, 6css, 6ct, 6cto, 6cub, 6daa, 6dab, 6daj, 6dan, 6dn, 6eb, 6jp, 6lj, 6qi, 6rb, 6rv, 6rv, 6sbb, 6sz, 6tvj, 6hf, 6zac, 7amm, 7ay, 7cu, 7hb, 7ij, 7kl, 7lu, 7mx, 7tv, 7ug, 7uz, 7zi, 7zj, 8ajj, 8aul, 8ave, 8br, 8caz, 8eed, 8eip, 8cuk, 8dnf, 8gq, 8le, 8aj, 8tpw, 8zl, 9aad, 9ajt, 9ado, 9apa, 9apm, 9aaq, 9ata, 9bbj, 9bdv, 9bcd, 9bht, 9bkj, 9bm, 9bmp, 9bmv, 9bnd, 9bnu, 9btj, 9bxq, 9caj, 9ck, 9cnp, 9cur, 9cwn, 9dae, 9dez, 9dmj, 9drd, 9dkl, 9dvl, 9ecc, 9eep, 9efs, 9ek, 9egg, 9egn, 9eiz, 9fg, 9hk, 9im, 9oo, 9wo, 9ql, 9qtu, 9xa, 9zt, naj, nkf, nve, wwp, wii, wiz, wwp.

**G. Hislop, 8 Fitzroy Road, Napier, N. Z.**

1aao, 1cmp, 2ajx, 2big, 2cgl, 2ktu, 2yiu, 3chg, 3sgd, 4cq, 4dm, 4tv, 5aci, 5uk, 5wi, 6asv, 6awt, 6bhz, 6cct, 6cqw, 6chi, 6chs, 6cto, 6ea, 6neh, 6no, 6xg, 6zac, 6chk, 8ry, 9arf, 9ado, 9adu, 9ck, 9daw, 9ded, 9dq, 9bqu, 9zt, gnq, nrll. Canada: c4gt. Cuba: q2ww. England: 92od. Italy: 3mie.

**Nelson Winch, Brady St., Te Awamutu, New Zealand.**

1pl, 1hr, 1auq, 2ago, 2ety, 3vva, 4sa, 5atv, 5wi, 5nj, 6xap, 6ql, 6eko, 6ajn, 6bur, 6cgv, 6arg, 6chz, 6hi, 6yz, 6ch, 6ks, 6er, 6chk, 9akf, 9apm, 9ded, 9ek, 9bht, 9bbp, 9uq, 1lmo, 1lb, 6z2sp, 6z1z, a2jm, a2cm, a2ds, a2zn, a2rj, a2ij, a2yz, a3bd, a4an, nrll, gbe, vis, pox, nkf.

**R. W. Mintrom, Christchurch, New Zealand.**

1aao, 1ahl, 1amd, 1py, 1qm, 1te, 1xz, 1yb, 2brb, 2cgl, 2cxw, 2xaf, 2cdk, 3ll, 3oe, 4cu, 5ew, 5mi, 5nj, 5ov, 5uk, 5vi, 5za, 6asv, 6ahy, 6ahp, 6age, 6agk, 6ac, 6ajm, 6ahk, 6aji, 6buc, 6bhz, 6bmw, 6bur, 6cgt, 6cmu, 6eej, 6cgv, 6cgy, 6ccw, 6est, 6chs, 6cub, 6cso, 6eb, 6ew, 6ia, 6jp, 6lj, 6km, 6no, 6nb, 6nx, 6rv, 6ts, 6xg, 6xap, 6zd, 6zbn, 7gl, 7ls, 7nt, 7ya, 8apw, 8ayy, 8kg, 8gz, 8pl, 9adu, 9ay, 9bht, 9bbp, 9ccs, 9dh, 9dhw, 9eky, 9elh, 9uq. England: 2kl, 3z, 2nm, 2od, France: 8by, 8et, 3fg, 3uq, 3yor. Italy: 1er, 1no, 1rg. Canada: 1ar, 4gt. Mexico: 1aa. Chile: 9tc. Hawaii: 6def, 6xt.

**S. F. M. Wilde, Mirfield, Marton, New Zealand.**

40 and 80 Meters.

1aao, 1aci, 1arc, 1cmp, 1cmx, 1hn, 1pm, 1te, 1uw, 1xav, 1yb, 2brb, 2cmp, 2cv, 2rm, 2xaf, 3ll, 3yx, 4an, 4cu, 4sa, 5hi, 5ox, 5uk, 6aak, 6ac, 6aga, 6age, 6ahp, 6alf, 6avj, 6awt, 6boa, 6bbr, 6bh, 6bmw, 6bsn, 6buc, 6bur, 6cgy, 6cbs, 6cdy, 6eej, 6ego, 6cgv, 6cgy, 6chl, 6chs, 6chy, 6cic, 6cix, 6cls, 6ema, 6com, 6cqv, 6ern, 6est, 6esw, 6cto, 6cws, 6dao, 6dl, 6ea, 6zac, 6ji, 6jp, 6jpb, 6kg, 6kra, 6li, 6no, 6qd, 6qi, 6tia, 6ts, 6tvj, 6ua, 6uf, 6ur, 6vi, 6vw, 6xap, 6xg, 6zh, 6zac, 7ack, 7ay, 7ec, 7gh, 7mf, 7uk, 7nt, 7vn, 7vt, 7ya, 8bx, 8bqi, 8er, 8gz, 8mz, 9abp, 9ado, 9bbp, 9bg, 9bwi, 9ddp, 9ded, 9deg, 9dey, 9dfh, 9dk, 9att, 9dum, 9eas, 9elj, 9eiy, 9ek, 9fyp, 9kjs, 9og, 9sr, 9tc, 9xi, kel, ket, kgi, kio, nkf, npl, upg, nrll, nss, wgh, wiz, g2an, g2ae, mbx, c6ur, pox, r68b, xq.

**R. J. Scott, 63 Fisher St., Christchurch, New Zealand.**

1yb, 5agl, 5zal, 6ac, 6age, 6arg, 6ahp, 6ar, 6awt, 6buc, 6cgy, 6ego, 6cto, 6cgs, 6jp, 8bzm, 8eb, 9cxx, 9dct, 9ek, 9mit, 9wo, 9xi, chl, nrll, c3ws, 1lb, 18qq, smcc, jbl, kel, kie, nkf, vis, wgh, wiz, 6iak.

**21AR, Dunedin, New Zealand.**

1cmp, 1cmx, 1pl, 1uw, 1wr, 2agq, 2bbx, 2cdc, 2lu, 2mu, 2av, 3hmz, 4gt, 4gy, 4sa, 4cl, 4hr, 4atv, 5lg, 5uk, 5vi, 6ak, 6awt, 6agd, 6ajm, 6bah, 6bhq, 6bur, 6cl, 6cgv, 6cto, 6cix, 6chs, 6dj, 6ex, 6jp, 6no, 6rv, 6ts, 7ack, 7cu, 8ahq, 8apw, 8bau, 8bgn, 8eyi, 8dae, 8don, 8eg, 8gz, 8jq, 8ry, 8se, 9aeb, 9ado, 9bat, 9bbz, 9beg, 9bht, 9bv, 9ccs, 9ded, 1lb, nrll, iler.

## A.R.R.L. Information Service Rules

1. Before writing, search your files of *QST*. The answer is probably there.
2. Do not ask for comparisons between advertised products.

3. Be reasonable in the number of questions you ask.
4. Put the questions in the following form:
  - A. Inclose a stamped self-addressed envelope. Envelope without stamp from foreign countries.
  - B. Make diagrams on separate sheets and fasten sheets together.
  - C. Number the questions and make paragraphs of each.
  - D. Print the name and address (NOT merely call letters).
5. Address all questions to Information Service, American Radio Relay League, 1711 Park Street, Hartford, Conn.
6. Keep a copy of your question and diagrams and mention that you did.
7. State whether or not you subscribe to *QST*.

## A New Process Grid Leak

**A**N entirely new method is used in the manufacture of the Durham Metalized Filament grid leaks. It was found that when two electrodes are enclosed in a vacuum and a source of very high direct current applied to the electrodes, the negative electrode will shoot off a very fine invisible "spray" of metallic particles. These particles are drawn toward the positive electrode and will deposit themselves on any substance between the two. A very fine glass filament is rotated between the electrodes and is coated with this spray from the negative electrode. After it has been coated the filament is baked in order to make the metal adhere to the glass. The glass is then cut into standard lengths, in-



serted in a small glass container and sealed with a low melting point alloy to the brass contact caps.

The result is an absolutely noiseless grid leak, accurate to a very close degree and extremely constant in its resistance. One of these leaks was used in a transmitter and purposely abused. After becoming so hot it could not be touched it was allowed to cool, and when tested it was perfectly quiet in operation and its resistance apparently had not changed in the least.

In addition to their use as grid leaks these resistances should serve admirably as coupling resistances in a resistance amplifier. They are available in ranges from 40,000 ohms to 10 megohms.

# Communications

The Publishers of QST assume no responsibility for statements made herein by correspondents



## Tune for 'Em, OMs

1057 Grant Ave.,  
Bronx, N. Y.

Editor, QST:

I am in receipt of a letter from Mr. Federico Nosiglia of Buenos Aires, Argentina, who operates station AH-2. Among other things he says, "Many times I answer your CQ's in hope of being heard by you, but evidently without result, due no doubt to the short wavelength (30 meters) I am using. Up to now I have received no replies to any of my US calls. I would appreciate it if you would let the American hams know that there are quite a few radio amateurs in Argentina who are operating on wavelengths less than 40 meters between 9:30 and midnight every night. These Argentina amateurs including myself are very deeply interested in that their calls be heard and answered so as to intensify inter-American radio relations and amity."

Keep an ear open for the foreigners just above and below our regular bands, gang.

—Jack Berliant, 2BEE

## The Other Side

54 Penn Avenue,  
Minneapolis, Minn.

Editor, QST:

At many times during the past year or so American amateurs have been harangued by foreign amateurs. Of course this may be justifiable but I think a good deal can be said on the other side. I think if the foreigners kept this in mind they would not seem to feel so prone to jump on us for alleged misconduct. Take for example the habit of sending cards. In the July issue of QST it was stated that some Australian sent three hundred cards and received one reply, and another sent 80 cards and received no reply.

Several prominent amateurs that I know of in the Twin Cities answer all of their cards and it does not seem possible that three hundred cards should have come out of Australia without at least some of them going to the Twin Cities.

Since this discussion has come to the front, many of us can recall having sent as many cards to these very same foreign amateurs and in some cases out of a good batch of cards we have never received a single answer. Personally I don't expect an answer, but would rather have reports concerning the operation of the station

than have to answer correspondence which is complete within itself. I think a great many others are like this and would rather have the answers come as the station is worked and so do not feel badly in any way should a mere report be left unanswered. I believe that they expect an answer too promptly, forgetting that the average American amateur is a very busy person and cannot always keep up his end of correspondence. At 9ZT, for example, over five thousand cards have been addressed during the past two years. About once a month all correspondence is cleared up, but we must confess it is rather difficult.

I think we will all agree that the substantial CQ is a necessity. Personally I have heard five and ten minute CQ's from Australia and New Zealand more frequently than I have from the United States. This is in spite of the fact that there are twenty or thirty times as many stations in the United States as there are in these two combined. The logs at many stations will also show this to be a fact. We do not think, however, that this is a serious offense as when a station gives a substantial CQ it usually means that he is having difficulty in receiving and would like a big call in return. Ordinarily we agree that a short snappy CQ is effective, but this is not always the case.

—Don C. Wallace, 9ZT

## 20 Meter Reception in S.A.

Rio de Janeiro,  
South America

Editor, QST:

With regards to the reception of 20 meter signals from the U.S. I think it is rather unsatisfactory, at least during what we call daylight. I have been listening in on the 20 meter band for several Sundays but relatively few stations have been logged. I have been unable to pick up any U.S. signals on 20 meters before 5:30 or 6:00 p.m. Rio time; at that time they begin to come in, first weak getting stronger and stronger and gradually dying out in two or three hours. At 10 or 10:30 p.m. Rio time nothing more can be heard on 20 meters. As far as signal strength itself is concerned the 20 meter signals seem to be stronger than the 40 meter ones, and also are easier to read (if the wave is not swinging) as static is not so bothersome as on 40 meters.

We are badly handicapped by the most

varying and unstable weather conditions, and chiefly by an extraneous and continuous type of static which hinders reception to an appreciable degree. Fading is also very pronounced in the signals coming from the U.S. although not bad in signals from Europe or New Zealand. It seems that a place exists somewhere between our countries where great absorption takes place.

—Alvaro S. Freire, 6z1AB

### Keying

845 East 13th Street,  
Brooklyn, N. Y.

Editor, *QST*:

I take exception to what Mr. Keene, 1AEL, says about keying in the grid circuit. Grid keying has many drawbacks that plate, or high voltage, keying has not. In the first place, the high voltage is *always* on the tube. This is the cause of many breakdowns, especially when the tube is being overloaded, that are not experienced with high voltage keying. Next, the grid leads have to be *very short*. This is not the case with plate keying. With grid keying the tube, although it may be drawing little plate current, nevertheless is oscillating strongly. It may oscillate, but very weakly, with plate keying.

—Edward M. Glaser, 2BRB

### The Printer's Devil

Boston, Mass.

Editor, *QST*:

What in Sam Hill are you talking about? I've taken my crack at Greek and Latin and the rest of the "compulsives" and even seen a letter written by the Grand Fuchow of the province of Tienstan, but I'll have to admit that:

“. . . just below the samsDORLYIDs es-cROPOT Z . . . Glib.”

which appeared in *QST* on page 36 of the July issue means absolutely nothing at all to me—nor as much as that! No wonder there's a “gulp” on the end of it—anybody would gulp trying to get that off his thorax!

—E. P. Gordon

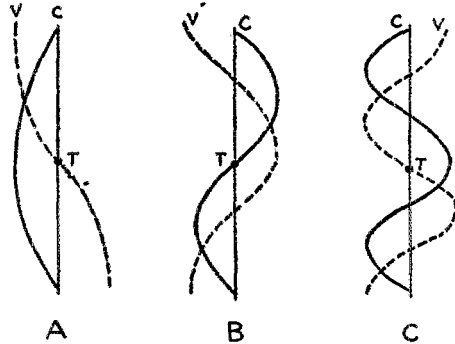
### Harmonic Transmission

Oberlin, Ohio

Editor, *QST*:

My interest was aroused by a note which you annexed to the article on the Hertz Antenna by H. M. Williams (July *QST*). I believe that I have one key, perhaps, to the solution. It is frequently noted that stations work much better on the 1st, 3rd and 5th harmonic of the antenna fundamental than on the 2nd, 4th, 6th, etc. That is, when the oscillating circuit is tuned to 1/3rd of the antenna circuit, better results are secured than from 1/2 wave. Exactly this condition was found to exist at 8ZE when operation was first attempted on 40 meters.

If the antenna system be represented schematically with the transmitter at T, the voltage-current curves for operation on the fundamental is shown at A. The second harmonic is represented by B and the third harmonic by C. Now in both A and C the voltage node is near the inductance,



tance, and the current is high. In B, on the other hand, the inductance is located at a current node where the voltage is high; hence the coil and the antenna wiring near it are “hot” to ground, and leaks at points where these come in contact with dielectric supports are much more likely to occur than when the voltage node is located in the inductance.

—E. W. Thatcher, 8ZE

### Aluminum Rectifiers

Albany, Indiana

Editor, *QST*:

It seems that many of the gang are passing the buck! All poor notes are *not* due to punk aluminum in a chemical rectifier. I have been using all kinds of aluminum for the past two years. My first rectifier consisted of 12 small jelly glasses with aluminum 1/16th inch thick. The rectifier was entirely satisfactory but the aluminum was too thin. My next effort was a 30 quart affair. This one used 1x7 inch aluminum strips one-eighth inch thick. This aluminum came from an automobile body works and is the best I have ever used. Aluminum wire, bent back and forth to give a larger surface, has been used and it works F.B. The trouble with the chemical rectifier is that most of the fellows either don't know how to build one, or will not take the necessary time and precautions to turn out a good job. If any ham will follow the following directions and turn out a bum rectifier I will eat the darn thing. Use almost any kind of aluminum you can buy. Take a piece of medium coarse emery cloth and work every piece of aluminum until it is perfectly clean on both sides. Do the lead the same way. Bolt them together with any good brass or iron bolts. Wash the glass containers until they are perfectly clean. Mix



up the water and Borax before you start building and let it set. Use all the Borax the water will soak up. Space your containers at least  $\frac{1}{4}$  inch apart. Fill them and then put in the electrodes. Put a thin layer of oil on top of the solution to prevent creeping. Connect the rectifier to your power transformer and turn on the juice. It will take some time for the rectifier to form, and you will have to watch the secondary of your power transformer as the rectifier, initially, places almost a short circuit on the transformer. Locate the rectifier at least 5 feet from the rest of your apparatus. This will keep the a.c. in the rectifier from bothering you.

—Walter L. Major, 9AUC

### Re Sulphur

Laplata, New Mexico

Editor, QST:

The article on *R.F. Properties of Insulating Materials* in February QST prompts me to say that sulphur is a very promising material to investigate. At the suggestion of the late Professor B. O. Pierce of Harvard, I used pillars of sulphur to insulate the quadrants of a Dolecalek Electrometer twenty years ago with entire success, in the place of hard rubber to avoid surface deterioration. If I am not mistaken no other material of equal cost could be used as easily in radio work in rods or bushings

which can be moulded in place, or fixed by moulded inserts. Sulphur is easily purified, consists of a single element inert at room temperature, non-volatile, can be machined or worked in a lathe to a good permanent surface and has a dielectric constant of about four.

—Harrison H. Brown

### D. C. Filters

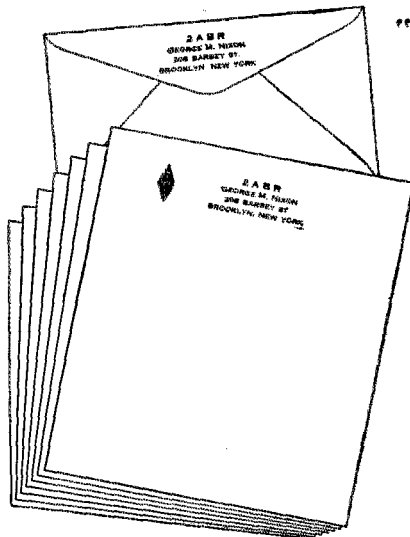
Dubuque, Iowa

Editor, QST:

Regarding hard-to-filter D.C. generator plate current supplies; a radio frequency trap in the supply leads can make a lot of difference in the interference problem. Two small chokes (W. E. Co. 67-A's are just the thing) in the armature leads right at the brushes and shunting the brushes by a 1  $\mu$ f condenser will do the trick. It may be necessary to ground the frame of the generator and the negative lead at the brush side of the choke. Such a combination changed my particular installation from an apparently unfiltered supply to an excellent imitation of storage battery supply with only a 3 henry series choke and a 2  $\mu$ f shunt condenser for a filter system.

Yes, I can now work on 170 meters and cause no interference to my neighbor next door on 210 meters—the lower limit of his tuner.

—C. M. Smith, 9BYP



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Concerning

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**"ASK ANY RADIO ENGINEER"**

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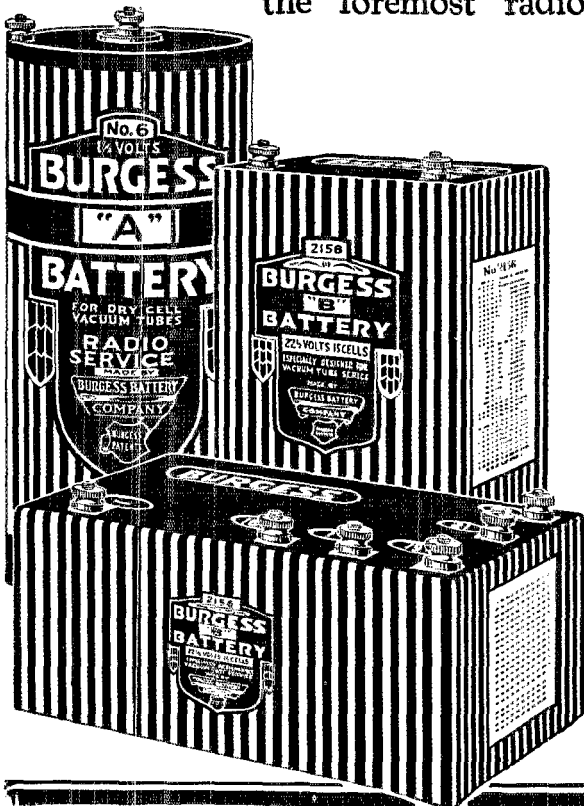
ENGINEERS - DRY BATTERIES - MANUFACTURERS  
FLASHLIGHT - RADIO - IGNITION - TELEPHONE  
GENERAL SALES OFFICE: HARRIS TRUST BLDG., CHICAGO  
LABORATORIES AND WORKS: MADISON, WISCONSIN

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# NEW!



No. 486 Eveready Layerbilt "B" Battery. 45 volts. Length, 8 3/16 inches. Width, 4 7/16 inches. Height, 7 3/16 inches. Weight, 14 1/4 pounds. Price, \$5.50.

## The greatest improvement

ABSOLUTELY new in construction—perfected through years of research, the new Eveready Layerbilt "B" Battery is as superior to the old type as a tube set is to a crystal.

Heretofore, all dry "B" Batteries have been made up of cylindrical cells—no one knew how to make them any other way. The new Eveready Layerbilt is made of *flat* layers of current-producing elements compressed one against another, so that every cubic inch inside the battery case is completely filled with electricity-producing material. Layer-building heightens efficiency by increasing the area

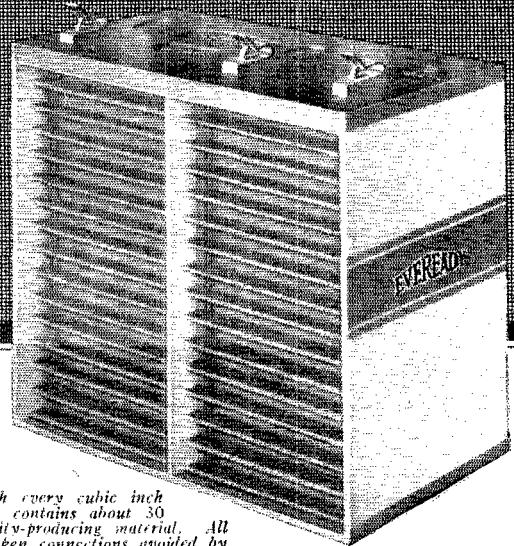
of zinc plate and the quantity of active chemicals to which the plate is exposed.

After the most rigid laboratory tests, more than 30,000 of these new Eveready Layerbilt "B" Batteries were manufactured and tested by use under actual home receiving conditions. These tests proved that this new battery is far superior to the famous Eveready Heavy-duty Battery No. 770, which up to now we have ranked as the longest lived "B" Battery obtainable.

On 4-tube sets, 16 mil drain,  
it lasts 35% longer.

On 5-tube sets, 20 mil drain,  
it lasts 38% longer.

*Radically different!*



*It's all battery. With every cubic inch packed to capacity, it contains about 30 per cent more electricity-producing material. All chance of loose or broken connections avoided by contact of full area of carbon plate against zinc plate. The scientifically correct construction.*

## ever made in "B" Batteries

- On 6-tube sets, 24 mil drain, it lasts 41% longer.
- On 8-tube sets, 30 mil drain, it lasts 52% longer.

The new Layerbilt principle is such an enormous stride forward in radio battery economy that we will bring out new sizes and numbers in this Layerbilt form as fast as new machinery is installed. For the present, only the extra-large 45-volt size will be available.

Buy this new Eveready Layerbilt No. 486 for heavy drain service. It far exceeds the performance for which Eveready Radio Batteries always have been famous and is, we be-

lieve, by far the most economical source of "B" current obtainable.

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For real radio enjoyment, tune in the "Eveready Group." Broadcast through stations—

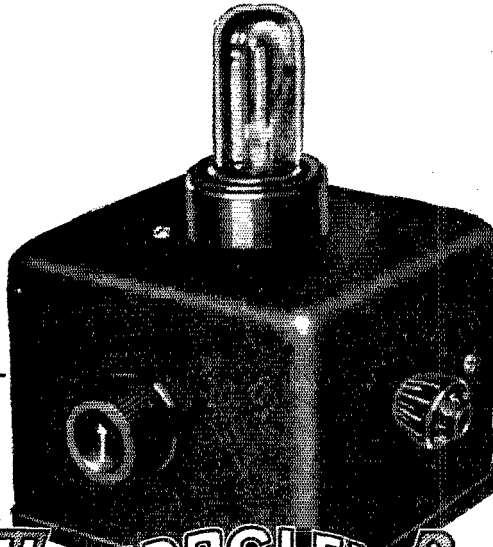
<b>WEAF</b> New York <b>WJAR</b> Providence <b>WEEL</b> Boston <b>WFIL</b> Philadelphia <b>WGR</b> Buffalo <b>WCAE</b> Pittsburgh	<b>WSAJ</b> Cincinnati <b>WWJ</b> Detroit <b>WCCO</b> { St. Paul Davenport             }
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# EVEREADY

## Radio Batteries

*- they last longer*

# Startling! Revolutionary! These



## The CROSLLEY Pup

### A genuine Armstrong Regenerative double circuit set

FIRST super-power broadcasting station remotely controlled—WLW, Cincinnati.

FIRST to develop an instrument reproducing in full tonal volume the entire range of music and the human voice—the Musicone.

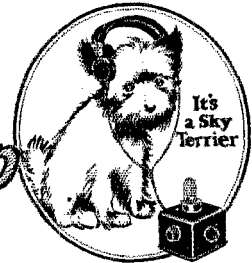
FIRST to provide radio parts at prices that enabled millions to build their own sets.

FIRST to market a complete crystal set below \$23.

FIRST to develop a low priced single tube receiving set.

FIRST to sell sets using tuned radio frequency amplification.

FIRST to combine successfully tuned radio frequency amplification with regeneration and the reflex principle, making three tubes give the results of five or six.



Radio, with all its romance, knows no more magic name than Crosley.

From the time that Powel Crosley, Jr., first enabled millions to build their own sets by offering parts at a fraction of existing prices—down to the present day, radio progress and Crosley achievements have gone hand in hand. Now Crosley announces not only vital improvements in radio performance—but in the Crosley "PUP" offers this finer performance at the lowest price in radio history.

This compact, efficient receiver is a development of the famous Crosley one tube set, with which Leonard Weeks, of Minot, N. D., heard the

MacMillan Polar expedition while the rest of America listened in vain.

The employment of the double circuit not only reduces radiation to a minimum, but radically improves selectivity. It can be tuned through local stations more readily. Under average conditions, its radius, with head phones, is 1500 miles or more.

You can use the "PUP" to check the performance of your larger set; to entertain the youngster whose curious fingers cannot resist the lure of dials and switches; to install in the maid's room, or even in your office—for the air is full each day. You can take it on canoe trips, picnics, outings

and on your business journeys—for it's only half the size of a shoe box.

Engineered and built to the strictest standards of Crosley quality, this genuine long distance set can be offered at the phenomenal price of \$9.75 only because of its simplicity and Crosley's tremendous manufacturing facilities.

**\$9.75**  
WITHOUT  
ACCESSORIES

#### ADD 10% TO ALL PRICES WEST OF ROCKY MOUNTAINS

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

Crosley owns WLW, first remote control super-power broadcasting station.

# CROSLLEY

THE CROSLLEY RADIO CORPORATION  
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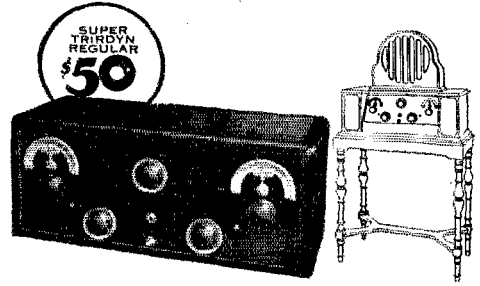
# new developments of Powel Crosley, Jr.

## 3 Tubes do the work of 6 in the new SUPER-TRIRDYNS!

You have not heard the perfection of radio reception until you have listened to these two new Super-Trirdyns. In them the need for more than three tubes is eliminated by the famous Trirdyn hook-up—which combines tuned radio frequency, Armstrong regeneration and reflex amplification. There is no radiation. Distant stations come in clear and sharp on the loud speaker and can be accurately logged. Offered in solid mahogany cabinets, these new models are the aristocrats of radio reception at democratic prices.

### DE LUXE COMBINATION

At the extreme right sketched in outline is the new Super-Trirdyn Special De Luxe Combination: solid mahogany table, the Super-Trirdyn Special (batteries self contained) and the Musicone De Luxe. Table \$25. Musicone \$27.50. Combination \$112.50.



SUPER TRIRDYN REGULAR \$50

## CROSLLEY RADIOS FIT EVERY PURSE

**One Tube Sets**—the tremendous popularity of Crosley Models 50 and 50 Portable is proof of the efficiency of the Crosley Armstrong regenerative hook-up. Real long distance reception with dry batteries. Model 50, price without accessories \$14.50. Model 50 Portable, price without accessories \$16.00.

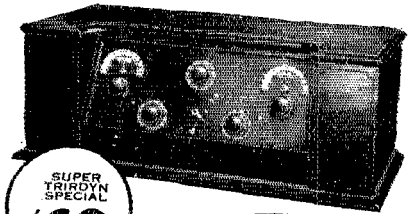
**Two Tube Sets**—Local and nearby stations on loud speaker always and distance up to 1500 miles under average conditions. Much greater range with headphones. Model 51, price without accessories \$18.50. Model 51 Portable, price without accessories \$23.50.

**Three Tube Sets**—Distant stations come in on the Musicone with exceptional clearness and volume. Model 52, price without accessories \$27.50. Model 52 Portable, price without accessories \$32.50.

## RADICAL IMPROVEMENTS IN TWO POPULAR CROSLLEY RECEIVERS

### 2-Tube Special De Luxe      3-Tube Special De Luxe

Of interest to the millions who know Crosley's past achievements in the direction of better and less expensive radio are these two new cabinet receivers. These low priced models represent radical improvements. More selective control and improved receptivity have been achieved by the use of the new worm type tickler, the new Crosley vernier plate condenser and the double circuit. Radiation is reduced to a minimum. Both cabinets are attractive in design, with sloping panels and mahogany finished. Both are genuine Armstrong regenerative circuits, the 51 with one stage of audio frequency amplification; the 52 with two. Both are true long range receivers.



SUPER TRIRDYN SPECIAL \$60

## The MUSICONES

*Rapidly replacing other types of loud speakers*

It is expected that no less than 500,000 present day "loud speakers" will be replaced by the Musicone in this, its first year. Reproduces full tonal range of the human voice and music; requires no adjustments nor additional batteries. Patented actuating unit, covered by basic patents, is the secret of its faithful reproduction of all tones. Not the mere cone. Beware of imitation cone speakers. Price...

**\$17.50**

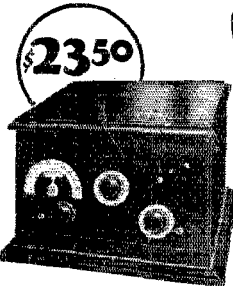
### The Musicone De Luxe

The Musicone has been artistically combined with a clock case of beautiful mahogany with a grided screen. Price of Musicone De Luxe.....

**\$27.50**

### New 2-Tube 51 Special De Luxe

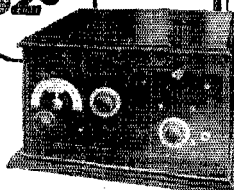
Mahogany cabinet—sloping panel, new style controls—engraved metal dials—cabinet will hold necessary dry batteries. Priced with out accessories.



\$23.50

### New 3-Tube 52 Special De Luxe

Mahogany cabinet of popular sloping panel, new style controls and art metal dials. Cabinet will hold necessary dry batteries. Priced with out accessories.



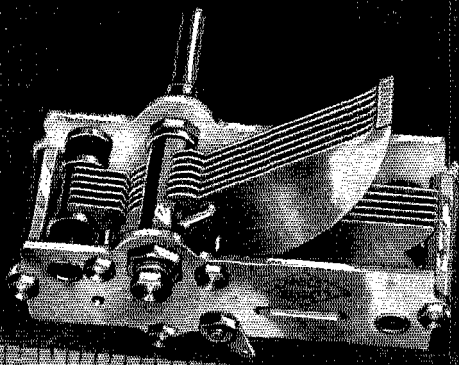
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**Solved!** The space problem of the straight-line frequency condenser. The new AMSCO Allocating Condenser is ingeniously designed to save room in the cabinet—yet spreads the stations evenly around the dial, according to frequency. Greatly improves the selectivity of the set—and simplifies tuning. Three sizes—Single or Siamese.

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the secret.



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the shape of the  
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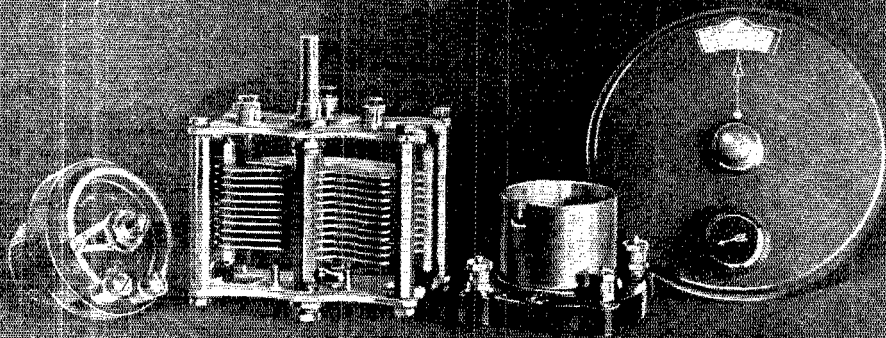


Half a Heart is  
the new symbol  
for efficient S.L.  
F. variable con-  
densers.





**AMSCO**  
**PRODUCTS**  
 ARE SPECIFIED BY  
 STROMBERG-CARLSON FREED-  
 EISEMANN PRIESS RADIO



*Set builders* who strive for electrical and mechanical perfection inevitably come to AMSCO. Look behind the panel of the finest sets, and you will find the AMSCO trademark, the sign of *engineered* radio parts. Standardize on AMSCO Condensers, Vernier Dials, Rheostats, Potentiometers, Sockets and Binding Posts—each the best that can be made, and made to *match* each other.

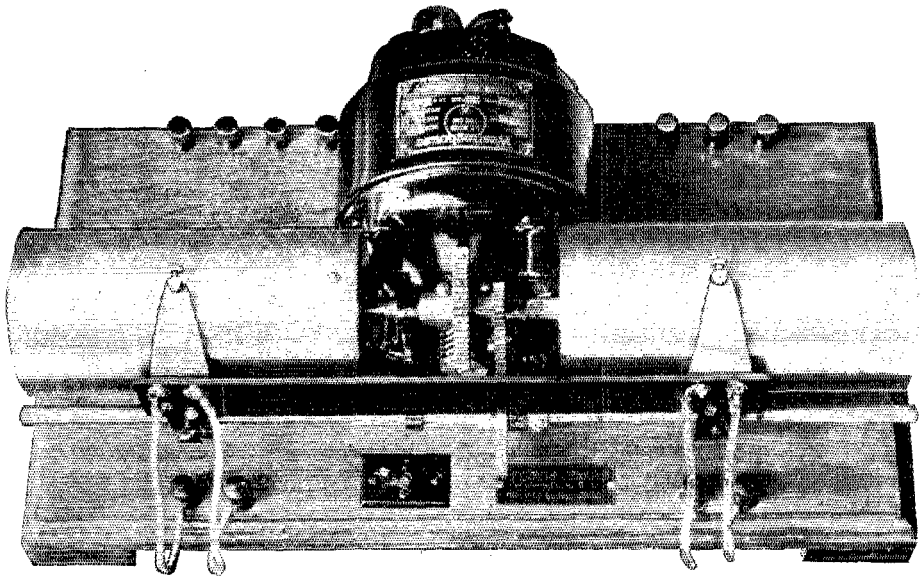
Ask your dealer—or write Dept. C

**AMSCO PRODUCTS, INC.**  
 Broome and Lafayette Streets, New York City  
 MAKERS OF MELCO SUPREME RADIO RECEIVERS

NEW—The AmSCO Vernier Dial—at a popular price. The right ratio for precision tuning.







# RADIO PICTURES

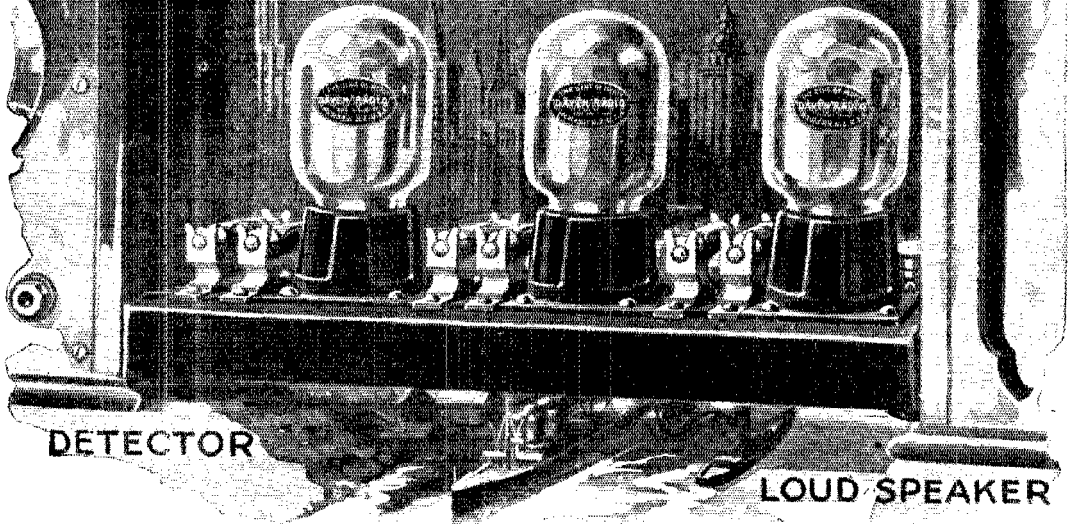
We are beginning now to find out what you radio experimenters want, and have put your suggestions into the new model machine, shown above. Not only is it complete for both sending and receiving pictures and picture-messages by radio (or by wire), but it is a beautiful piece of workmanship. The price to A.R.R.L. members is but \$45—less than it costs. Why? Because we want your assistance in developing visual radio. But whether you buy a machine or not send for information about prizes for suggestions, for each of which a copy of the book "Radio Vision" is sent, whether you get in the cash prize lists or not. We are after helpful suggestions. Shoot 'em in, and we will do our part.

## JENKINS LABORATORIES

1519 Connecticut Avenue

Washington, D. C.

# DAVEN TUBES



## The Bridge To Amplification Without Distortion

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

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



**RESISTOR MANUAL**  
Manufacturers of high grade sets are turning to Resistance Coupled Amplification. The authority is *The Resistor Manual*. At your dealer's, 25c; or by mail, 35c.

### A NEW TUBE BY DAVEN

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

*"The Star of Merit"*  
**DAVEN RADIO CORPORATION**  
*Resistor Specialists*  
Reg. U. S. Pat. Off.

NEWARK

NEW JERSEY

USE THIS FREE <sup>G-925</sup>  
COUPON

Daven Radio Corporation  
158-160 Summit Street  
Newark, New Jersey

Please send me the following on Resistance Coupled Amplification:—

- Check one.*
- Resistor Manual, 25c is enclosed.
  - Complete Catalog (free)

Name .....

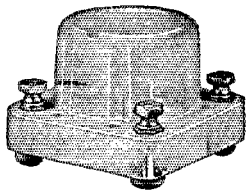
Address .....

*For Dealers: Send your letter-head or card, or this coupon and we will have our nearest distributor communicate with you.*

## THE BIG LITTLE THINGS OF RADIO

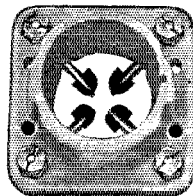
# Radio Sockets

TRADE MARK



W198 -- Side View

W-198—Composed of one-piece porcelain, for use with standard tubes. The special design of the phosphor spring bronze contacts engage the valve or tube prongs in a wiping contact. To mount the tubes, one merely inserts the tube. A groove in the side of the socket, down which the valve or tube pin slides, insures the correct position. A slight flare to each contact makes the installation of the tube an easy matter. "Pussyfoot" rubber cushions reduce microphonic noises.



W198--Top View

## Take It from "Q S T" Readers—

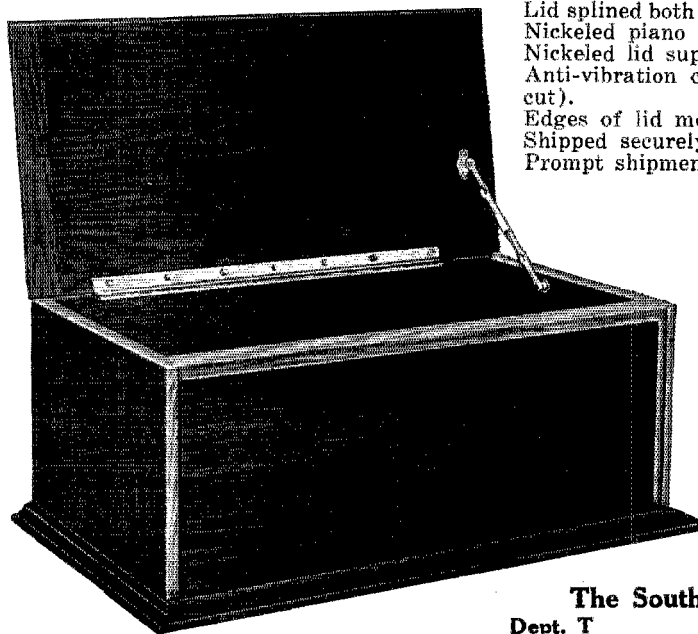
THIS is the perfect socket, especially for high frequencies. Says 4RR-4VL: "I used no sockets at all in the detector circuit, soldering the leads to the tube base tips. When your sockets were tried, the same results were obtained — oscillation over the same wave lengths, etc. — showing that the sockets were perfect." Station 9DXY says: "They are all that a socket should be." You have surmounted all the difficulties and in addition, have put a wiping contact on the side of the prongs where it belongs." Write in for *Catalogue 6W*—more things as good as the Sockets!

RADIO DIVISION OF

**THE HART & HEGEMAN MFG. CO.** HARTFORD, CONN.

Everything from Aerial Insulator to Ground Clamp.

## A Radio Cabinet of Beauty and Elegance Direct to You at Lowest Cost



Lid splined both ends to prevent warping.  
Nicked piano hinge.  
Nicked lid support of artistic design.  
Anti-vibration cushion feet (not visible in cut).  
Edges of lid moulded to match bottom.  
Shipped securely packed in strong carton.  
Prompt shipment.

	Hardwood Mahogany Flotah	Rubbed American Walnut
7 x 18 x 7 1/2 or 10 in. deep	\$3.50	\$5.00
7 x 24 x 7 1/2 or 10 in. deep	4.00	5.50
7 x 26 x 7 1/2 or 10 in. deep	4.75	6.25
7 x 28 x 7 1/2 or 10 in. deep	5.50	7.00
7 x 30 x 7 1/2 or 10 in. deep	6.00	8.00

CASH WITH ORDER or C. O.  
D. if 1/4 of price is sent with order.

Prices F. O. B. Hickory, N. C.  
Order express shipment, often cheaper than mail and much safer from damage.

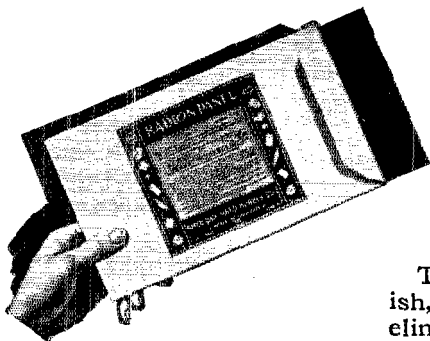
FREE WITH EACH CABINET,  
a glued-up stock non-warping  
1/2-inch BASEBOARD.

Free Catalogue.

**The Southern Toy Company, Inc.**  
Dept. T Hickory, North Carolina

# This special insulation made to order for radio

— now built into a line of low-loss parts



**T**HE first choice of thousands of successful set builders is Radion Panels — made of *Radion*, the insulating material built to order by our engineers for radio exclusively.

Now we announce new developments in *radio parts* made of this perfect insulation that practically reduces losses in reception to a minimum.

These parts have the wonderful Radion finish, smooth and high-polished. This finish eliminates those losses caused by moisture gathering on the surface of ordinary insulation, causing leakage paths. The high-resistant characteristics found in Radion Panels also mark these new parts.

You can now get Radion Sockets, Radion Dials, the new Radion Loud Speaker Horn, Radion Tubing, Radion Binding Post Strips, Insulators, etc. And, of course, Radion Panels (made in black and Mahoganite) come cut in standard sizes for whatever set you wish to build.

Ask your dealer to show you these new Radion parts. Practically every Radio store carries Radion Panels and will gladly get any of the new Radion parts if it hasn't them in stock.

*Send for Booklet, "Building Your Own Set"*

MANY set builders have written us that our booklet, "Building Your Own Set", is the most practical and helpful they have seen. It gives wiring diagrams, front and rear views, shows new set with slanting panel, sets with the Radion Built-In Horn, list of parts and direction for building popular circuits. Mailed for 10c. Send the coupon today.

AMERICAN HARD RUBBER COMPANY  
Dept. L6, 11 Mercer Street, New York City



*The Radion Built-in Horn takes up small space in the cabinet and gives clear, rounded tones.*



*The new No. 10 4-inch Radion Close-Tuning Dial, built to conform to the fingers. We believe it is the most beautiful dial yet designed.*

# RADION

*The Supreme Insulation*

Made to order for radio purposes exclusively

AMERICAN HARD RUBBER COMPANY  
Dept. L6, 11 Mercer Street, New York City.

Please send me your booklet, "Building Your Own Set" for which I enclose 10 cents in stamps.

Name.....

Address.....

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**P** Low Wave-Length Work  
**Demands the Best Insulation**

**Y** **T**HE Navy-MacMillan Arctic Expedition is using PYREX Insulators for the various antennae and leads on the "Bowdoin", "Peary" and the planes.

**R** Radio communication is a vital part of present day Arctic exploration, and the choice of PYREX is a compliment to this unique material.

**E** PYREX is made in a variety of shapes for amateur use.

**X**

**CORNING GLASS WORKS**

Industrial Division  
Corning, New York

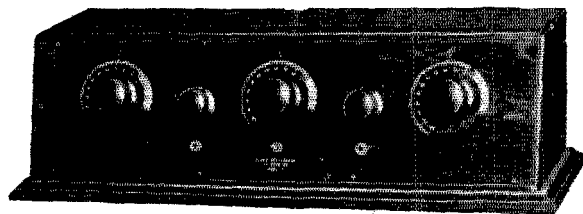
*World's Largest Makers of Technical Glassware*

**P**  
**Y**  
**R**  
**E**  
**X**

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**Wait--'till You've Heard the Slagle!**



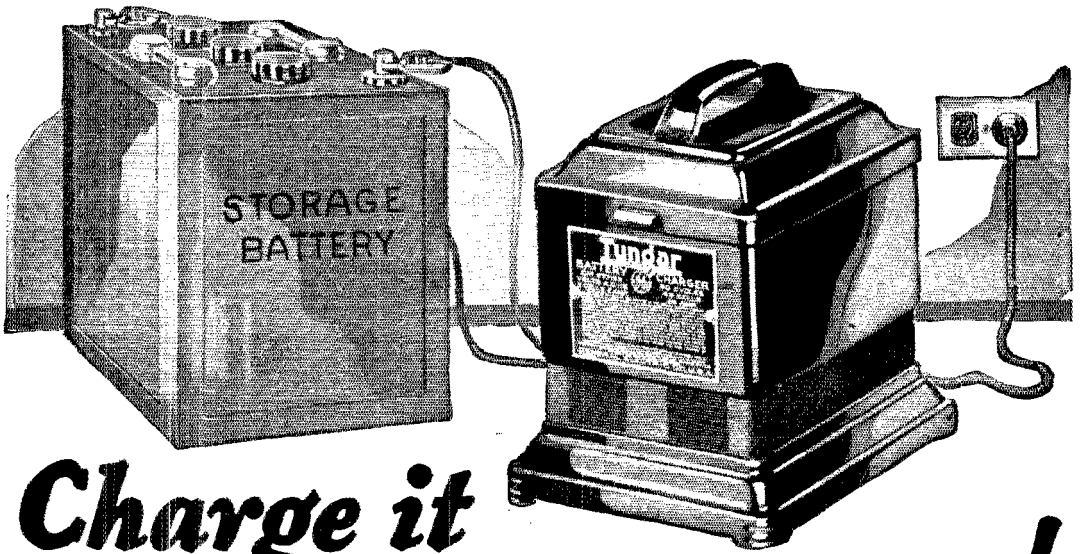
**Is There A Best Radio Receiver?**

Only deliberate comparison of various receivers can determine. The ideal receiver is a musical instrument—that's a Slagle! Its vast reserve of power is operated by one simple control. Go to a Slagle dealer and ask for a demonstration. It will mark the end of your quest for the best in radio achievement.

**SLAGLE RADIO COMPANY**

**Fort Wayne**

**Indiana**



**Charge it  
while you sleep!**

Last thing at night—concert over—time to lock up. Radio battery low? Just clip on the Tungar, and plug it in. Or if you connect up the Tungar permanently, *just throw a switch*. Charge the battery while you sleep.

The Tungar is simple—makes no disturbing noise. And the low cost of Tungar recharging cuts battery upkeep to next to nothing. It means top notch performance—clear, full-volumed reception—*all the time!*



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

The new Tungar charges radio "A" and "B" batteries, and auto batteries.

Two ampere size (East of the Rockies) . . . \$18.00

60 cycles—110 volts

# Tungar

REG. U.S. PAT. OFF.

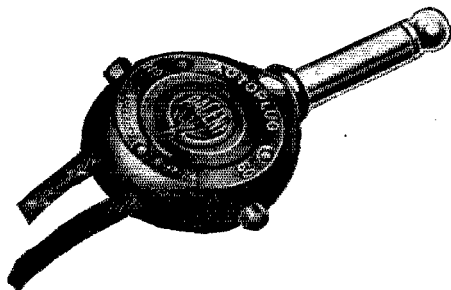
**BATTERY CHARGER**

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

Merchandise Division  
General Electric Company, Bridgeport, Conn.

# GENERAL ELECTRIC

# Shock-proof!



The Pacent Autoplug is different—The entire length of the cord tips is encased in the plug shell of genuine Bakelite. No screws are used in its assembly and there is nothing to work loose or cause trouble. It's simple to connect the Autoplug. Drop the cord tips in the recesses in the bottom of the plug shell—press in on the push buttons at the same time. When the push buttons are released the cord tips are held with a biting, electrically perfect grip. The polarity of the connector springs is indicated by the red (+) and blue (—) push buttons.

Autoplug 60. Price 75c  
 Autoplug 60G (with gold plated metal parts) Price \$1.00

Write for catalog of complete  
 Pacent Line

## PACENT ELECTRIC CO., Inc.

91 Seventh Ave. New York City

Washington	Pittsburgh	St. Louis
San Francisco	Minneapolis	Boston
Philadelphia	Chicago	Buffalo
Jacksonville	Birmingham	Detroit

Canadian Licensees:

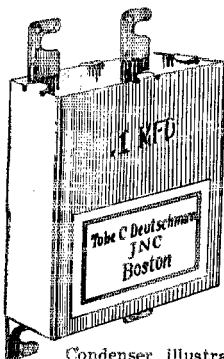
R. H. White, Limited, Hamilton, Ont.

# Pacent RADIO ESSENTIALS

DONT IMPROVISE — PACENTIZE

## TOBE C. DEUTSCHMANN

Fine Radio Apparatus



## Filter Condensers

Another remarkable example of Deutschmann technical and scientific skill.

Condenser illustrated is used in connection with "B" battery eliminators—is light, durable, inexpensive. This marvel removes disturbing noises and in addition greatly increases the efficiency of sets so equipped. Each condenser is tested to show a resistance from 125—150 megohms, and withstands a breakdown test of 750 volts D.C. One of a complete line of quality condensers of all types for transmission or reception. Manufacturers, manufacturers' agents, and jobbers write for details.

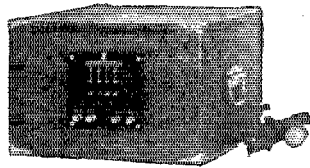
**Tobe C. Deutschmann**  
 CORNHILL BOSTON



**KIC**  
 STORAGE OF BATTERY  
**"B" ELIMINATOR  
 SIMPLICITY**  
**PERMANENT  
 ALKALINE STORAGE  
 BATTERY RECEPTION**

KIC-O MULTI-POWER UNITS separate from your lighting line and eliminate the replacing of dry cell "B" batteries... usually saving their cost in the first six to twelve months of service on Neodyne and Super Heterodyne sets.

Guaranteed  
 Two Years  
 Prices  
 MULTI-POWER UNITS  
 (Complete)  
 90 Volt MX...\$26.50



Power—Economy—Performance  
 Shipped charged and ready to use.  
 No costly bulbs! No acid fumes!  
 Units for 110 volt A. C., D. C. or farm Plants.  
 Write for special offer! Distributors! Everybody!  
**Kimley Electric Company, Inc.**  
 2665 Main Street Buffalo, N. Y.

# ANNOUNCING

the

new



## RATHBUN STRAIGHT LINE FREQUENCY CONVERTER

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

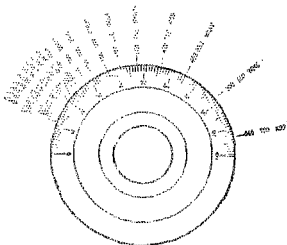
The Rathbun Straight Line Frequency Converter is adapted for use on your receiver

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

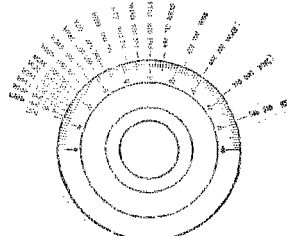
The Rathbun Straight Line Frequency Converter provides straight line frequency tuning with ordinary capacity condensers. It is interchangeable with any condenser—on any receiver. It is sold with the guarantee of reliability and satisfaction attached to all Rathbun Radio Apparatus.

**See and Try it—at Your Dealer's**  
*If your dealer cannot supply you, send Money Order (\$3.50 each) and your order will be shipped promptly by Parcel Post prepaid.*

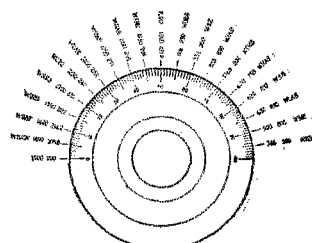
**Rathbun Manufacturing Co. Inc.**  
Jamestown New York



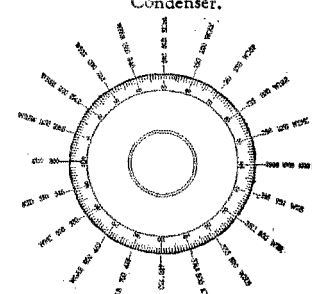
Stations indicated in kilocycles and wavelengths showing crowding with an ordinary capacity condenser.



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

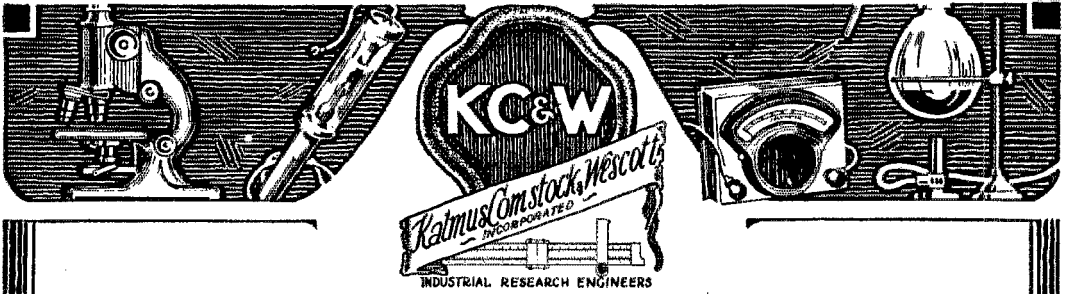


Practically even separation over half the dial with a Straight Line Frequency Condenser.



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





## Scientific Research for Radio Manufacturers

Radio Manufacturers are constantly faced with scientific problems due to the discovery of new principles and the necessity for keeping their product in the front rank in Radio's rapid advance.

Kalmus, Comstock & Wescott, Inc. offers to the Radio industry resources, equipment, and trained scientific skill necessary to solve these problems.

We maintain a staff of highly trained scientists and engineers with years of practical experience in the various fields of industrial research. Our Laboratories, personnel and experience are available to Radio Manufacturers for a reasonable compensation. It will pay you to write for complete information.

### KALMUS, COMSTOCK & WESCOTT Inc.

110/114 BROOKLINE AVE. *Industrial Research Engineers..* BOSTON, MASSACHUSETTS

The Great  
Manufacturers'  
Exposition  
Attended by  
Leading  
Jobbers and  
Dealers

The Official 1925 R.M.A. Show

# THE SECOND RADIO WORLD'S FAIR NEW YORK CITY

U. J. HERRMANN, MANAGING DIRECTOR

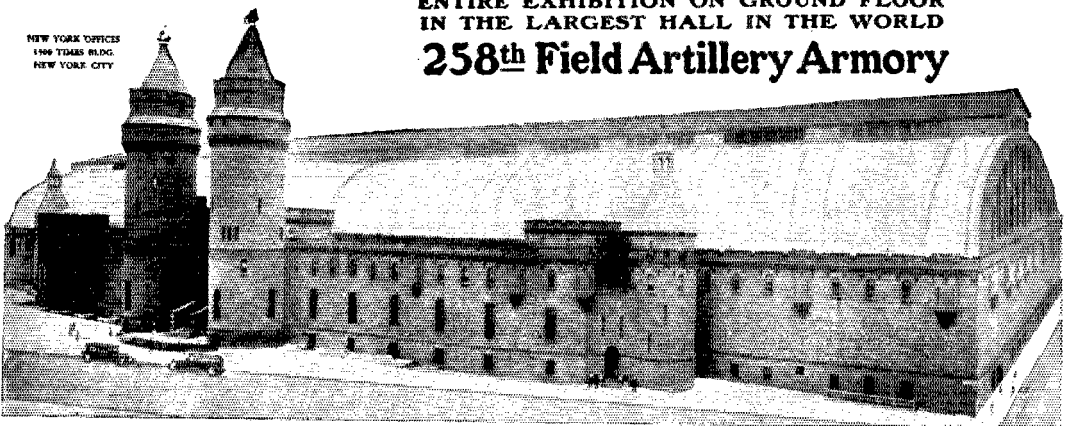
**SEPTEMBER 14<sup>th</sup> to 19<sup>th</sup>**

MONDAY NOON TO SATURDAY MIDNIGHT

ENTIRE EXHIBITION ON GROUND FLOOR  
IN THE LARGEST HALL IN THE WORLD

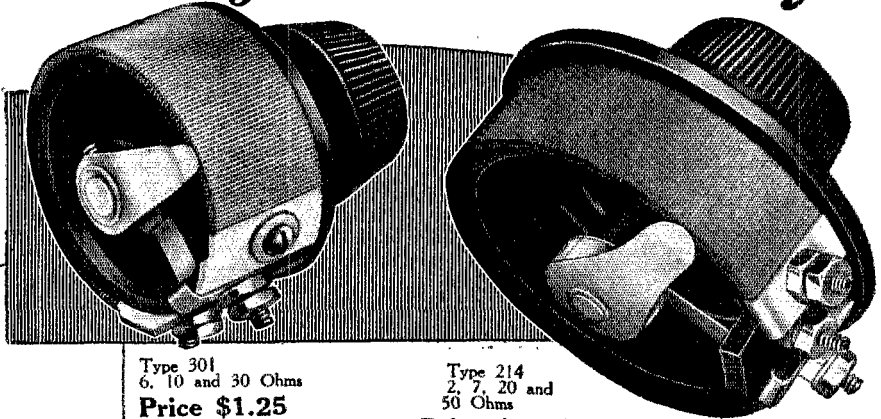
**258<sup>th</sup> Field Artillery Armory**

NEW YORK OFFICES  
1506 TDAR BLDG.  
NEW YORK CITY



# GENERAL RADIO

*Rheostats and Sockets  
mean higher tube efficiency*



Type 301  
6, 10 and 30 Ohms  
Price \$1.25

Type 214  
2, 7, 20 and  
50 Ohms

Price \$2.25

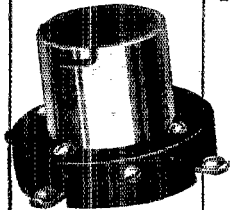
## General Radio Rheostats Are Smooth Running and Uniform

**T**HERE is only one way to operate tubes at their peak of efficiency—by the use of properly designed rheostats and sockets. In building your set, remember that vacuum tubes are important factors in successful radio reception, and require rheostats which provide a gradual and uniform resistance control over the filament.

General Radio Rheostats are smooth running, uniform, and capable of very minute variations. Many of the well-known manufacturers of receiving sets have chosen General Radio Rheostats and Sockets as standard equipment because of their high efficiency in tube operation. Why not use them in the next set you build, and get more out of your tubes?

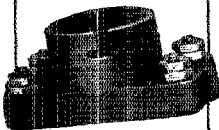
Sold at all good radio stores  
Write for New Radio Catalog 920

The red cartons with the General Radio  
label are your unfailing assurance  
of satisfaction.



### Type 156

For all standard base tubes. A positive wiping contact is made to the side of the tube prongs by double spring terminals. These terminals hold the tube firmly and prevent vibrations. Price \$1.00

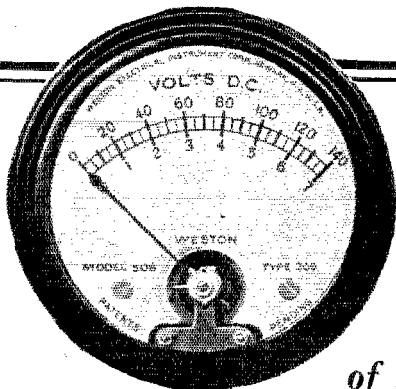


### Type 299

For UV-199 Tubes. This socket is a particularly high-grade socket of moulded bakelite. Contact is made to tube prongs by phosphor bronze terminals with double leaf blades. Price 50c.

**GENERAL RADIO Co.**  
Cambridge, Mass.





## A New Two-Inch Radio Panel Voltmeter

of WESTON Standard Quality

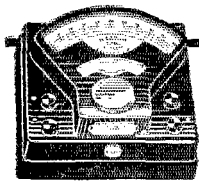
THESE Model 506 instruments fill a long felt need for small Panel Voltmeters for radio receiving sets. They have all the precision, craftsmanship of assembly and ruggedness of the famous Weston line.

Made in single and double ranges for measuring filament and battery voltages, they have an exceptionally high internal resistance—125 ohms per volt. Regularly made with a black finish and narrow flange type of case; fastened to the panel with a special type of clamp supplied with each instrument.

*For further information address*

WESTON ELECTRICAL INSTRUMENT CORPORATION,

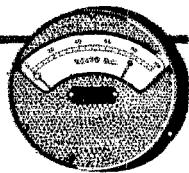
158 Weston Avenue, Newark, N. J.



STANDARD THE WORLD OVER.

# WESTON

*Pioneers since 1888*



# H A M S !

## Sixth Annual

# THIRD DISTRICT CONVENTION

Come to Atlantic City, the Country's Playground,

## SEPTEMBER 23 to 27, INCLUSIVE

Meet Brother Hams from everywhere in an atmosphere of bracing sea-air and goodfellowship. Tickets, including the Banquet and all the many features, are only Five Dollars. The Convention is endorsed by the A. R. R. L. Don't miss the time of your life, OM. Write now to

CHARLES GOODFELLOW, Convention Chairman

Third District, Executive Radio Council,

146 South Maryland St.,

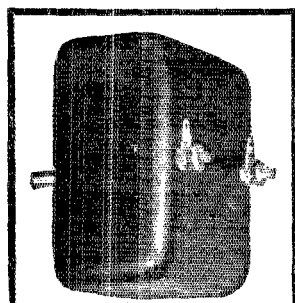
Atlantic City, N. J.

## Advance Announcement



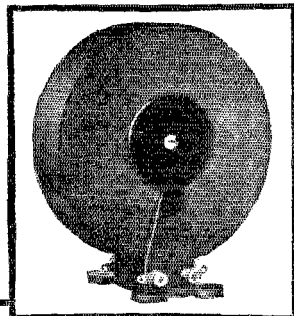
STRAIGHT-LINE-FREQUENCY

# TUNING



### All-American Straight-Line-Frequency Condensers

Type C-35 Max. 350 micromicrofarads (Min. 10.5 mmf.) . . . \$4.50  
Type C-50 Max. 500 micromicrofarads (Min. 11.8 mmf.) . . . 5.00



All-American Toroid Coils  
Type T-1 Antenna Coupler \$3.50  
Type T-2 R.F. Transformer 3.50  
Set of 3 Coils complete . . 10.50

## ALL-AMERICAN TOROID COILS

Numerous theoretical advantages of the toroid or endless-field type of coil have been familiar to engineers for some time. Special machinery now available in the new *ALL-AMERICAN* factory enables us to offer precision-wound toroid coils carrying the same unconditional guarantee as the standard *ALL-AMERICAN* Audio Transformers.

*ALL-AMERICAN* R. F. Transformers of the toroid type embody an air-insulated primary winding of exceedingly high electrical efficiency, which increases selectivity and reduces danger of oscillation to values hitherto unobtainable.

## ALL-AMERICAN Straight-Line-Frequency CONDENSERS

Dispensing entirely with the usual rotor plates which become, in the straight-line-frequency shape, so bulky and difficult to align, these condensers provide, nevertheless, a smooth dial motion accurately proportional to frequency, covering from minimum to maximum capacity a range of 360° rather than the usual 180°. Panel space required is *one-half* (or less) of that for the rotor types. Condensers are completely shielded, making them dust-proof and eliminating absolutely all practical effects of body capacity in tuning. The minimum capacity at 400 meters represents a max.-min. ratio of over 30 to 1.

*Further information will be sent promptly on request*

ALL-AMERICAN RADIO CORPORATION, 4205 Belmont Ave., Chicago

E. N. Rauland, President



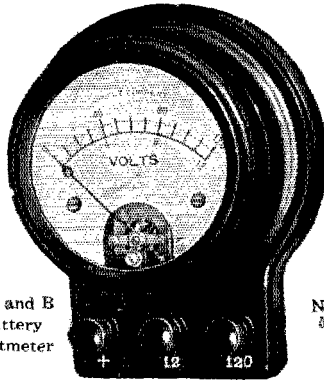
OWNING AND OPERATING STATION WENR-265 METERS

# ALL-AMERICAN

*Pioneers in the Radio Industry*



## IT HAS BEEN SAID—



A and B  
Battery  
Voltmeter

No  
57

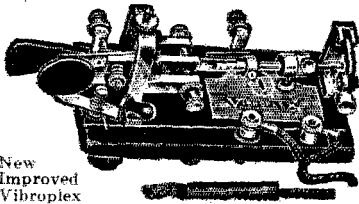
- ¶ "That over 60% of all Radio trouble is traceable to poor or run-down batteries."
- ¶ Our No. 57 has been designed to meet the demand coming to us from serious experimenters for an accurate all around semi-portable instrument for battery, filament and grid voltage tests.
- ¶ Jewell Instruments lead in the Radio field. They are fully illustrated with diagram connections, in our 15-B radio catalog.

Order from Dealer  
**Jewell Electrical Instrument Co**

1650 Walnut St. - Chicago  
"25 Years Making Good Instruments"

## Over 85,000 Operators *use the* **VIBROPLEX**

Reg. Trade Marks:  
Vibroplex Bug Lightning Bug



New  
Improved  
Vibroplex

Japanned Base, .....\$17  
Nickel-Plated Base, ..... 19

Because it transmits **STRONG** signals at any desired speed with less than **one third** of the labor required in key sending. Easy to learn and operate. Simply press the lever—the Vibroplex does the rest.

### Special Vibroplex Requires No Relay

Equipped with 3/16-inch contact points to break high current without use of relay. Radio operators say fills a long felt want ..... \$25

No radio station is complete without a Vibroplex. Radio operators and amateurs on land and sea now sending with a Vibroplex—it's easier.

Sent on Receipt of Price.

THE VIBROPLEX CO., Inc. 325 Broadway, NEW YORK



## A. R. R. L. MEMBERS!

**Get Your Automobile Emblem NOW!**

As your lapel emblem gives you distinction and gets you recognition from brother amateurs when you're on foot, so the A. R. R. L. Automobile Emblem on your radiator proclaims you to the whole motoring world as one of the aristocracy of radio.

Gold and black, heavily enameled on sheet steel, 5 x 2 1/4", holes top and bottom for handy attachment, only 50c postpaid to members.

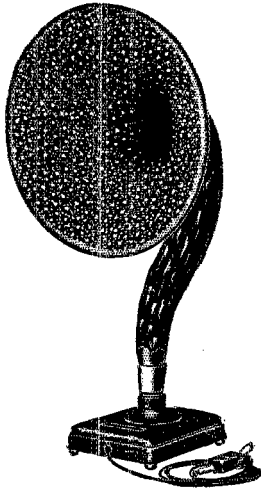
**Mail Your Order NOW!**

**The American Radio Relay League, Hartford, Conn.**

# Three Stromberg-Carlson

## *Aids to Distance, Volume and Quality Reception*

More DX reception is judged by loud speakers than by audibility meters. The powerful signals all Stromberg-Carlson Loud Speakers deliver without extra batteries or stages and the high plate voltages their windings can handle, has helped many records of DX with loud speaker volume.



**No. 2 A Loud Speaker**

24 in. High, 18 $\frac{1}{2}$  in. Bell. Massive, powerful magnets that stay magnetized. Inert horn and firmly clamped diaphragm insure natural tone on loudest signals. Oxidized silver finish.

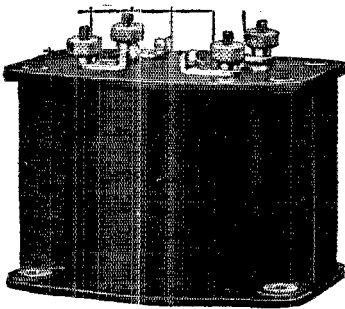
**PRICE, \$17.50**



**No. 3A Head Set**

Permanently sensitive. Magnets exert 2 $\frac{1}{2}$  lbs. pull. Hard Rubber Ear Caps. Die Cast Aluminum Case. Nickled Head Band with Swivel and Slide Adjustment. 11000 ohms total impedance.

**PRICE, \$5.50**



**No. 3A Transformer**

Ratio 4 to 1. Primary reactance, 125,600 ohms at 1000 cycles. Low core losses, thin laminations. Compact dimensions for sub panel or base board mounting. 2 $\frac{3}{4}$ " long, 1-15/16" wide, 2-3/16" high. Shell type shielding.

**PRICE, \$4.50**

## **Stromberg-Carlson Head Sets**

The same is true of reception with Stromberg-Carlson headphones. Any single Stromberg-Carlson headphone unit equals the average loud speaker unit—excels the majority in combining sensitivity with ability to handle volume. A pair of such units compels better DX results.

## **Stromberg-Carlson Transformers**

And when it comes to delivering power to speaker or headphones, Stromberg-Carlson Audio Transformers excel for the same reasons Stromberg-Carlson Loud Speakers and Head Sets excel. All these three pieces of apparatus are

## **Layer Wound and Layer Insulated**

The coils in Stromberg-Carlson radio apparatus are wound one layer at a time, with a wrapping of tough insulation between layers—and vacuum impregnated. That is why they stand up indefinitely under present-day high plate voltages.

*Sold by authorized Stromberg-Carlson Dealers*

# Stromberg-Carlson

## Telephone Mfg. Co.

Rochester, N. Y.

*Shielded Radio Frequency Transformer!*  
**HARPER METALOID**  
*The Original Canned Coil*  
**Simplifies Building! Improves Reception!**



*An instrument designed exclusively for Cribben Radio Corp. by W. W. Harper, Consulting Radio Engineer, Chicago.*

A remarkable improvement in Radio Frequency Transformers. Lowest curve of resistance of any transformer on the market. Effective Electromagnetic and Electrostatic shielding; reduces interference from strong local signals; permits more compact construction; eliminates inter-stage coupling, which prevents stray feed-back, thus allowing better control of regeneration. The undeniably superior space wound solenoid form of inductance is used. *No critical angle for mounting.* Mounting base  $3\frac{1}{2}$  x  $4\frac{1}{2}$  inches. Easily substituted in your present set. Primary tapped for all tubes. Write for circular.

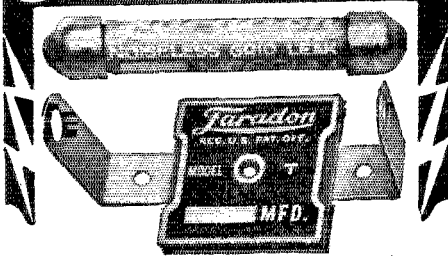
Price **\$5.00**  
 Each

*From Your Dealer or Sent Postpaid By*  
**CRIBBEN RADIO CORPORATION**

**961 Montana Street**

**Chicago, Ill.**

*Faradon*



**The 'Last Word' in  
 Condenser and Grid Leak Units**

Radio amateurs quickly appreciate the latest FARADON MODEL T—All Metal-Mica-fixed condensers. Special construction and treatment assures constant dielectric spacing, permanent accuracy, low energy loss, and quiet operation.

The New Grid Leak—so good we put our famous FARADON trade mark on it—is likewise permanently accurate and noiseless, satisfying those who want the best.

In addition to having superior electrical characteristics they are most pleasing in appearance.

We have prepared some interesting descriptive and operating data. It is free for the asking if you mention Q.S.T. Write us now for your copy.

**Wireless Specialty Apparatus Co.**  
 JAMAICA PLAIN, BOSTON, MASS., U. S. A.  
 ELECTROSTATIC CONDENSERS for all PURPOSES

**EAGLE**



*The Peer of  
 Neutrodyne Receivers*

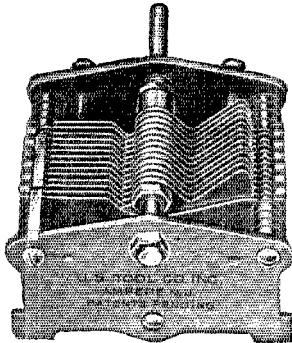
The distance and volume you expect to get, plus the dependability and sterling quality of reception that is characteristic of Eagle. Your dealer will demonstrate the Eagle, or you can see each model in our booklet. Just request a copy of

**“Radio at Its Best”**



**EAGLE RADIO COMPANY**  
 23 Boyden Place Newark, N. J.

# ANNOUNCING *New Models of* U.S. TOOL CONDENSERS



THE new models U. S. Tool Condensers embody the latest refinements made possible by the combined skill of our large staff of engineers.

U. S. Tool Condensers have always been good condensers. The new models are **better** condensers. When the best condensers are made, U. S. Tool will make them.

## MODEL 8

An efficient condenser made with new and patented one-piece stator, guaranteed to give sharp tuning at the lower broadcasting wave lengths.

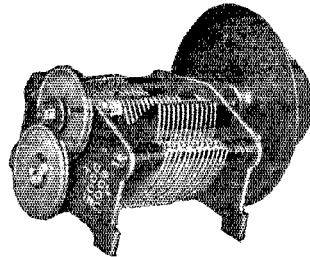
Capacity,	Max. .00025,	Min. .0000076,	\$2.70
	Max. .00030,	Min. .000008,	2.85
	Max. .00035,	Min. .0000086,	2.95
	Max. .00050,	Min. .000011,	3.75

## MODEL 9

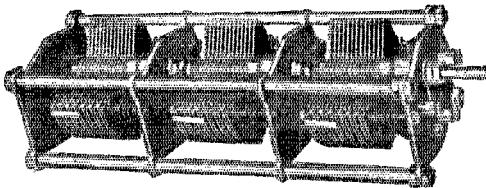
Same as Model 8, but with Vernier and Kurz-Kasch Dial.

Capacity:

Max. .00025,	Min. .0000076,	\$3.75
Max. .00030,	Min. .000008,	3.85
Max. .00035,	Min. .0000086,	4.10
Max. .00050,	Min. .000011,	4.75



## MULTIPLE CONDENSER



For Single  
Control  
Receivers

Made under Hogan,  
Patents, Jan. 9, 1917  
Pat. No. 1,014,002.

You can now build a single control receiver with two or three units of U. S. Tool Condensers. The same efficiency, but greater simplicity. One dial enables any novice to tune in stations at will.

*See These New Models at Your Dealer's*

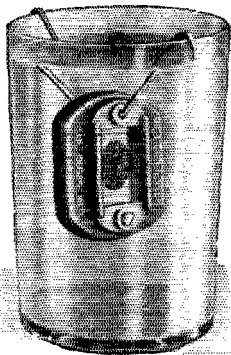
**U.S. TOOL CO., INC. AMPERE, N.J.**



# Sangamo Mica Condensers HOW TO BUILD

THE

## McLAUGHLIN ONE-CONTROL SUPERHETERODYNE



See the Sangamo Exhibit at the National Radio Exposition, Chicago The Week of September 28th

*Nothing will change their accuracy*

"WHAT'S wrong with my set?," asks many a puzzled builder, forgetting that inaccurate fixed condensers throw the whole circuit out of electrical balance.

Perhaps this is your trouble. With Sangamo Mica Condensers you can be sure of dependable accuracy no matter how severely they are used.

For here is a condenser that is guaranteed to be accurate within 10 per cent of marked capacity, and to sustain that accuracy under all conditions of service. It is solidly molded in smooth brown bakelite; impervious to moisture, acid fumes or salt air.

Even boiling and freezing will not injure a Sangamo Mica Condenser. Soldering has no effect upon the capacity; heavy surges of current in special uses will not break it down. Its great mechanical strength gives protection against shipping or cracking even if dropped on hard cement. Approved by all nationally recognized radio laboratories.



First class radio dealers have Sangamo Mica Condensers in stock — or can quickly obtain them for you. Insist!

**Sangamo Electric Company**  
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



You can have the most selective receiving set in the world, together with coast-to-coast reception at a surprisingly moderate cost. The McLaughlin One-Control Superheterodyne is simple to operate and gives better results than any other circuit during the summer.

Our booklet "Building the McLaughlin One-Control Superheterodyne" gives full constructional data and exact size working blue-prints. Price 25c.

Order from your dealer or from

PRECISE MANUFACTURING CORP.

Rochester, New York

## PROFESSIONAL SET BUILDERS

and

*dealers who build sets*

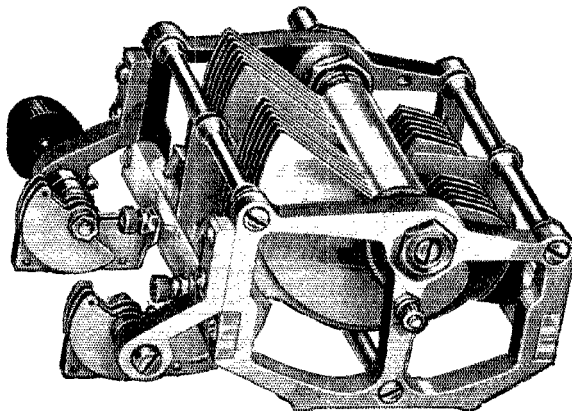
WE will shortly begin a series of newspaper advertisements, featuring the work of individuals and dealers who build sets using Cardwell Condensers.

If you build to specification or from original design, it will be to your interest to communicate with us immediately.

Ask for details of plan. Be sure to give name of your jobber.

ALLEN D. CARDWELL  
MANUFACTURING CORP.

81 Prospect Street, Brooklyn, N. Y.



And Now—

## The B-T Tandem Condenser

**T**HE same high efficiency, and unequalled construction that put the B-T "Lifetime" Condenser in the front rank is also available in tandem form. More than just a "Double Condenser,"—two carefully balanced units in one frame, working from a single shaft. Independent auxiliary "Trimmers" provide the accurate balance vitally necessary in correct tandem design.

A product that really fulfills its purpose,—Simplified Control.

Complete information on request.

### The B-T Torostyle Transformer

A "Toroid" that really works. Exhaustive research and years of experience in inductance pitfalls are behind this coil.

Arranged for short leads and easy wiring. Used in patented B-T Circuit.

Write for descriptive literature.

The B-T Torostyle Transformers and Tandem Condensers are the heart of the "COUNTERPHASE".

The patented B-T "bridge" circuit gives maximum efficiency on all wave

lengths. The greatest of the B-T Circuits.

### The B-T Tuning Control

Decorate your set, while making tuning easier with this "Control." Its smooth easy action is a delight.

### Straight Line Frequency vs Straight Line Wave Length.

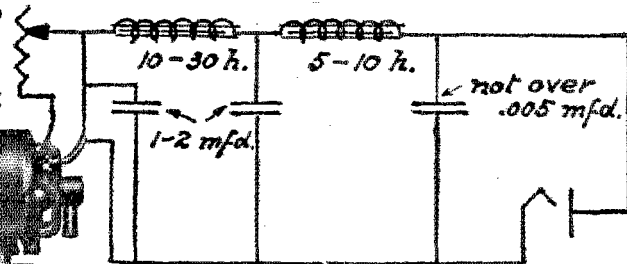
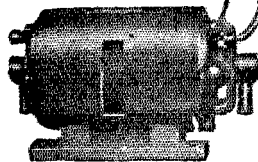
You've heard a lot about Station Separation on the lower waves. Is the answer in any condenser? We build **both** kinds,—and tell **both** sides,—in "Better Tuning," 8th Edition,—postpaid 10c.

# BREMER - TULLY MFG. Co.

532 S. CANAL STREET

CHICAGO, ILL.

No. 9 of a series of 10  
**"FILTER FACTS"**  
 Follow them thru monthly



The "pi" type of filters described in numbers 7 and 8 of this series while excellent for C. W. and some forms of phone modulation are not suitable for Heising modulation. The large condensers tend to short circuit the modulating frequencies. This may be overcome by the addition of a small choke, 5-10 henries, in the plate lead directly after the filters, followed by a small condenser not over .005 mfd. across the line.

Bulletin No. 237-B lists over three hundred motor-generator combinations that will give the maximum miles per watt. Write for your copy to-day.

## ELECTRIC SPECIALTY COMPANY

TRADE "ESCO" MARK

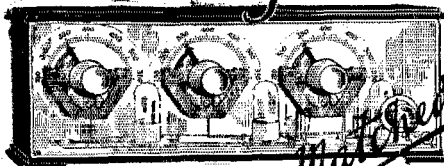
225 South Street.

Stamford, Conn.

This complete series with other valuable motor-generator information may be obtained in pamphlet form. Write for your copy.

# MATCHED DUPLEX CONDENSERS

*Always Read Alike  
 Because They Are ~ ~*



Just one number to log—or eliminate logging and dial by wave-lengths. Made as Bureau of Standards specifies, and guaranteed. Rugged, with wear-proof bearings. Built for accuracy. Packed in matched sets. Sealed, to remain untouched until used.

DUPLEX Matched condensers assure you the most out of your radio set. Ask your dealer.

Interesting illustrated folders on request.

DUPLEX CONDENSER AND RADIO CORP.  
 32 Flatbush Ave. Extension, Brooklyn, N. Y.

## Another TOAZ Development FUSOCKETS

PATENT APP. FOR

Individually Fused Sockets  
 Insure your Tubes  
 199 or 200

Single or any multiple  
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 \$1.00 per Socket, P. P.

## TOAZ TERMINALUGS BEST FOR RADIO BUGS

At your Dealers or send \$1.00 for Special Package, including Gripfast Terminalugs. (Pat. App. For.)

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FILAMENT AND  
 PLATE TYPES



TRANSFORMER  
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## FAMOUS "B H" TRANSFORMERS

BUILT TO THE HIGHEST  
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Used by the Leading  
 Amateurs of Canada  
 WRITE FOR LITERATURE  
 Benjamin Hughes Elec. Co.  
 298 LaSalle Street, W.  
 MONTREAL, CAN.

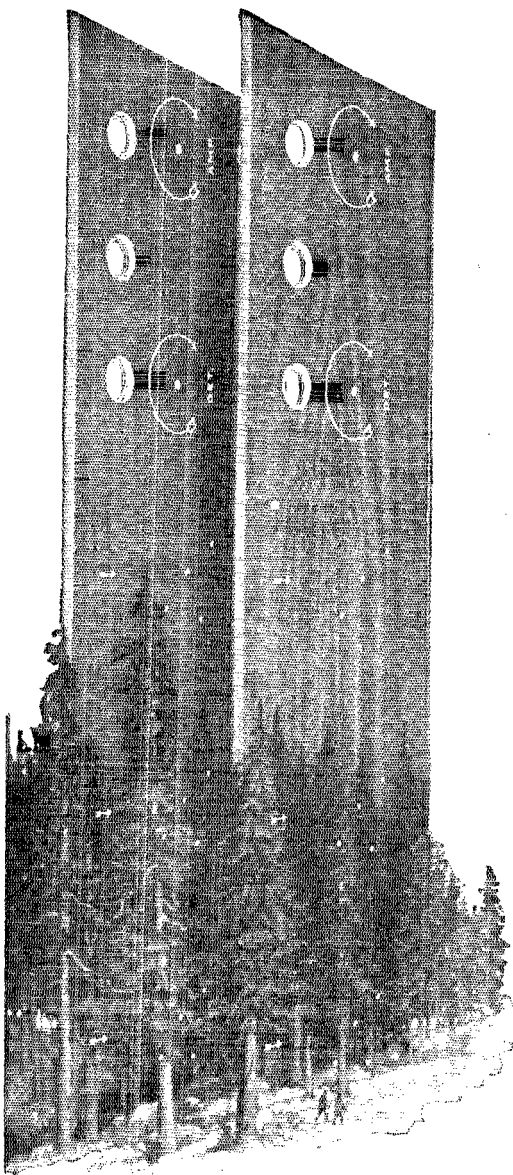
AUDIO AND  
 PUSH-PULL



SINCE 1910

SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST

# It's mahogany to the eye- but in fact it's Bakelite



So perfectly is the grain and color of mahogany and walnut reproduced in these Bakelite Radio Panels, that the eye cannot distinguish them from the natural woods.

By using a Bakelite Panel that matches the wood in the cabinet, your finished set will be far more handsome than if a plain panel is used.

Rigid and strong, Bakelite Panels support the weight of heavy instruments without sagging. They will not compress, or cold-flow, under pressure of binding screws. Because of their resistance to extremes of heat, cold and moisture, they will not warp nor split. These properties and their insulation value, color and finish are permanent.

Be sure to ask your dealer to show you these wood finish Bakelite Panels — obtainable under any of the following trade-names:

**FORMICA** CELORON **Dilecto**  
**Spaulding** Fibroc **Micarta**

A Bakelite Panel on a set is an indication that the manufacturer has used the best.

*Write for Booklet 27*

## BAKELITE CORPORATION

247 Park Avenue, New York, N. Y.  
Chicago Office: 636 West 22d Street

*Visit our booth at the Chicago and New York Radio Shows*

# BAKELITE

Bakelite is an exclusive trade mark and can be used only on products made from Bakelite & manufactured by the Bakelite Corporation. It is the only material which may bear this famous mark of excellence.

  
BAKELITE is the registered trade mark for the phenolic resin product manufactured under patents owned by the Bakelite Corporation.

THE MATERIAL OF A THOUSAND USES  
SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST

# A Revelation in Tone—Volume—Clarity

The Kellogg Symphony Reproducer brings the broadcasting studio into your very room, so realistic is its reproduction.

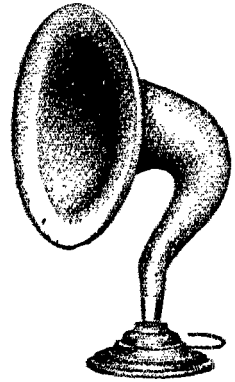
Piano music, the most difficult to reproduce, sounds so natural that you are completely carried away by its beauty.

Vocal selections retain all of the tone colorings of the artist.

Orchestra music is indeed a recreation, every instrument can be heard, clear and full.

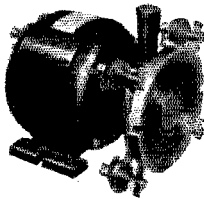
Magnetic diaphragm control—used exclusively in the Kellogg unit—is the new principle that performs wonders in radio reproduction.

Nothing like it at twice the price—\$20.00 each.  
At your dealers—Hear one today.



**The Kellogg Switchboard & Supply Company**  
1066 W. Adams St. Chicago, Illinois

**KELLOGG SYMPHONY REPRODUCER**



## Make Thousands of New Friends

WITH THE

## ADVANCE "SYNC" RECTIFIER

MORE IN USE THAN ANY OTHER RECTIFIER MADE ANYWHERE

Make your calls heard over maximum territory. Give them clearer tone—better volume. Reach hundreds of sets all over the land that did not know your station was in existence. The new improved ADVANCE "SYNC" RECTIFIER will do it. Very efficient on short waves. Requires no attention—always ready.

Moulded Bakelite revolving disk 6" dia. Nickel plated brush holders with adjustable gauze copper brushes. Convenient control handle. Perfectly insulated throughout.

- Complete with Westinghouse 1/8 h. p. Synchronous Motor ..... \$40
- Rectifying wheel with complete brush assembly and mounting ring to fit your own motor ..... \$15

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

**ADVANCE ELECTRIC CO.**

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SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

At your dealer  
**\$1.25**

**TUNE-IN**  
More Stations!  
GET those far-away ones quickly, easily, clearly—just replace your dials with

**WALBERT**  
**UNIVERSNIER**

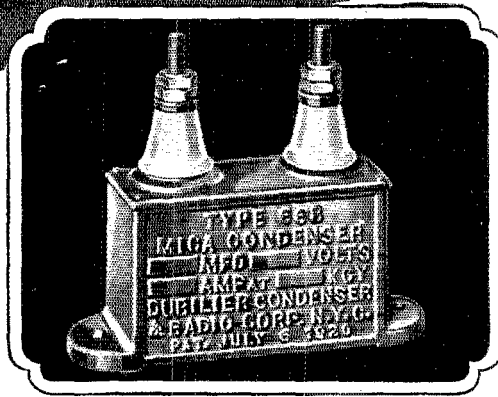
WALBERT MFG. CO., CHICAGO

Laboratory Product

**CRESCENT LAVITE RESISTANCES**  
for Distortionless Amplification.

12,000, 48,000, 50,000, 100,000 Ohms. List \$1.50 ea. Special Sizes to Order \$2.50 ea. Dealers write for discounts. When Better Resistances are made they will be Crescents. Crescent Radio Supply Co., 1 Liberty St., Jamaica, N. Y.

# amateur transmitting condenser



For amateur transmitting stations—the Dubilier Condenser No. 668. It may be used as a series antenna condenser; a plate blocking condenser or a grid coupling condenser in tube transmitters of 500 watts or lower.

Capacity .0001 to .075 Mfd. operating voltage 1000 to 3000 volts continuous at a current of 5 amperes—radio frequency of 750 to 1000 kilocycles.

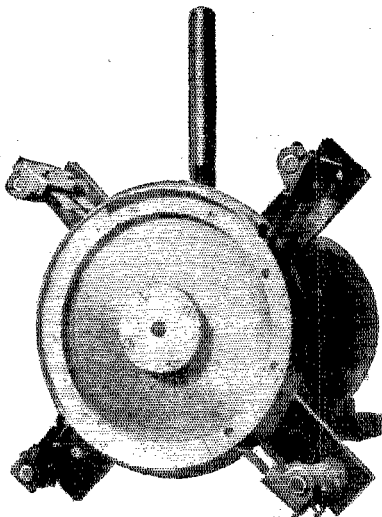
# Dubilier

**CONDENSER AND RADIO CORPORATION**

# THE SUPER-SYNC

The only synchronous rectifier that can be filtered

What are you doing to warm the plate of that 250 with this fall OM? Of course a motor generator would do it providing it is large enough, but the price is usually way above what the average Ham's pocket book can afford. Now OM what would you say to a rectifier that gave equally as good if not better results than a motor-generator but at a price well within the reach of all? This is exactly what the SUPER-SYNC offers you. With its large rectifying commutator and excellent insulating materials it easily supplies power for the transmitter using the larger size tubes, and naturally it is just as efficient on the lower powered sets. Thus the Purchaser of a Super using the small tubes is assured his rectifier will function perfectly in



the event that he should decide to increase power. This is true of no other form of rectifier than the Super. The main advantage that the Super offers, however, is the fact that it can be filtered. No mysterious apparatus is required to filter the SUPER. In other words the usual Brute Force type of filter is just as effective on the Super as on a motor generator. Another advantage of the Super is the fact that it requires practically no care, once adjusted it stays put, and an occasional oiling of the motor bearing is all the attention that is required. The motor, by the way, is a husky 1/4 H.P. 1800 R.P.M. sync. motor, and none have ever been known to slip a pole or fall out of Synchronism.

PAT. PENDING

PRICE \$75.00 F. O. B. ST. LOUIS

MARLO ELECTRIC CO., 5241 Botanical Ave., St. Louis, Mo.

Obsolete

The HEART of the Circuit is **AMPERITE**  
The "Self-Adjusting" Rheostat

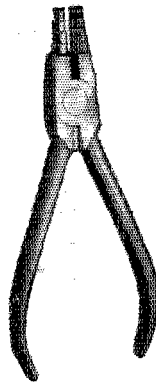
AMPERITE controls the flow of current through the tubes automatically just as the heart controls the flow of blood through the body. Does away with hand rheostats and filament meters. Eliminates guessing and all tube worry. Prolongs tube life. Lowers set cost. Proved and adopted by more than 50 set manufacturers. For perfect filament control you must use AMPERITE. \$1.10 everywhere.

RADIALL COMPANY  
Dept. QST-9, 50 Franklin Street, New York, N. Y.

Write for  
**FREE**  
Hook-ups

**AMPERITE**  
The "SELF-ADJUSTING" Rheostat

SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T



## "Windham" Wire Former

(Pat. Pending)

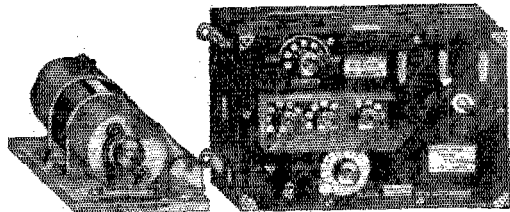
A complete and handy tool for electricians, radio set builders and mechanics. It will accurately form loops or eyes for No. 4, 6, 8 and 10 screws, make easy radius and sharp right angle bends, has flat jaws and wire cutters. This tool is made of the best quality steel, drop-forged and carefully tempered in oil.

We guarantee every tool against defects in workmanship and materials and will promptly replace or refund money on any found defective by purchaser.

Price \$1.25 Each

Ask your dealer  
MANUFACTURED BY  
**THE GOYER COMPANY**  
Willimantic, Connecticut

## Western Electric Portable Navy Telephone Transmitter and 3 Tube Receiver Complete



Consists of Transmitter and Receiver Cabinet, Microphone, Head Set, 12V. to 360V. Dynamotor and Cable. Price without tubes or batteries. Slightly Used, \$40. Express Paid.  
Other Navy Apparatus at Special Summer Prices.  
Geo. W. Eaton Electric Co., 1915 S. 12th St., Phila., Pa

# ANNOUNCEMENT

To you who are scientifically interested this is of even greater interest than it is to opera-goers, patrons of lectures and concerts, or to the dancing set.

Artistic radio has come with Thorola Islo-dyne, the only receiver embodying the *Isolated Power* principle made possible by Thorola Low-Loss Doughnut Coils. They conquer the causes of interfering currents, pick-up feed-back, uncontrollable oscillation, complicated and freak wiring, uncertain operation. Radio experimenters know what all this means. Radio listeners no longer need to know!

Islo-dyne action now keeps every set of radio impulses clear, free, separate. The one station wanted is cleanly selected, even in the broadcasting centers. Utmost power, unscattered, is *isolated—focused*—on this one set of signals only. The impulses do not conflict or neutralize. Full tone, un-

modified—full volume, full distance at last are possible, at all wave lengths.

With the uncontrollable, temperamental factors of radio reception banished, Thorola Islo-dyne achieves uniformity of results. Every Thorola Islo-dyne is as good as the best one ever built. The same stations keep coming in the same. The set you inspect tells what every Thorola set does.

Radio reception is unmistakably elevated to a new plane. What you knew would come some day, is now accomplished. There is a complete Thorola receiver leading its field by far, just as Thorola excels in loud speakers and other apparatus.

The Thorola name is surety of radio development which nothing will eclipse. The intense interest in the 5-tube Thorola Islo-dyne receiver at every radio store will tell you where expert opinion centers today. Go and make your own tests.

R E I C H M A N N C O M P A N Y, C H I C A G O



Thorola Loud Speakers with new burnished Bakelite horn and gold throat-band are still better in appearance and performance.

Thorola No. 4 \$25

Thorola Jun. or No. 12.....\$15

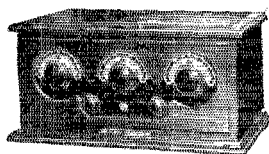
Phonograph Attachment.....\$45

Thorola Jun. or No. 8

Phonograph Attachment.....\$7.50

Thorola (Large Unit) No. 6 \$15

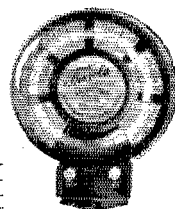
Phonograph Attachment.....\$15



The very proportions of Thorola Cabinets suggest new internal design.

In smart Thoroco Cabinet the 5-tube Thorola Islo-dyne is.....\$85

In stunning Burled Walnut Cabinet with Circassian top the 5-tube Thorola Islo-dyne is.....\$115



Thorola Low-Loss Doughnut Coils installed in other

sets as recommended will provide many of the greatest Thorola advantages.

For the complete set of three.....\$12

Coupler and transformer coils, each.....\$4

# Thorola

I S L O D Y N E

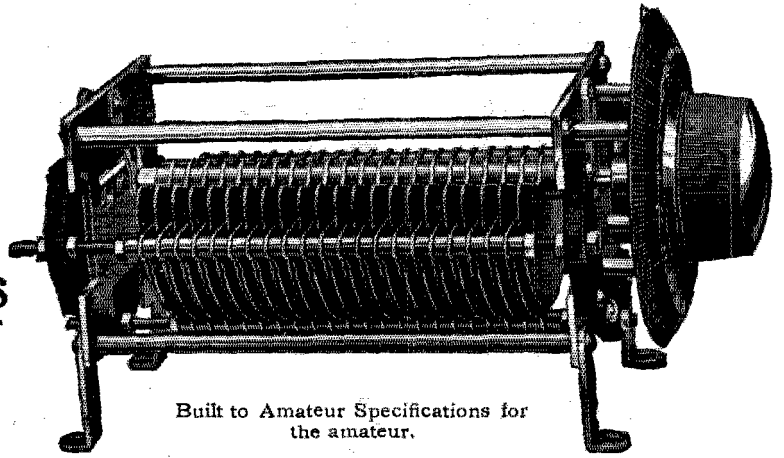
SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST



Antenna

Series

Condensers



Built to Amateur Specifications for the amateur.

Type 150 — 3000 150 MMFd. (.00015 MF).

3/16" spacing (ordinarily known as double spacing), 3000 volt flashover. Fine for 5W and normal 50W sets. Proper size for primary circuits.

Price \$7.50

Type 450 — 3000 450 MMF (.00045MF)

3/16" spacing, like those NATIONAL supplied to N.R.R.L.

Price \$16.50

Type 100 — 6000 100 MMF (.0001MF)

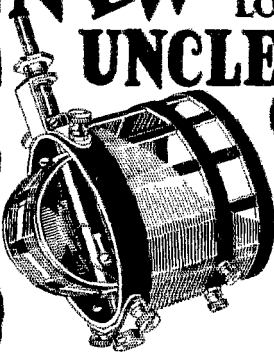
3/8" spacing, 6000 volt flashover, for the overloaded "50" and the "250" W. Plenty big enough for the primary, too. All prices include 4" Velvet Vernier Dial.

Price \$12.50

"NATIONAL" can furnish you with 5 or 3 plate Receiving Variables for that short wave receiver. Send for Bulletin 106 Q S T

**NATIONAL COMPANY, INC., ENGINEERS AND MANUFACTURERS**  
110 Brookline Street, Cambridge, Mass.

**NEW** LOW WAVE  
LOW LOSS  
**UNCLE SAM  
COIL**



SIZE

2 7/8 x 2 1/2 in.

Tunes from  
35 to 150  
meters with  
a.0005 Mfd.  
Condenser.

**FREE** Ask your dealer or send us four cents in stamps for wiring diagrams in which this unit can be used.

**UNCLE SAM ELECTRIC CO.**  
212 E. Sixth St. Plainfield, N. J.

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**BINDING POSTS**  
Twenty-five Different Engraved Tops.



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

**ULTRA-LOWLOSS  
CONDENSER**

SPECIAL OUTLASS PLATES DISTRIBUTE THE STATIONS EVENLY OVER THE DIAL. SIMPLIFIES TUNING. CAPACITY 0005 MFD.

\$5.00

PHENIX RADIO CORP., 116-F East 25 St., N.Y.C.

**CRISS-CROSS**  
THE COUNTRY WITH  
**Premier**  
5 TUBE  
**Ensemble**  
TRADE MARK

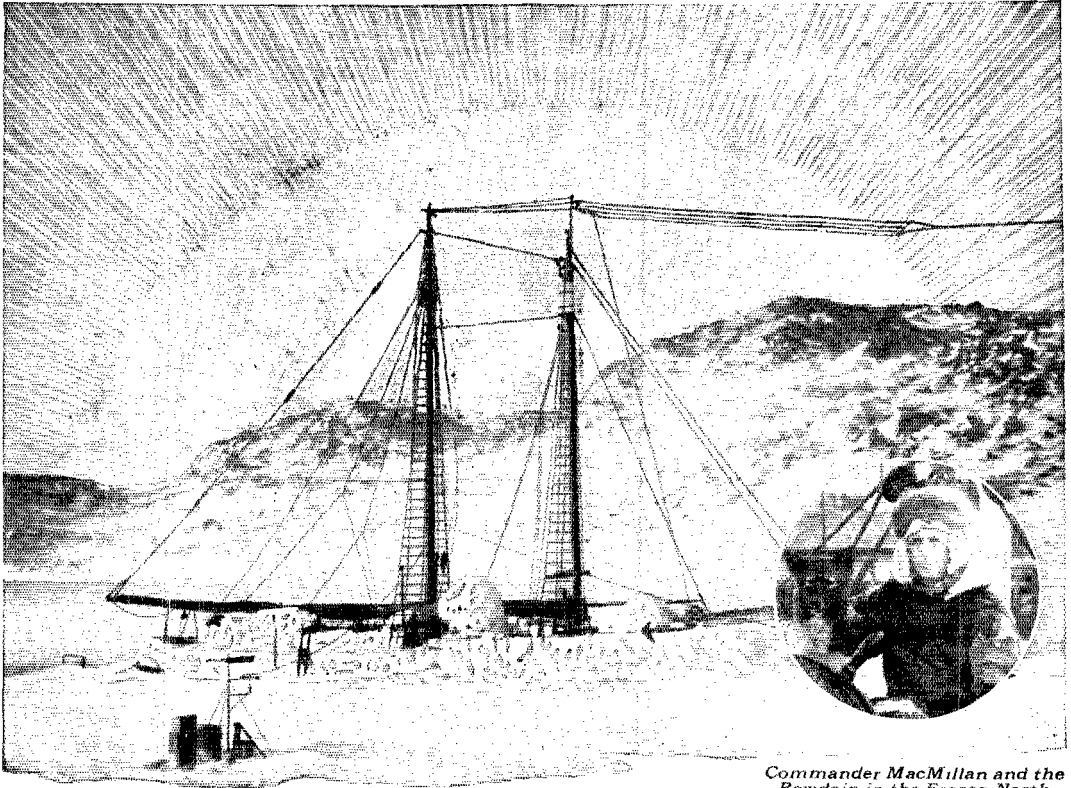
SOMETHING decidedly new, different and better has been perfected in radio. Interesting information is ready for you. Write us at once.

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1800 Grace St., Chicago, Ill.

SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T



Commander MacMillan and the Bowdoin in the Frozen North

## With MACMILLAN in the ARCTIC

ONCE again that intrepid explorer, Donald MacMillan, has gone into the Frozen North. And once again—for the fourth time—he relied on Exide Batteries to serve him, without flinching, through the extreme rigors of the Polar region.

Each item of equipment on such an expedition is chosen with utmost care, for life or death hangs in the balance. On previous voyages to the Arctic with MacMillan, Exide Batteries have been through shipwreck, blizzard and incredible cold and never once have failed.

On this latest adventure all the storage batteries are Exide—for radio sending and receiving, for electric light aboard ship and on shore, for operating the sensitive scientific instruments. The three U. S. Navy airplanes that accompanied MacMillan's two vessels are equipped with Exide Batteries.

Wherever radio must not fail, you will almost always find Exide Batteries have been installed—in government and commercial plants—on the giant ship Leviathan, on

the Navy dirigible Shenandoah, on the new British airship R33; on every continent and the seven seas speeding up communication through-out the modern world.

The same qualities that make Exide the choice where lives are at stake are built into the Exide Batteries that you can have with your own receiving set. Staunch and dependable, the Exide gives uniform current through a long period of discharge and assures the clearest reception of which your set is capable. There is a type for every tube and a size for every set, obtainable at radio and all Exide dealers.



Exide 6-volt "A" battery  
in one-piece case

There are also Exide "A" batteries for 2-volt and 4-volt tubes and "B" batteries, 24 and 48 volts, of 6000 milliampere capacity. The Exide line includes a most economical "B" battery rectifier.

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Philadelphia

Exide Batteries of Canada, Limited  
153 Dufferin Street, Toronto

# Exide

## RADIO BATTERIES

FOR BETTER RADIO RECEPTION USE STORAGE BATTERIES  
SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

## 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.

.....1925

American Radio Relay League,  
Hartford, Conn.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose \$2 (\$2.50 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.

.....  
.....  
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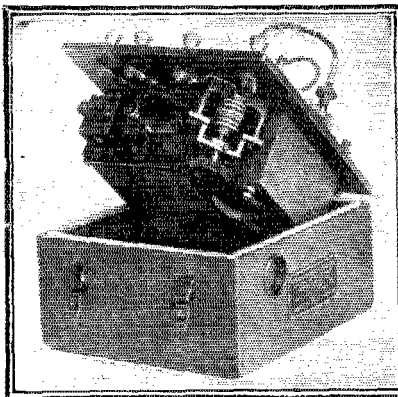
Station call, if any .....

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!



### RADIO SPARK TRANSMITTERS (75 WATT PORTABLE)

*Made for U. S. Army Aeroplanes*

This is a tuned spark coil transmitter, with a wave length of 100-300 meters. The set is made of the finest of materials and the essential parts are the spiral tuning inductance, the induction coil, sending condenser and spark gap. Can easily be converted into spark coil CW set. Brand new, in original cartons. ORIGINAL GOVERNMENT COST, \$47 EACH

**OUR PRICE \$5.75 EACH**

**AMERICAN SALES COMPANY**

21 Warren Street

New York City

# GRAND CENTRAL PALACE

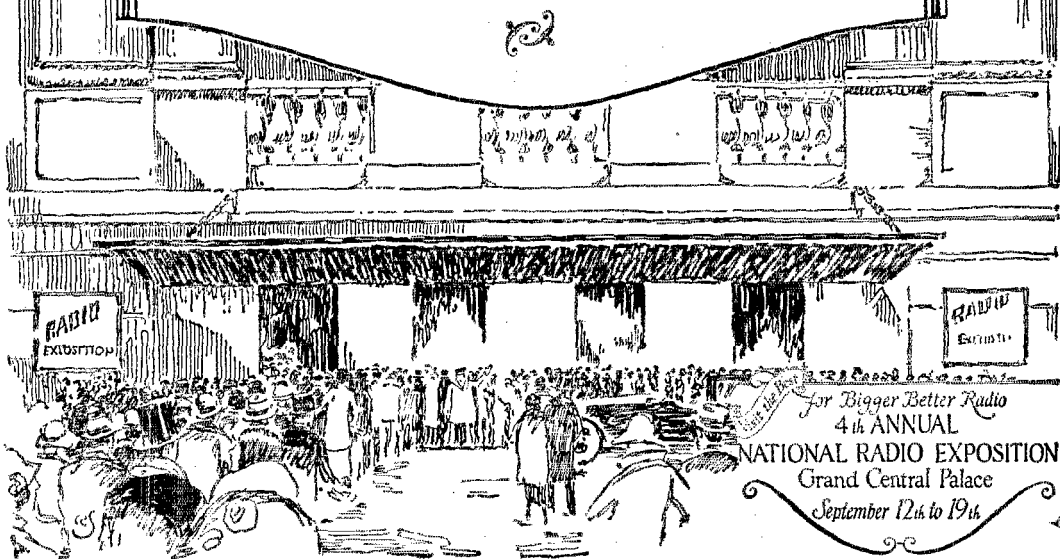
## 4<sup>th</sup> Annual NATIONAL RADIO EXPOSITION

Grand Central Palace, New York  
September 12th - 19th incl.

- the fourth successive national exposition representing all the leading manufacturers of the radio industry;
- the only great radio exposition of 1925 to be held in the metropolitan center of New York;
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Business Office  
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# Clearing Up Odds and Ends!

We have for sale the following material at special prices subject to prior sale:

- |   |  |
|---|--|
| <p>9—<math>\frac{1}{2}</math> Horse-power A.C. 110 Volt 1 phase motors brand new at ..... \$12.00 each</p> <p>1—Telefunken U.S. Naval, Radio Laboratory wave-meter 66-3000 meters with calibration within 1% on first coil, slightly used, including thermo couple ..... \$40.00</p> <p>4—900 Cycle Aeroplane transmitters complete new ..... \$15.00 each</p> <p>6—40 meter inductances made of heavy brass strip, mounted on maple base, movable primary ..... \$8.00 each</p> <p>6—80 meter of the same ..... \$8.00 each</p> <p>3—Pyrex 32" insulators for large antenna, brand new ..... \$20.00 each</p> <p>6—Electrose 24" antenna insulators at.. \$1.50 each</p> <p>1—Holtzer Cabot 500 cycle motor generator 110 Volt D.C. Drive <math>\frac{1}{2}</math> K.W. brand new..... \$30.00</p> | <p>30—R.C.A. U.C. 488-1 mfd condensers .. \$1.00 each</p> <p>2—Dubilier .004 aluminum case condensers 12500 Volts tested, shopworn ..... \$12.00 each</p> <p>4—<math>\frac{1}{2}</math>K.W. Dubilier Protective devices for transmitters ..... \$1.50 each</p> <p>1—Roller Smith 750 Watt-Meter ..... \$8.00</p> <p>2—2 K.W. 500 Cycle Telefunken transformers, shopworn ..... \$15.00 each</p> <p>20—R.C.A. UC 1846 Faradon Antenna series condensers ..... 50 cents each</p> <p>1—U.V. 217 Kenotron slightly used ..... \$15.00</p> <p>60—R.C.A. PR 535 Rheostat for U.V. 202 tubes. List at \$15.00. Special ..... 90 cents each</p> <p>1—C.N. 240 Tuner in perfect condition, but slightly used, 1000-10000 meters ..... \$35.00</p> |
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Write for New Detailed List No. 2 for New Specialties Too Numerous to Mention

All Prices F. O. B. New York



## Troy Radio Company

1254 St. Johns Place

Brooklyn, New York



## KENOTRON RECTIFYING TUBES (Type TB-1)

Manufactured by the General Electric Co., new, in original cartons.

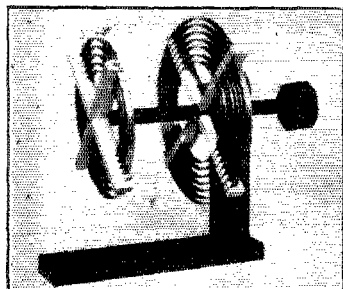
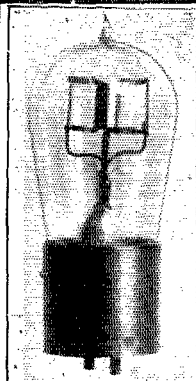
These tubes operate on a filament voltage of 7.5 volts, and an A.C. input voltage of 550 volts. Their normal output is 20 watts at 350 volts D.C.

Eliminate your transmitting plate supply troubles with these tubes.

Make your own B-Battery eliminator with two of these Kenotrons and a suitable filter.

And the bargain price, O.M., is only **\$1.50 Each**

**AMERICAN SALES COMPANY** 21 WARREN ST. New York City

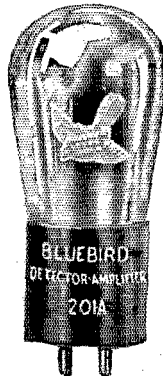


**Coupled S. W. Inductances \$10.50**

Postage Extra

20, 40 or 80 meters at one price. Higher ranges to order. Pri. and Sec. Coils only, no stand \$7.00. Used by all leading Hams. If your set won't perk try a set of these coils. Complete transmitters on hand.

Manufactured by **J. GROSS & CO.**  
Phone Lenox 10199 323 E. 83rd St.  
NEW YORK CITY, N. Y.



## BLUEBIRD RADIO TUBES

—are powerful—sensitive for distance, give clear volume and long service.

**GUARANTEED**

to work in Radio Frequency, Neutrodyne, Super Heterodyne and Reflex.

WITH BAKELITE BASE

Type 200  
Type 201A  
Type 212  
Type 258  
Type 299A with standard base  
Type 202 5 watt Transmitter \$3.00

**\$2.00**

When ordering Mention Types

Shipped Parcel Post C. O. D.

**BLUEBIRD TUBE CO.**

200 Broadway Dept. S. New York

# HAM-ADS

## IMPORTANT NOTICE! NEW RATES ADVANCED CLOSING DATE

Effective with May QST, the HAM-AD Advertising 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, in force with the May issue.

The closing date for HAM-ADS is now 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.

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

Rates for the QRA Section remain the same; 50c straight. See heading of that section for details.

### \$2.95 ——— OUT AT LAST!

"THE Hawley." An alkali un-acid rechargeable "B" storage Battery of 22½ volts. Not an un-assembled 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 day 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.

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.

REBUILD YOUR NEUT—Use same panel, same parts. No neutralization. 22 feet gold wire, only extra part. circuit and complete, simple instructions—\$5.00 prepaid. Hundreds of Neut owners use this Kit. Details—10c. 48 page catalog parts—10c. Stamps accepted as cash. KLADAG RADIO LABORATORIES, KENT, OHIO.

MAKE \$120 WEEKLY IN SPARE TIME. Sell what the SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST

public wants—long distance radio receiving sets. Two sales weekly pays \$120 profit. No big investment, no canvassing. Sharpe of Colorado made \$955 in one month. Representatives wanted at once. This plan is sweeping the country—write today before your county is gone. OZARKA, 353 Washington Blvd., Chicago.

AMRAD No. 2796 Lightning Switch, \$1.50. AMRAD No. 4000-1 "S" Tubes, Lowest Prices. AMRAD-Send-Receive Switch No. 2834, \$5.00. AMRAD-New Type Variometers, \$1.50. UP-414 Mike Transformers, \$3.75. UC-1831 Variable Trans. Condensers, \$1.50. Roller-Smith Radiation Meters 0-5 \$3.75. ALL POST-PAID. Send for list STATE RADIO COMPANY, 286 Columbia Road, Dorchester, Mass.

Send for our FREE CODE LESSONS showing simplicity of learning Radio. Positions secured for graduates paying \$40. to \$50. per week after short course. Fall term begins September 14. Free Scholarships for a few lucky ones. INQUIRE! Catalog free. MASSACHUSETTS RADIO SCHOOL, 18 Boylston St., Boston, Massachusetts.

FOR the first Sept. and Dec. 1923, Jan. Feb. Mar. April, July, and August 1924 QST copies received will extend your QST subscription one year. Address to David Houghton, c/o A.R.R.L., 1711 Park Street, Hartford, Conn.

200-20,000 METER receiver including radiotron \$25.00; two step amplifier \$18.00. Smith, 4416 Market, Philadelphia, Pa.

General Electric 24/1500 volt .233 ampere 6000 RPM dynamotors. Half voltage tap. Unused \$45.00. Slightly used \$25. Guaranteed. Adapted for belt drive \$3.00 additional. 12/500 volt .07 ampere \$18.00. Navy Keys with blinker \$2.00. Henry Kienzie, 501 East 84th Street, New York.

NEW PARTS OMS. CARDWELL 5 PLATE CONDENSER FOR LOW WAVE TUNERS \$4.00. CARDWELL DOUBLE SPACED TRANSMITTING .00045 \$15.00 AND IT HOLDS 8000 VOLTS. SAME TYPE .00025-11000 VOLTS PRICE \$10.00. GIVES YOU EASY TUNING. RADIOSTATS FOR FLEXIBLE FILAMENT CONTROL \$8.50. ACME TRANSFORMERS. ORDER WHAT YOU WANT. WE HAVE IT. THE TIME TO GET THE OLD MILL IN SHAPE FOR THE REAL DX IS TODAY. NOT TOMORROW. DROP US A CARD AND GET NEW PRICE LIST. JUST COMPLETED. FORT WORTH RADIO SUPPLY CO., FT. WORTH, TEXAS.

TO TRADE—Three A Graflex Camera, on fifty watter parts. 9EFE, Coffeyville, Kas.

PLENTY of Western Electric condensers 2mfd, tested 500 volts \$1.25 1mfd 1000v. \$1.25. 1mfd 400v. 50c. postage extra. Other supplies. R. Wood, 38 Way Avenue, Corona, N. Y.

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TESTED GALENA CRYSTALS 50c pound bulk. Buskett, Chemist, Joplin, Mo.

ELECTRICALLY WELDED connections for that RECHARGEABLE EDISON "B" BATTERY. Largest size elements with 2 welds of pure nickel wire on each negative and one weld on each positive element for 7½ cents pair postpaid. Hard rubber separators ½ cent each. Sample pair and "dope" sheet 10 cents. Paul Mills, Woodburn, Oregon.

NEW—RCA 40 H. Chokes \$3; PT537 Rheostats \$5; UV216 Kenetrons \$4.75; 30-220 M. Wavemeters \$7.25; UC1015 Anl. Series Cond's, \$3. 3 BOV.

HEADQUARTERS FOR AERIAL EQUIPMENT. THE SUMMER MONTHS IS THE TIME TO FIX UP THE AERIAL SYSTEM. DYNEX SOLID COPPER ENAMELED WIRE, No. 12, 1c FT. 500', \$4.75. 1000', \$9.25. PYREX GLASS TRANSMITTING INSULATORS \$1.50. RECEIVING SIZE 45c. OHIO BRASS INSULATORS. 5", 75c. 10", \$1.50. "DYNEX" KEM RECTIFIER ELEMENTS. READY CUT AND DRILLED. 1" x 4", 6c EACH. 1" x 6", 7c EACH. 1½" x 6", 8c EACH. 1/16" SHEET LEAD 90c SQ. FT. 1/16" ALUMINUM 90c SQ. FT. "DYNEX" HOOPS FOR THE CAGE. 8", \$2.50. 18", \$3.00. 30", \$3.50. CARDWELL TRANSMITTING CONDENSERS, \$15.00. GAROD-PYREX SOCKETS.

\$1.50. RCA INDUCTANCES. \$11.00. ALLEN-BRADLEY RADIOSTAT. \$6.50. TYPE E-210 BRADLEYSTAT. \$4.00. AMRAD "S" TUBES. THE IDEAL DC SUPPLY. TYPE 4000-1. \$10.00 EACH. MERSHON CONDENSERS \$2.00. 1 FT. SHIN SUPPLY THE PARTS FOR THAT NEW REMODELED SET. AND DON'T FORGET "DY-NEX FOR DX." SHIN (THE EIGHT THAT PAYS THE FREIGHT). E. J. NICHOLSON, 1407 FIRST NORTH ST., SYRACUSE, N. Y.

GLASS ANTENNA INSULATORS. 40c. Linn Collins, Jr., 1461 West 110th St., Cleveland, Ohio.

GORTON PANEL ENGRAVING—one day service. We cut Bakelite panels any size or thickness. All size Bakelite tubing in stock. Complete line of receiving and transmitting apparatus including Gen'l Radio, Cardwell, Remler, Acme, etc. BROADCASTING EQUIPMENT—LINE AMPLIFIERS, Microphones, all size tubes, transformers and generators, etc. Can supply any special radio equipment for any installation. Write us your requirements for quotation. X-L RADIO SERVICE, 223 VAN BUREN ST., JOLIET, ILLINOIS.

BARGAINS—Grebe Cr 5, \$35; Rord, \$20; Fada, five, \$50; Fada, four, \$40; Rca, three, \$30; Western Electric five-wattors, \$5; EIS CT, with tubes, less cabinet \$70; EIS intermediate transformers \$1. McCarron, 236 Nott Ave., Long Island City, N. Y.

4UC SELLING OUT. Going to College. Prices cut very low. Write for list. Donald B. Whittemore, Box 4, Seabreeze, Fla.

PORTABLE set users. Special 2 volt 50 amp. storage batteries guaranteed. \$4.50 prepaid in USA. Send for circular. Precision Electric Company, 147 West 24th St., New York City.

TWO NO. FOUR THOUSAND S TUBES WITH SOCKETS SIXTEEN DOLLARS. SINGER TUBE WITH GENERAL RADIO SOCKET USED TEN HOURS EIGHT DOLLARS. VIBROPLEX GOOD CONDITION. EIGHT DOLLARS. DANA, GRANTWOOD, N. J.

TIMEGRAPH—SHOWS DIFFERENCE IN TIME OF ALL COUNTRIES. PRICE TWO BITS. 7KU, 2500 E. HELEN ST., SEATTLE, WASHINGTON.

"AMATEUR RADIO EXCLUSIVELY" AND SHORT WAVE WORK. WHEN YOU CANNOT MAKE YOUR OUTFITS WORK DROP US A LINE. WE NOW TAKE CARE OF ANY TWENTY METER WORK IN THE TRANSMITTING LINE. LOWER IF YOU WISH. LET US DO YOUR EXPERIMENTING AND GIVE THE D.M. BETTER TRAFFIC REPORTS! WE BUILD TO ORDER ANYTHING IN THE TRANSMITTING AND RECEIVING LINE. IF YOU HAVE THE PARTS SEND THEM IN. WE ALSO SUPPLY THE BEST IN PARTS. ESCO MOTOR GENERATORS, THORDARSON AND ACME PLATE TRANSFORMERS, POWER TUBES, PYREX INSULATORS, JEWEL AND WESTON METERS. ALSO INDUCTANCES FOR ANY WAVELENGTH FOR THAT TRANSMITTER OR RECEIVER. THE SHORT WAVE RECEIVER HERE WORKS FROM 7 TO 200 METERS. WHEN YOUR SUPER-HETERODYNE FAILS TO "PERK" SEND IT TO US. IT WILL WORK AFTER. DON'T KNOW YOUR WAVELENGTH? BUY A WAVEMETER! WE BUILD SPECIAL EXPERIMENTAL EQUIPMENT TO ORDER. ANYTHING SHOWN IN QST. OUR PRICE IS RIGHT FOR ANY WORK WE DO. USE THE BEST! FOR THE BEST IN AMATEUR EQUIPMENT DROP US A LINE. IF IT'S HAM LET'S HAVE THE PROBLEM. SEND US YOUR INQUIRIES. ESTIMATES GLADLY GIVEN. QSO. THOS. ENSALL, (ENSALL RADIO LAB.) 1208 GRANDVIEW AVE., WARREN, OHIO. ("Designers of High Grade Amateur Equipment").

\$10 RCA PT 337 RHEOSTAT \$5.95. \$17.00 RCA UT 1367 (3 1/4 to 5 amperes) Magnetic Modulator. \$11.95. New. Guaranteed. COD. Money back if not satisfied. Write for list transmitting-receiving accessories. Kirk Burg, 2936 Palm St., St. Louis, Missouri.

Omnigraphs, meters, radio sets, bought and sold. Ryan Radio Company, Hannibal, Mo.

UV204, A1 condition \$60. Harold Olson, 4217 Sheridan Ave., So., Minneapolis, Minnesota.

MUST SELL—Transmitter, receiver, tubes and junk. Cheap. List. SAHQ, Wyatt Hall, St. Charles, Virginia.

INTENSIVE SPEED PRACTICE TESTED AND FOUND FB. SPEED INCREASED FROM 25 TO 35 PER IN TWO EVENINGS. If interested ask for information, Dodge Radio Shortcut, Mamaroneck, N. Y.

We bought 200 five tube receiving sets used by the air service during World War. Made by The General Electric Co. 2 stages radio also 2 stages audio amplification. Untuned. Remote Control. Without batteries, telephones or tubes. Mounted in durable box on rubber cords. Price \$10.00 per set while they last. J. A. Howenstine, 2100 So. High St., Columbus, Ohio

RECEIVERS built to order. WORK guaranteed. Earl Deakins, Macedonia, Iowa.

WELCOME RADIO WEATHER BACK WITH AN EDISON B, THE STEEL ALKALINE LIFE TIME BATTERY. A TROUBLE FREE POWER PLANT FOR YOUR SET. ELEMENTS ELECTRICALLY WELDED TO HEAVY NICKEL CONNECTORS. 54 VOLT \$3.25. 100 VOLT \$15.00. OTHER SIZES. OAK CABINET. LARGEST ELEMENTS. REAL EDISON SOLUTION. A BIG 2000 MILLIAMP HOUR B FOR THE MULTI-TUBE SET, 105 VOLTS \$24.00 CELL PARTS 17c. DRILLED 19c. ASSEMBLED CELLS 24c. QUANTITY DISCOUNTS. EDISON A ELEMENTS 5c. WELDED PAIRS 7 1/2c. A NEW SUPERCCELL 4000 MILLIAMP HOUR, 40c. SAMPLE 50c. ANNEALED TEST TUBES 3/8" 3c, 1" 4c. SHOCKPROOF JARS 1 x 6-4c, 1 1/2 x 6 1/2-5c. PUREST SOFT .032 NICKEL 1c FOOT. RUBBER SEPARATORS 1/2c. REAL EDISON ELECTROLYTE. \$1.25 MAKES 5 LBS. WILLARD COLLOID—A REAL B CHARGER, 50 VOLTS \$2.00. JUMBO \$3.00. 100 VOLT FULLWAVE \$4.00. JUMBO FULLWAVE \$6.00. FOR HIGHEST INPUT AND OUTPUT EFFICIENCY USE NO. 12 ENAMELED AERIAL WIRE—75c 100 FT. OHIO BRASS, WET PROCESS AND PYREX INSULATORS. A NEW QST LEADIN INSULATOR—PYREX—NEW PRICE \$1.50. ANYTHING YOU NEED. RADIO SML, FRANK M. J. MURPHY, 4837 ROCKWOOD ROAD, CLEVELAND, OHIO.

FOR SALE—9EH complete station. New stuff. 50 watt transmitter with tubes, dynamotors (2) etc. Lu-luss receiver new. Write for list and prices. Bargain for sum one. C. W. Clement, Java, South Dakota.

ATTENTION—By common consent as evidenced by Universal Patronage—The very best and most economical Stationery for Hams. See our "ad" on page 52 this issue.

THE JACK GRAY PRESS  
Stationery Specialists  
Evanston, Illinois.

SACRIFICE—Grebe CR5 \$27.00. RORK two stage \$19.50. RORN-R F Amplifier \$17.50. Magnavox R3 \$2.50. Outfit cost \$242.00. Will sell complete with tubes \$70.00. Guaranteed perfect condition. W. L. Otto, Cambridge, Ill.

EDISON B BATTERY SUPPLIES. LARGEST SIZE TYPE A ELEMENTS 4c A PAIR. DRILLED 5c A PAIR. WIRED IN PAIRS 8c. PURE NICKEL WIRE 1c A FOOT. PERFORATED RUBBER SEPARATORS FOR BATTERIES 1/3c EACH OR CUT YOUR OWN SEPARATORS FROM SHEETS 5 8/16 x 5 1/2" 3c A SHEET. CHEMICALS FOR 5 LBS. BATTERY SOLUTION, ENOUGH FOR 100 VOLTS 75c. EDISON 300-AMPERE HOUR A BATTERIES IN PERFECT CONDITION 55c. ALL ARTICLES POSTPAID. SEND REMITTANCE WITH ORDER. BERNARD STOTT, 60 PALLISTER AVENUE, DETROIT, MICH.

Cut Prices on New Material Radiotrons Receiving \$2.40. Write me for prices on anything you want. All shipments C.O.D. A. A. Dombrowski, 4341 S. Campbell Ave., Chicago, Illinois.

RELIABLE WAVEMETERS in cabinets, rugged, accurate and dependable. 20-50 meters \$3.00, 75-200 \$3.00, 20-200 \$14.00, postpaid with curve charts. Accuracy GUARANTEED within 1%. Also Crosby Tridyn Special demonstrator, can't be told from new, fully guaranteed. \$40.00. Edward Bromley, Jr., Whitewater, Wis. 9CSM.

OMNIGRAPH, new, 15 dial, \$20.00. Bunnel key-Century buzzer, \$3.00. Grebe CR5—Rork and tubes, \$45.00. Clare, Sixth St., Allentown, Pennsylvania.

**MOTOR GENERATOR** Bargains. Robbins & Myers 110 V. generator 250 V. 100 W. \$25.00. Robbins & Myers 110 V. generator 350 V. 100 W. \$30.00. Robbins & Myers 110 V. 60 cycle single phase generator 750 V. 250 W. \$55.00. 750 V. 350 W. \$65.00. Esco 220 V. 60 cycle 3 phase 1750 Generator 400 V. 100 W. \$25.00. Esco motor 220 V. 60 cycle single phase Generator 500 V. 200 W. \$40.00. 220 V. Direct current Generator 1000 V. 500 W. \$65.00. 1500 V. 500 W. \$75.00. All above machines are ring oiled and include field rheostat. Also many others. 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.

**Bargains in Ham equipment.** No. 12 enameled antenna wire \$6.90 per 1000'. 75 per 100'. Pyrex insulators and sockets. UV-203 \$30.00. UV-203-A \$37.00. Special prices on Cardwell condensers. Thordarson 5 watt transformer \$6.90, 50 watt \$16.00. A. battery bulb rectifier \$8.00, bulb \$3.50. Carry Acme, Cardwell, Thordarson, Radio Corp., and Jewell equipment in stock. Write us for dope and give us an order. R. Waite, Vinceland, N.J.

**RADIO WORLD TIME CLOCK** ornament to your set, and correct timepiece, giving time from Berlin to Hawaii; just out; guaranteed. By mail \$5.00. Don't build set without investigating this wonderful clock. HUDSON TERMINAL STATIONERY SHOPS, McAlpin Hotel Lobby, New York City.

**COMPLETE** fifty watt, receiver, etc., dirt cheap. Duncan, 1357 E. 13th Street, Des Moines, Iowa.

**FOR THAT WINTER DX:** No. 12 ENAMELED WIRE 1000 feet \$5.75. Pure ALUMINUM square foot 56c; LEAD square foot 55c. No. 4000-1A "S" TUBES \$10.00. Thordarson POWER TRANSFORMERS 550 volts each side \$9.95. Jewell 5-15 AC VOLTMETERS \$6.95, 0-500 MILLIAMMETERS \$6.95. APEX 5-WATTERS \$3.00. Send 3c for the "HAM-LIST". CURTIS-GRIFFITH COMPANY, 5AQC-51P-SRV, 1109 EIGHTH AVENUE, FORT WORTH, TEXAS.

5 watt, TV-2's—New list three dollars—Wholesale and Retail. Write for proposition on this and other types. Thermo-Valve Company of America, 10 Orchard St., Newark, N.J.

**BIG TIME FOR AMATEUR RADIO.** 9ALD IS GETTING READY FOR IT WITH A BIG NEW HAMALOG. IT ISN'T JUST A CATALOG, BUT FULL OF GOOD HAM DOPE, TRANSMITTING AND RECEIVING. GET THE ONLY REAL HAM CATALOG IN EXISTENCE AND FIND OUT WHAT A REAL HAM STORE CAN DO FOR YOU. Edgewise wound copper strip 1/16" x 3/8" for the new SW inductance, 4" inside diameter 10c per turn, 6" 12c per turn, straight strip 5c per ft. Our own inductance clips for flat strip, extruded contact, 20c; Put up a new aerial before it gets cold. No. 12 enameled wire \$6.90 per 1000', 75c per 100' for less. No. 14 enameled \$5.00 per 1000', 75c per 100'; 20' Sure Fire porcelain insulators only \$1.15, \$1.00 each for 4 or more. 5/16" General Porcelains 30c, extra strong and finely glazed; WE RENT OMNIGRAPHS. GET THE DOPE IN A HURRY, THERE'S A WAITING LINE FOR THEM. IF YOU HAVE ONE TO SELL, IN PERFECT CONDITION, WRITE US. WELL TRADE; 4000-1 S tubes in stock, \$10.00, sockets 90c; Good rectifier aluminum 1/16" thick, 75c per square foot, lead 90c; All sizes Acme filter chokes; UC-490 1 mfd. 1750 volt filter condensers \$2.50. 21-AA 1 mfd. 1000 volt, \$1.90. UC-1014 grid and plate condenser, .002 mfd. 3000 volt, \$2.50. UC-1865 filament by pass condensers \$1.35. UC-1831 mica variable transmitting condensers, .0012 mfd. maximum, 4000 volts, only \$1.30. UC-1015 fixed condenser, .0003, .0004, .0005 mfd. 7500 volts, \$2.25; 50 watt grid leaks \$1.65, 5 watt \$1.10; Radiostats for filament transformer primary, \$6.50, big new stock; NEW SEPTEMBER CITIZENS CALL BOOKS WITH AMATEUR SECTION OUT IN FEW DAYS. 75c. BAILLANTINE'S RADIO TELEPHONY FOR AMATEURS \$2.00. Thordarson power transformers of all types in stock; UV-203-A 50 watters \$35.00, UV-203 \$30.00. 50 watt sockets \$2.25; Those neat General Radio No. 260 supporting insulators you see everywhere, 25c; Mesco keys, with 1/8" removable silver contacts \$2.25; Transformer iron cut any size 11c per pound plus cutting charge; By special arrangement we have 247-W wavemeters in old type ranges, best for ham use, 150-500 meters, only \$9.50. 1/2 and 3/4 wave coils \$2.85 extra; General Radio condensers too; General Radio buzzers \$2.00; Magnet wire, all sizes 10 to 30 DCC; 60 strand wire for 9APW's transmitting inductance, 100' \$1.00; SOME UP-1016 POWER TRANSFORMERS FOR TWO 50 WATTERS, \$38.50 LIST, ONLY \$21.00 WHILE THEY LAST;

**SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST**

**SPECIALS ON A FEW RCA VOLTMETERS AND THERMO-AMMETERS:** This is only a part of what you'll find in the HAMALOG, besides lots of helpful information. It's free, get it now. Let's have your order too, and don't forget the postage, please. E. F. JOHNSON, 9ALD, Waseca, Minn.

**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.

**9AMQ** selling out. 550 volt B bat. 10c cell 2 volts per cell 8 volt storage bat. 135 AH cap. \$20. Write for list of other stuff. L. W. Jenkins, Crookston, Minnesota.

**TRANSMITTING** and receiving apparatus and radio magazines for sale. Write for list, McAllister, 400 Baltic St., Brooklyn, N. Y.

**DODGE RADIO SHORTKUT HAS PRODUCED REALLY WORTH WHILE RESULTS EASILY AND QUICKLY.** 1BXA Speed was 15 Nov 25. Total attention was about 3 hours. 1COB Memorized Code in fifteen minutes. Now Commercial First. 2CPQ Dodge Shortkut helped me much. Qualified in three days. 3UU Thought knew Code. Could not receive. In one week passed. 3QY Had license. In five hours doubled my receiving speed. 5BT Speed was five. After brief study and practice speed 15. 6CDY Long anchored at 8. Attention two evenings. Can now do 15. 6QM Did master Code your way to stay put in fifteen minutes. 7IE Loug anchored at 6. Attention two weeks and speed is 15. 8RCY Speed was 15. After attention four hours can do thirty. 9BHM Am now ORS. This was impossible before getting Shortkut. C3ADY Must thank you for license. Speed 6. Jumped to 20-6 days. WILL RE-PAY INVESTIGATION BY OLD TIMERS, BRASS POUNDERS, HAMS OF RECENT VINTAGE, OR RADIO FANS AND ALL INTERESTED IN TWO WAY RADIO—REAL RADIO. HONOR ROLL TELLING OF PROGRESS MADE BY 300 STUDENTS ALL LICENSED MAILED ON REQUEST. METHOD \$2.50 IN U. S. AND CANADA—ELSEWHERE \$3.00. KILLS HESITATION. Dodge Radio Shortkut, Mamaroneck, N.Y.

**WE SCORE AGAIN—NEW RCA UV202** Bottles \$6.00. Complete Ham Station equipment at MONEY SAVING SPECIALS. M-G Sets and other "STUFF". 1st cum 1st served. 3 ROV—S. Strobel, 3223 N. 6th St., Phila., Pa.

**BARGAINS:** 3—New 203's @ \$15. Acme mounted 500 watt Plate Transformer \$14. R.C.A. Oscillation Transformer \$5. Keying Relay 6 volt \$2.00. 5 amp. Tungar \$15. 2 amp. Tungar bulb \$2.50. 2-50 watt sockets @ 75c. R.C.A. Loud Speaker UZ-1320 \$17. Paul Kern, 1030 N. 10th St., Reading, Pennsylvania.

**EDISON A ELEMENTS 4c PAIR.** OTHER APPARATUS. WRITE 5ADY, 3312 P GALVESTON, TEXAS.

**WAVEMETERS,** 10 to 100 meters, two coils, individually calibrated. Accuracy guaranteed within one percent. Excellent construction and handy size with flash lamp, \$12.50 Postpaid. "ALL-BAND" AMATEUR TUNER, 15 to 220 meters, Includes four plug-in celluloid supported coils, rotor, and variable antenna coupling condenser all in one compact unit, \$5.00 We build real amateur equipment and carry the supplies you need. Send for list. Seattle Radio Laboratory, 3335 33rd Ave., South, Seattle, Washington.

**HAM AND BCL BARGAINS—**here are a few; write for complete bargain list of parts and sets; guaranteed goods. Jewell meters 25% off. Amateur and broadcast Lopez tuners \$7.35. UV216 Kenotrons \$3.00. 300 cycle quarter KW alternator \$25.00. Low loss condensers: Acme \$4.55; \$6.50. Websters stand hivoitage \$2.10. Baldwin phones \$7.70; W.E. \$6.50. \$3.50 approved lightning switches asbestos base \$1.50. \$5.00 Acme RF and super-heterodyne transformers \$3.00; \$8.50 Rectrad super-heterodyne transformers \$4.50; \$3.50 Naald RF transformers \$2.00. Stube 3coil set worth \$75.00, \$38.50; Stube W.E. pushpull amplifier \$20.00. Radidlectric Company, 1610 N. Lawdale Ave., Chicago, Ill.

**ROICE 5-WATT DX BABIES \$3.00.** CURTIS-GRIFFITH, FORT WORTH.

**RECEPTACLES** for those baseless tubes are now 65c. There's a reason. Ask the op that uses them. A. Mallins, 39 Webster Av., Brooklyn, N. Y.



\$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.

FOR SALE 8BD0s ten watt transmitter. DX 21 foreign countries. Complete with tubes, meters, rectifier, transformers, etc. \$50.00. R. Waite, Vineland, N.J.

SELL Dictograph loudspeaker. Albert Krug, Gardner, Illinois.

WE have quit printing expensive catalogues. Order from this ad. Only satisfactory B eliminator \$10.00 net. Uses two 201A tubes. Fifty Henry choke for eliminator \$3. Transformer 110v primary 300v secondary \$3. Two mfd salvaged condensers 75c. Any color bakelite any thickness cut to any size \$2.50 lb., 20 cu. inches to pound. Any article in the radio line 20% discount cash with order, except power tubes 10%. The Radio Club, Inc., LaPorte, Ind. WRAF.

POLE TRANSFORMERS, 2200/1100 x 220/110 Volt. Westinghouse—1 Kw. \$25. General Electric—6 Kw. \$20. Just the thing for Hi-Voltage plate supply.

FILTER CONDENSER, Hi-Voltage, any capacity, made at home at nominal cost. Full instructions with blueprint showing every detail sent to you upon receipt of \$1.00. P. Getty, Box No. 49, South Station, Yonkers, N.Y.

TELEFUNKEN 200 WATT TUBES \$50; filament 14 volts, 4 amps., plate 3000; TELEFUNKEN 30 watt tubes \$16.50; filament 10 volts 2 amps., plate 1000; NEW R.C.A. APPARATUS; chopper wheel, \$3.50; filter reactor U P 1654, \$9.50; Meters, H.W., (0-2 1/2) (0-5) \$2.80; thermocouple, (0-5), millamp. (0-500), \$9.50; 0-1500 volts, \$19.00; P R 535 Rheostat, \$1.50; U C 1803, 1806, 1015, condensers \$2.25; also some stopwork U T 1867 Magnetic modulators, \$5.50 (list \$17); U P 1656 filament transformers, \$4.00; Edison elements, \$.01 each. EVERYTHING guaranteed. ARTHUR BEYER, 106 Morningside Drive, New York City.

SEND 5c FOR THE "HAM-LIST". CURTIS-GRIFFITH, FORT WORTH.

AMRAD "S" TUBES, Type 4000-1; \$8.00 each. Immediate shipment. DEALERS SUPPLIED. George Voigt Radio Supply Co., Dept. Q, Maspeth, N. Y.

Bargains: Crystalstat panel mounting detectors, wonderful for reflex, 95c. Crystalstat Crystals mounted 20c. Lowloss variocoupler \$1.25. Lowloss Crystalstat Receiving sets \$1.25. Martin Vibroplex \$12.00. All Prepaid. BRECKENRIDGE ELECTRIC, 1923 LYSANDER, DETROIT.

FOR SALE CHEAP—U NO HOW IT IS, O.M. WANT SOMETHING ELSE. WILL SACRIFICE SEVEN TUBE SUPER-HET. 2000 MILES SUMMER RECORD. SEND TEN CENTS FOR PICTURE. UZ-1325 RADIOLA LOUD SPEAKER TEN DOLLARS. PATHE LOUD SPEAKER SEVEN FIFTY. THREE A RADIOLA AND TUBES FORTY BUCKS. THREE TUBE REGENERATIVE, KELLOGG 150 to 2500 VARI-COUPLER, KELLOGG VARIOMETER, HAMMAR-LUND "C" 43 PLATE VERNIER WITH TUBES FORTY SIMOLEONS, SUPER-DUCON, NEW TUBE UV-196, SIXTY CYCLE THIRTY BEANS. TWO R.C.A. RADIO TRANS UV-1714 THREE BERRIES EACH. THORDARSON PUSH PULL TRANS. BOARD MOUNTED, SOCKETS, RHEOSTAT, SWITCH, PLUG AND JACK SIX FIFTY.

HENRY NACE, GILBOA, NEW YORK.

WANTED—Your attention to our "ad" on page 52 this issue of QST. In addition to our wonderful value in personal STATIONERY we produce the very finest line of QSL CARDS, RADIOGRAMS and LOG SHEETS. Send for Samples and prices.

THE JACK GRAY PRESS  
Stationery Specialists  
Evanston, Illinois.

HI-voltage transformers 250 Watt 1100 Volt with center tap \$11.90. All new. 9DAL Arkansas City, Kans.

ALBRIGHT VIBROPLEX \$7.50. CURTIS-GRIFFITH, FORT WORTH.

QSL cards—start the DX season rite,—supply yourself with some honest to goodness cards that will be a credit to your station. Samples and prices cheerfully furnished. S.B.T. Press, 701 Walnut Ave., Scottsdale, Pennsylvania.

\$35.00 Decade Portable Resistance Test Set, complete, made by Thompson Levering Co., worth \$195. Bought \$10,000 worth United States Government Aircraft Department Radio Transmitting, Receiving Sets and Parts. Get our new and latest reduced price list. Send 2c stamp for list. Mail orders answered all over the world. WEIL'S CURIOSITY SHOP, 20 South 2nd St., Philadelphia, Pa.

TEST TUBES 3/4 by 6 3/8. PEPP0, 1695 TAYLOR AVE., DETROIT, MICHIGAN.

GENERATORS—new—rated at 275v-120 watts, but will give output up to 500v DC \$8. UC1831 variable transmitting condensers \$1.50 UC1015 \$2. VTI and VT2s \$5. No. 12 enameled wire any length in one piece 75c per hundred, 14, 50c. 3/4 HP AC motors \$12. Used generators in good order 1500 v 3600 speed \$20. Self excited alternators 500 cycle 1/2KW, \$20. 200 watt \$10, and others. Superheterodyne transformers UV1716 \$2. Honeycomb coils 1250 \$1. WANTED ONE TO FIVE KILOWATT HIGH VOLTAGE TRANSFORMERS SPARK. R. Wood, 33 Way Ave., Corona, New York.

"PEPPO" PUTS A LASTING AND TREMENDOUS "KICK" IN YOUR EDISON BATTERIES. \$1.25 PER CAN (1 1/4 LBS.—5 POUNDS SOLUTION—100 VOLTS). TEST TUBES 3/4 x 6"—3c each. SUPERIOR ELEMENTS 3c PER PAIR. PERFORATED HARD RUBBER SEPARATORS 1/4c EACH. PURE NICKEL WIRE 1c PER FOOT. COMMON CHEMICALS FOR EDISON BATTERIES. 85c FIVE POUNDS SOLUTION (100 VOLTS). PREPAID. ATTACH REMITTANCE TO ORDER. NORTHWESTERN RADIO LABORATORIES, 1695 Taylor Ave., DETROIT, MICH.

GENUINE SILICON Transformer steel cut to order 25 cents lb. 10 lbs. and over, 4 cubic inches, weight 1 lb. postage extra. Geo. Schulz, Calumet, Mich.

LALLEY Electric plant \$2 volt with Willard Batteries. Good condition. Cheap. J. P. Hyde, Bristow, Virginia.

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.

THORDARSON 650 VOLT POWER-FILAMENT TRANSFORMERS FOR 5-WATERS \$6.90. CURTIS-GRIFFITH, Fort Worth.

MOTORS \$2.98. Good, practical, twentieth horsepower, 115 volt alternating—direct current. Tenth horsepower \$3.98. Fans \$6.48 eight inch. Order now. Pay postman. Ferry Trading Co., Dept. T9, 215 Lake, Racine, Wis.

HERE you are number twelve enameled aerial wire at six seventy five a thousand or seventy five cents a hundred. All kinds receiving and transmitting supplies. Drop me a card. Edwin L. Robb, Decker, Indiana.

PURE ALUMINUM and lead rectifier elements, drilled, brass screws and nuts, pair 1/16", 1/4" x 4", 13c. 1 x 6, 15c. 1 1/4 x 6, 17c. 1 1/2 x 6, 19c, single half price. Aluminum 1/16", \$1.00, 1/8" \$1.90. Lead \$1.00 square foot prepaid. Geo. Schulz, Calumet, Michigan.

TEN WATTER and honeycomb coils for sale. Best offer takes them. 9BUT.

SELL: Haynes Griffin Superheterodyne with tuner in cabinet, \$60.00; two stage amplifier \$10; Se-Ar-De amplifying unit \$6.00; Radio Corporation potentiometer \$1.50; 2 general apparatus radio frequency transformers 200-500 meters \$5.50; antennae \$75. 1COJ.

EDISON ELEMENT STORAGE "B" BATTERY POWER UNITS WILL LAST A LIFETIME AND GIVE DEPENDABLE SERVICE. JUST CONNECT TO RECEIVER AND 110 VOLT LINE PERMANENTLY. NO EXTERNAL CHARGER REQUIRED. 100 VOLT TYPE "AC" UNIT \$14.00. 140 VOLT, \$18.50. COMPACT 100 VOLT TYPE A UNIT, 6" x 8" x 12", \$9.50 COMPLETE. YOUR TUNGER OR RECTIGN "A" BATTERY CHARGER CAN EASILY RECHARGE THE TYPE "A" BATTERY WITHOUT ANY SPECIAL

**ATTACHMENT. TYPE "A" ELEMENTS WITH ELECTRICALLY WELDED CONNECTORS, 5c PER PAIR. DRILLED "A" ELEMENTS 4c PER PAIR. 3/4" x 6" HEAVY GLASS TUBES, 3c. 1" x 6", 4c. NO. 20 PURE NICKEL WIRE, 1c PER FT. NO. 18, 1 1/2c. SEPARATORS, 1/3c. CHEMICALS FOR MAKING 5 LBS. EDISON ELECTROLYTE 85c. 78 CELL RACK FOR 3/4" x 6" TUBES \$1.95. J. ZIED, 530 CALLOWHILL ST., PHILADELPHIA, PA.**

**SELLING OUT.** Write for list. Jones, 4705 1/2 Brooklyn St., Seattle, Washington.

**EDGEWISE** wound copper ribbon, the only really satisfactory antenna inductance, .350" wide; 3 1/4" diameter, 10c a turn; 4 1/4" diam., 13c turn; 5 1/4" diameter, 15c turn; 6 1/4" diameter, 17c turn; 7 1/4" outside diameter, 20c turn, prepaid. Geo. Schulz, Calumet, Michigan.

**JEWELL METERS.** Overstocked. All types and patterns 25% discount. Write for catalog. Sodian tubes \$4.00. Western Electric 518-W Speaker \$23.00, slightly used. E-Z-Toon Dials 4"—1.69; 3"—1.50. Fil-Ko Arresters \$1.13. Pyrex Insulators special. Litz Wire .03. Honeycomb coils 25% discount. DeJur Rheostats and Potentiometers .75. Fleron Low-Loss high-glazed products, lead-in bushings .88; stand-off 8" bronze base .94 and 8" antenna insulators .45. Storad 100 A. H. 8 volt A Battery 11.00. 120 A. H. 6 volt 13.00. Storad 4500 M. A. 48 volt trays 10.50, excellent for D. C. Transmitter, all Storads guaranteed 2 years. France Super-Charger 16.50, charges A and 120 volts B. Electron Bulb Type 6 ampere, 21.80. Two ampere size 13.50, both charge 100 volts B. Fleron low-loss, high-glaze porcelain sockets, both sizes .40. Number 12 enameled copper .58 per hundred. 7-22 stranded enameled copper .63. Magnet wire, all sizes special price. 16-32 silk covered enameled loop wire .95. New York Coil mica fixed condensers, all sizes 25% discount. Bakelite sockets .65. Connecticut Telephone & Electric Products, highest quality, 5 to 1 transformers, completely shielded, not affected by salt air or moisture, 3.00. Triple Range, low-loss, straight line condensers, 11-23 and 43 plate combined, 2.75. Push-pull battery switches .35. Six ampere Rectigon Charger Bulbs 6.40, two ampere type 3.20. Amertran transformers 5.25. Tunewell low-loss, silver-plated, straight line condensers, 11 plate 2.63, 15 plate 2.82, 23 plate 3.00, other sizes. Discounts to dealers and amateurs only. No orders less than \$5.00 shipped. Two dollars with each order to guarantee transportation charges; balance C. O. D. Celeron bakelite panels, tubing and rods. All sizes and specials. Cut, drilled and engraved if necessary, 25% discount. All merchandise fully guaranteed. Established since 1915. Roy C. Stage, Wholesale Radio, 292 Burt St., Syracuse N. Y.

**1ZE**—Irving Vermilya, at Mattapoisett, Mass. has the following material on hand for sale. Prices are F. O. B. Mattapoisett. Eleven UV203 tubes new at \$20.00 each. 1 Motor Generator set 500 watts 1500 volts Esco Machine. Motor 110 volts 60 cycles single phase or 220 volts 60 cycles, \$125.00. Four 50 watt sockets @ \$1.00 each. 1-1500 volt meter (Weston) and antenna ammeter \$20.00. 1 R. C. A. Transformer filament and plate good for four fifties \$7.50. Irving Vermilya, Mattapoisett, Mass.

## 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 Street, Newton Centre, Massachusetts.

**1ALP**—Frank L. Baker, Jr., 30 Minot St., Neponset, Massachusetts.

**3HP**—George E. Stewart, 220 Collins Ave., Baltimore, Maryland.

**5HE**—G. N. Witting, 300 Kenedy Ave., Alamo Heights, San Antonio, Texas.

**6ACD**—Hugh Avary, Jr., 238 East 16th Street, Oakland, California.

**6RAF**—St. Clair Adams, 409 Harris St., Eureka, California.

**9AIL**—P. S. Pfeifer, 4837 Fulton St., Chicago, Illinois.

**9ARA**—Robert E. Henry, 307 West Pine St., Butler, Missouri.

**9CFO**—Theodore Lange, 914 North Division Street, Appleton, Wisconsin.

**9CN**—A. C. Azazim, 2269 N. Kedzie Blvd., Chicago, Illinois.

**9CNB**—E. L. Fletcher, 1802 Irving Pk. Blvd., Chicago, Illinois.

**1IRG**—Radiogiornale, Viale Maino 9, Milano, Italy.

**N-PB3**—H. A. Veringa, Gerard Schaepe Straat 8 Amsterdam, Holland. ex-N-OLL.

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. C. Beekley  
**1BHW** K. B. Warner                **1OA** R. S. Kruse  
**1IDQ** John M. Clayton            **1OX** L. W. Hatry  
**1ID** C. A. Service, Jr.                **1XAQ** R. S. Kruse

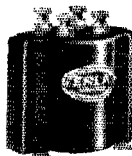
**HAVE YOU BOUGHT YOUR A.R.R.L. AUTOMOBILE EMBLEM YET, OM? SEE DISPAY AD IN THIS ISSUE PAGE 72.**

## For Amateurs! this 1000 cycle audio

Here is a new transformer built especially for the amateur. Often it is desired to heterodyne all signals to one frequency and then amplify them. The Erla 1000 cycle audio will do this with 3 advantages.

1. Only one frequency is amplified appreciably. Any static discharges occurring at any frequency except approximately 1000 cycles are not amplified.
2. Harmonics from broadcasting stations picked up by the amateur's short wave set are amplified only at one frequency, causing suppression of this interference.
3. Enables differentiation between heat notes of different frequencies by audio tuning effect.

If you want this remarkable new invention send \$6.50 apiece and transformers will be shipped at once.



**Electrical Research Laboratories, Dept. 29**  
2500 Cottage Grove Ave.,  
Chicago, Ill.

Note: This instrument is unsuited for broadcast reception.

# Prest-O-Lite



## There are many improvements in the new Prest-O-Lite Battery

IN THIS new battery you'll find all the good points and high quality that have made Prest-O-Lite an unflinching aid to better radio. And in addition there are many important refinements and improvements that make it the most attractive, most convenient battery you can buy.

This new battery has a beautiful stippled finish hard rubber case that blends with any furnishings. The case is molded in one piece, giving sturdy, leak-proof strength.

To make the battery convenient to carry, the handle has been given a comfortable rubber grip.

The oversize terminal nuts on the binding posts are easy to turn and insure perfect contacts.

Novel rubber insulators completely cover the tops

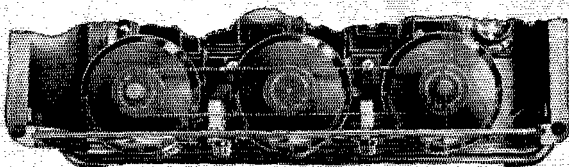
and sides of the cell connectors, preserving the original fine finished appearance at all times and giving protection against accidental short circuits.

No effort has been spared to make this a battery you will be proud to own. Yet, like the rest of the Prest-O-Lite line, it is priced to offer you the biggest value of the day. Ask your dealer to show you this battery and the Prest-O-Lite Chart that helps you select the right battery for your set. Or write Indianapolis for a copy of our interesting handbook on radio storage batteries and how to charge them.

THE PREST-O-LITE CO., INC.  
INDIANAPOLIS, IND.

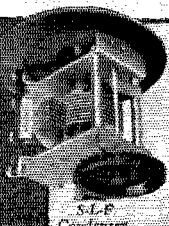
New York San Francisco  
In Canada: Prest-O-Lite Company of Canada, Ltd., Toronto, Ont.





Another exclusive Grebe feature: One dial can operate all three—or they can be set separately at will.

Again  
Grebe  
steps  
ahead—



S-L-F  
Condenser

## The Synchronphase now has One, Two or Three-dial Control

THE three condensers operate from one dial—or separately at will. This first real, flexible form of "unit-control" marks another milestone on the road of Grebe leadership.

The new Synchronphase has the same *Binocular Coils* which give that unusual "selective sensitivity" so universally prized; the same *Straight-Line-Frequency Condensers* that make accurate tuning easy.

*Ask your dealer to demonstrate; then compare*

A. H. Grebe & Co., Inc., Van Wyck Blvd., Richmond Hill, N. Y.  
New York Office: Steinway Hall, 109 West 57th Street  
Western Branch: 443 So. San Pedro Street, Los Angeles, Cal.

This company owns and operates  
stations WAHG and WBOQ;  
also mobile and marine low-  
wave rebroadcasting stations.

# GREBE

# SYNCHROPHASE

TRADE MARK



"Get rid of small wisdom and great wisdom will shine upon you"

Chuang Tzu

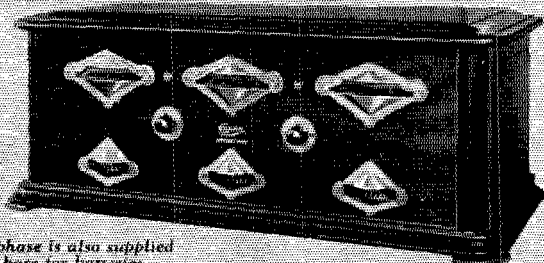
It is great wisdom to buy the Synchronphase.

Doctor Ma

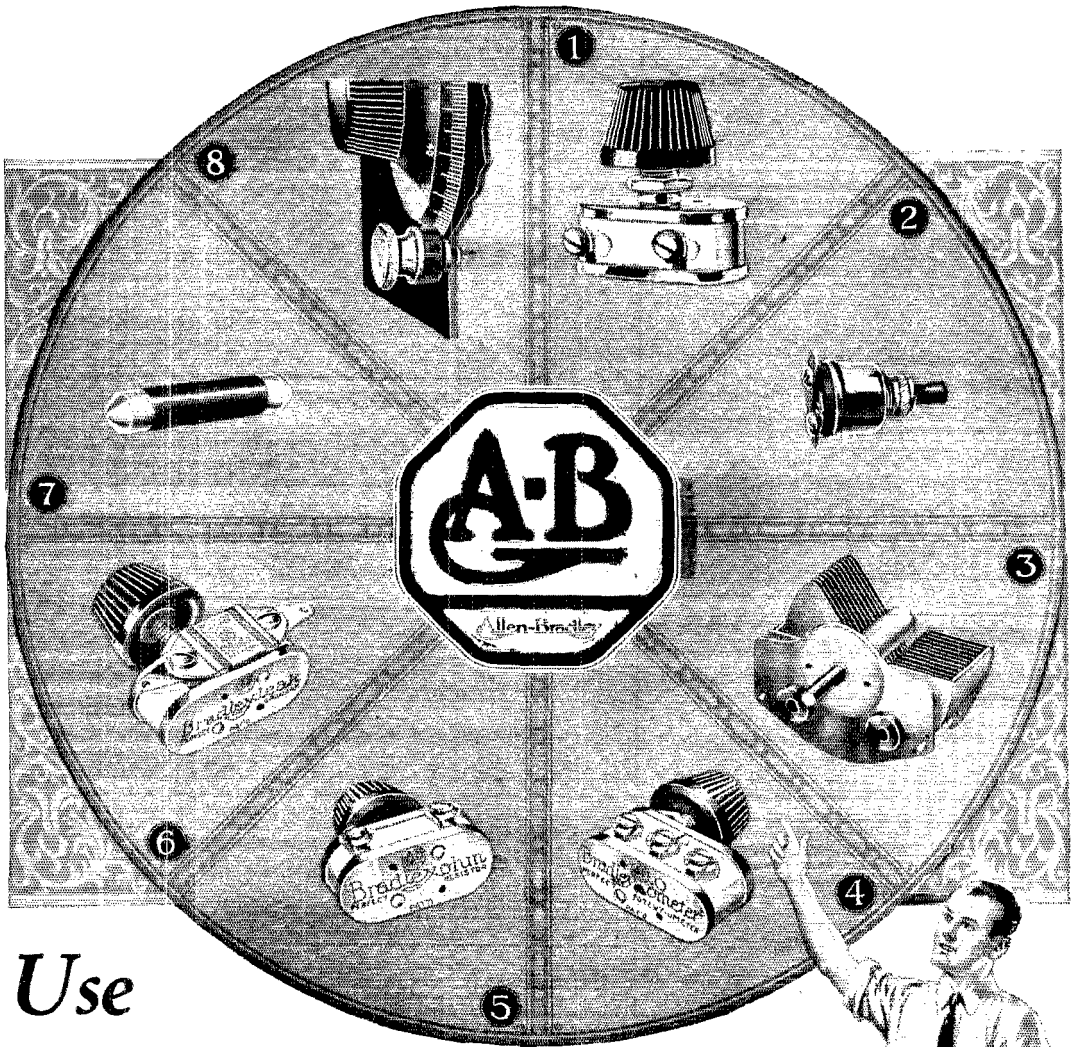


TRADE MARK

All Grebe apparatus is covered by patents granted and pending.



Synchronphase is also supplied  
with base for batteries



Use

## Allen-Bradley Perfect Radio Devices for maximum selectivity and noiseless control

- 1 — **Bradleystat** — Noiseless Rheostat for ALL radio tubes.
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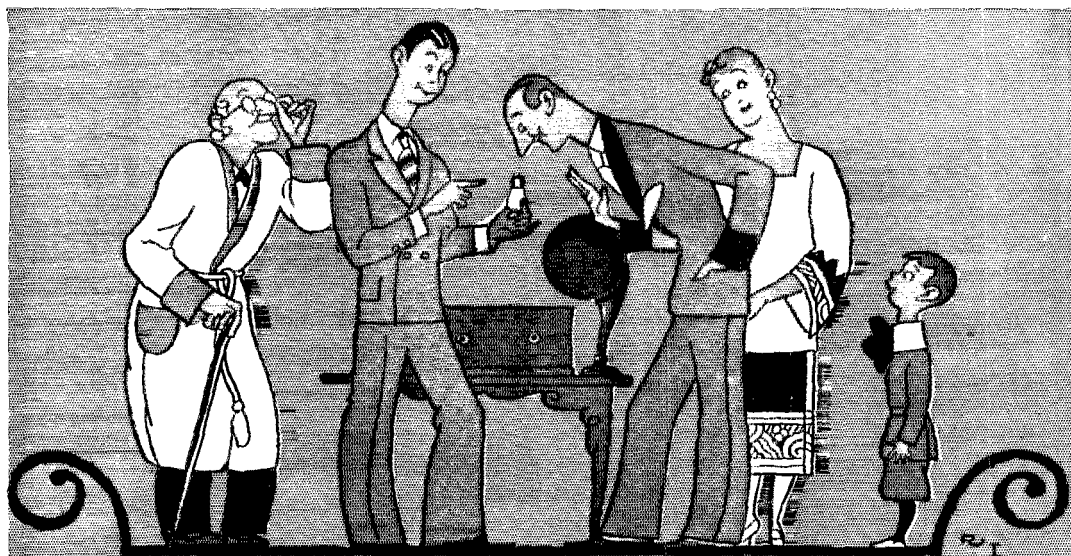
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Address .....

.....





It's a *genuine* UV-201-A  
 only when it bears  
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*and* the RCA mark



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Radio Corporation of America  
 Chicago                      New York                      San Francisco

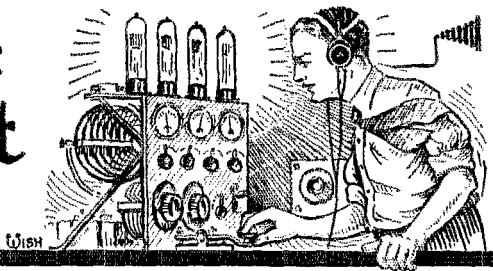
# Radiotron

REG. U.S. PAT. OFF.

AN RCA PRODUCT

# The Traffic Department

F. E. Handy, Acting Traffic Manager  
1711 Park St., Hartford, Conn.



## Use the Service Message!

A service message is a message sent one station to another station relating to the "service" which we are able to give in message handling, and it may relate to non-deliveries, delayed transmission, or to any phase of message-handling activity. Be cause there is till some confusion about our A.R.R.L. message form we are explaining the proper message form and illustrating a service message at the same time.

"HR SVC FM MIAMI FLA 4FM NR 86 AUG 8  
(CK TEXT 15)

TO HDQ RDO STN 1MK  
1711 PARK ST.,  
HARTFORD, CONN.

UNABLE FWD YR NR 202 TO PLEASS SO-AFRICA  
SIG HANDY ROUTE STILL UNOPENED  
(SIG) WATTS 4FM "

If you receive a message with an insufficient address for delivery, the proper procedure to follow is to try the telephone book and the city directory. If no address can be found a service message should be written and sent to the station of origin asking for a better address. While it is seldom proper to abbreviate words in the text of regular message, it is quite desirable and correct to use abbreviations in these station-to-station messages, relating to traffic handling work. The prefix "svc" in the place of usual "msg" shows the class of the message and indicates at once that a station to station message is coming through. Service messages should be handled with the same care and speed that is given other messages. A service message counts as a message originated when traffic figures are reported. Please make use of the "service" message.

All Official Relay Stations are urged to make and keep schedules as suggested by 6PS in his article, "The Five Point System". Send a list of your "five-pointers" to your ADM with the report every month so that we can make up network maps for the whole country for these pages. With maps available better routing will be possible. A few letters will fix some schedules. Don't forget that when you make schedules they must be kept consistently. Originate your share of messages to make the schedules useful and to keep things humming generally.

QST FOR SEPTEMBER, 1925

## Contact With the MacMillan Expedition

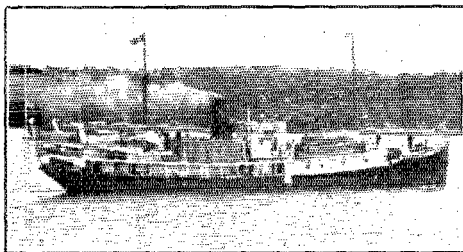
WITH the signals from these two stations being reported from all over the United States, Mexico, Canada, England, France, and Holland, and with 20 meter daylight work to the United States a matter of record, reliable communication with the MacMillan Expedition seems assured.

Extremely satisfactory two-way work between this country and the expedition has been maintained ever since the ships left Wiscasset. Hundreds of words of press, official messages to and from the Navy Department and the National Geographic Society, and many personal messages to members of the crews have been handled.

One very interesting fact has already been observed; that is, on the 37-meter wavelength the expedition continues to be heard on the Eastern Coast of the United States even while the ships are at Etah, Greenland, the northern base. It will be remembered that on the previous expedition, the 180-meter signals passed out of the picture completely for East Coast amateurs as soon as the Bowdoin passed the southern tip of Greenland, and the contact was mainly with West Coast stations after arrival at the base in the North.

During the first part of this year's voyage, both ships used a 37-meter wavelength exclusively. This wavelength was most suited to communication with the United States each night and the difficulties of operating on very short wavelengths due to the motion of the ship were overcome by using this wavelength. Some troubles with a poor note and badly swinging signals were remedied. IMY handled the bulk of the traffic during the trip North. In the past month 140 messages were handled by this station to or from the MacMillan expedition. Many of them were coded by the Navy Department; some of them contained hundreds of words in the check; but by consistent hard work the traffic that arrived at his station was cleared promptly and accurately every night.

On August 2 the *Bowdoin* had arrived at Etah.



THE S. S. PEARY, WAP  
© McDougall and Keefe

A permanent base established, more work on shorter wavelengths was attempted. WNP first succeeded in hooking up with 9CXX on a wavelength of 16 meters and the second of August marked the date of the first daylight communication. The signals were fairly loud and very steady at both ends of the communication lane and message traffic was handled. NKF, operating on an 18.7 meter wavelength, next worked WNP. The ability of the twenty-meter signals to pierce the daylight barrier now seems assured.



Last reports from the expedition indicate that WAP will continue to use a 37-meter wavelength, while WNP will concentrate on 19 meters, with a transmitting schedule planned from 3.00 p. m. to 7.00 p. m. EST, daily. All amateurs are urged to listen on both 37 and 19 meters for the PEARY and the BOWDOIN, and to do everything possible to insure reliable communication with the expedition and the United States.

All messages from the expedition should be mailed promptly, forwarded by radio, and telegraphed collect to the National Geographic society or to the Navy Department when it is requested in the message. Amateur stations are warned to observe strict secrecy of messages in accordance with paragraph nineteen of the U. S. Radio Laws and Regulations.

20 Meter Log of WNP (by amateur radio via 9CXX)  
 Heard to August 2.  
 1BZC, 1CAK, 1II, 1XAM, 1ZS, 2XAF, 2XK, 4SA, 6AGK, 8CQL, 9CIB, 9CXX, 9DEJ, 9UQ, 9ZT.

### Logs of WAP and WNP

(Not complete; only those stations reporting to Headquarters are included, as no log had been received from Reinartz at the time this article went to press).

### Worked

By WAP: 1abp, 1aci, 1aep, 1aao, 1aau, 1are, 1ekp, 1ef, 1mk, 1my, 1pl, 1uw, 1xu, 2bkg, 3aba, 3dw, 4ask, 4iv, 5agn, 5eq, 5ks, 9bkr, 9cap, 9xn, nkf, naj.

By WNP: 1aqa, 1ekp, 1lar, 1cmx, 1ef, 1my, 1ahe, 1aep, c2be, g2kf, 3zw, 3btu, 4af, 4sa, a "7" in Seattle, 5cvi, 5ecr, 5axn, 9bkr, 9dbf, 9exx (16m), nOBA, nkf.

### Stations Reporting Reception to HQ

WNP: clam, 1axa, 1qv, 1vj, 2cth, g2sz, 3iw, 6bur, 4js, 6ckv, 6bur, 8aj, 9cvi, 9dlh, 9mm, f8et.

WNP: clam, 1axa, 1qv, 1vj, 2cth, g2sz, 3iw, 6bur, 8aj, 8brb, 8by, 9dve, f8et, Dr. R. Woodard, Hartford, Conn.; Karl Knudsen, Brooklyn, N. Y.; and Alexis Levassor and Louis Carrot, Melun, France.

### THE TRAFFIC TROPHY

Back numbers of QST contain complete information about the Traffic Department Trophy. When you hand over 100 messages in a month be sure to turn in to your local Traffic Officials who will forward them along to the Division Manager. Division Managers will send bundles of messages to Headquarters each month and one man at Headquarters will count the messages and make up a "Brass Pounders' League" each month after which the message file will be returned promptly direct to you. Only messages containing the CITY and STATION of origin, a SUFFICIENT ADDRESS to insure delivery, the TEXT, and the SIGNATURE shall be counted. The date and number are important as the inclusion of a date speeds up the message and the number makes it possible to easily trace the message. The fundamental parts of a message shall determine whether or not it is counted. All messages must be handed in 48 hours or less. If there is any doubt about your messages, send them in and get the credit that is due you.

### HELP IMPROVE OUR OPERATING

Official Relay Stations are requested to send in lists of calls of off-wave-length stations, of CQ hounds, of stations using improper message forms and of those sending excessively long calls without signing their own station call. These lists are to help us in making amateur radio so well supervised that we are justified in complaining to the Department of Commerce about interference to our service from certain commercial stations. We regard more than five (5) CQ signals without a station call as "abuse of CQ" and we regard more than ten (10) calls for a station without signing as "long calls without signing". Carefully observe the new rules for Official Relay Stations mentioned in August QST and you need not worry about being criticized.

## OFFICIAL BROADCASTING STATIONS

THE LEAGUE maintains a broadcasting service which is changed in some respects from time to time. Certain appointments are cancelled for failure to keep schedules and additions are made as they become necessary. Beginning September 13 new broadcasting schedules will be effective. The latest news and schedules are made into a broadcast which is sent each operator of an Official Broadcasting Station to send on such wavelengths and days as he can conveniently be at his station. The service will soon be complete and when some additional stations have been appointed it will be possible for any reader of QST to take his latest number in hand; to look at a list of the Official Broadcasting Stations, and to find who is sending on that particular day; to note the time and wavelength to listen for him; to plug the proper coil in the standard plug-in coil receiver, and to get the latest information from A. R. L. Headquarters.

Below are listed the present active stations that gave us the information we requested in time for this number of QST. New appointment certificates are being sent them. If a large number of additional appointments come to hand before QST goes to press we will include a more complete list. Stations not listed below who have been broadcasting under the old system will be dropped unless they wish to continue and unless they send us information to insert in the different columns of a table like that given below. Every station has pledged himself to send on scheduled time and wavelength. The wavelengths are listed so that you will know just where to listen. These stations are willingly giving their time to this work. They will appreciate it if you drop them a postal card saying that you copied the Official Broadcast Message from them.

Station	Wavelength				Days of Transmission
	AST 12:30p.m.	EST 7:00p.m.	CST 10:30p.m.	MST 10:30p.m.	
1BEP	....	....	....	42.0	Tues. and Fri.
1CKP	....	39	....	....	Sat. and Wed.
1EP	....	40	....	....	Mon. and Fri.
2WR	20	....	....	....	Sat. and Sun.
2WR	....	40	....	....	Daily during Sept.
2WR	....	....	....	80	Wed. and Fri.
3APV	19.3	37.5	....	75	Sat.
3APV	19.3	....	....	37.5	Sun.
3BVI	....	80	....	80	Mon. and Thurs.
3BWT	....	82	....	82	Fri. and Sat.
3U	....	59.6	....	....	Tues.
4FM	....	42.5	....	42.5	Tues., Sat. and Sun.
5ACZ	....	38	....	38	Sun., Tues. and Thurs.
5GJ	....	80	....	....	Mon. and Thurs.
6BUR	20	....	....	40	Tues. and Thurs.
7ACT	....	40	....	40	Sat. and Sun.
7BI	....	76	....	76	Sun., Mon. and Fri.
7NT	....	30	....	30	Sat.
7NT	21	....	....	....	Sun.
8BSU	....	78	....	78	Mon. and Fri.
8CFO	....	40	....	80	Sat. and Sun.
8CFO**	....	158	....	....	Mon., Wed. and Fri.
8DME	21.5	41.2	....	83	Tues. and Sat.
8GX	20.7	....	....	....	Thurs.
8ZE	41.5	....	....	....	Tues. and Fri.
8ZE	....	....	....	44.5	Wed.
8ZFL	....	80	....	80	Mon. and Thurs.
9BKR	....	40	....	40	Mon., Fri. and Sat.
9BMX	....	42.5	....	42.5	Mon., Thurs. and Sat.
9CAA	....	160	....	40*	Wed.
9CAA	....	80	....	....	Fri.
9CAA	....	....	....	40*	Sun.
9DXY	20(noon)	42.3	....	75	Sun., Wed. and Sat.
9EGU	20(noon)	37.5	....	....	Mon., Wed. and Fri.
9ZB	....	....	....	42	Sat. and Sun.

\*Midnight

\*\*20.M. Sat. and Sun. 4 P.M. E. S. T.

2PF has a good suggestion for the old-timers. Why not print, "Station Established 1918" or whatever year you started in the game, on your station card and let the gang know about it. Another suggestion is a good one for everyone to follow. Be sure to acknowledge every postal you receive. It is a little matter of courtesy to be sure, but it will pay big returns in creating friendly feelings toward you. 8BSU was responsible for this one.

## TRAFFIC BRIEFS

Lieut. Haydn P. Roberts, pl 1HR, writes us that there are 25 licensed amateurs in and about Manila and he expects to form an organization of those whose interest is in amateur two-way telegraphy. We expect that these fellows will be instrumental in handling traffic to South Africa, as they are somewhat nearer that country than they are to San Francisco, and they are regularly in contact with many West Coast amateurs. Undoubtedly these stations will be active in handling some high-speed around-the-world relays this fall and winter because of their favorable location.

Lieut. Roberts requests that we call your attention to the proper use of the finish signs and the international intermediates again. He sent us a bunch of calls, some of which looked rather familiar, but which could not be used as they had no identifying intermediates. If any reader of these pages has friends or relatives in the Philippines, pl 1HR will gladly forward traffic and guarantee deliveries.

He also says, "If some of these birds think I am going to sit here in the heat listening to ten-minute CQs in order to finally hear them sign, they are all wrong and defeating their own purpose. When I hear a station CQ more than three times, I tune him out without listening to his call." That should show some League members that good operating is worth while.

The South Africa Radio Relay League has just been organized with aims and objects very similar to our own. South Africa has several Divisions for Traffic work. There is close cooperation between the members of the League and the Johannesburg broadcasting station. This local station closes for a half hour each day to enable the experimenters to carry on their receiving work to best advantage. Information from League Headquarters is sent broadcast weekly for the benefit of the members and every member keeps his transmitter silent so that all can successfully receive the broadcast. We should like to establish a regular route for traffic handling work with South Africa through our own or South American stations. Perhaps rCB8 will be the best intermediate point. We are sure that plenty of worth while traffic will appear if some international routes are opened and used consistently. Who will be first to start the ball rolling?

d7EC and u4SA in Porto Rico have a daily schedule, and any traffic for Denmark should be routed via Porto Rico for forwarding by 4SA. The effectiveness of scheduled work in handling traffic accurately and speedily is being demonstrated every day.

We feel inclined to pat ourselves on the back occasionally when a particularly brilliant piece of work comes to hand. The fellows who do the worthwhile things are usually so modest that only one in ten gets credit for his good work. Getting our fingers on the information is hard work like pulling teeth. "BER" in Bermuda recently gave 1ABP a message for Connecticut. While "BER" stood by, the message was phoned: An answer was obtained, and in less than an hour the answer was back in Bermuda and had been acknowledged. FB, OMs!

For some time after the Santa Barbara earthquake 6AIV-6OI kept a nightly schedule with 6ZH and M3Y at San Diego. Marine traffic was regularly and efficiently handled. 500 word press messages were sent and the stricken district was kept in touch with the outside world by amateur radio. The U. S. Marines at Santa Barbara were in daily touch with their base at San Diego.

In less than half an hour after the news of the disaster reached Oakland, California, City Manager Upson had five of his Official Relay Stations standing by for message traffic to Los Angeles. Two stations in Los Angeles handled that end of the work. 6CCT, 6CMG, 6B8Z, 6CAX, 6ALX and 6CMG remained at their keys from 10 a. m. of June 29th until 5:30 a. m. the following morning. They are all to be complimented for their share in the work.

The West Coast fellows are certainly doing their share in making amateur radio of service to the public. 6HU-6AAF got the final reports of the yacht race direct from the Idalia, KFVM, on its arrival at Papeete, Tahiti, July 9.

Our good friend, g2KF, writes that we should again call to your attention the fact that English stations are not allowed to handle any traffic of a private nature. Any messages for QSR to continental stations or any traffic relating to experimental work with English stations will be accepted but messages to private addresses cannot on any account be handled without subjecting station licenses to cancellation. Partridge recently took three long messages for the National Geographical Society from WNP, passing them to u2BKR for forwarding to Washington. He is operating on 48 meters early every Sunday morning. g2KW operates early mornings on 45 meters.

Here is a new "Q" signal, suggested by 1JR, that will be a time-saver in these days of out-of-date call books:

QRAR?—Is your call-book address correct?

QRAR—My call-book address is correct.

1FD is interested in picture-broadcasting. He suggests that the men having one of the Jenkins machines get together and run some preliminary tests. It will be mighty interesting to receive a nice fresh occupational cartoon and message on one of the machines at a certain time each week. Write Mr. Hubbard if you are interested and we will see what can be arranged.

SZH, 8AND, 9BVZ, and 9EJI recently demonstrated the usefulness of amateur radio to Chief of Police Cole of Flint, Michigan. When he attended a convention in Indianapolis recently, he directed the activities of his department in Flint during the entire time of his absence by the services volunteered by members of the A.R.R.L. Assistant Division Manager Angus of Indiana helped in arranging the first tests that preceded the actual traffic handling work.

SCPE suggests that we have a popularity contest to decide what amateurs in each Division are the most popular. Each station voting can have two votes. One vote is to be given some amateur in your Division. The other vote is to be given some "DX" station. All votes are to be sent by radio to Divisional or National Headquarters. The messages must include the reasons for the popularity of the stations for whom you vote. If you like this suggestion and want us to set a time for the "popularity relay" drop us a postal or send a radiogram to 1MK, 1711 Park St., Hartford, Conn.

Active Montana amateurs have a chance to get QST free for a whole year. Beginning this month A.D.M. Willson is offering the owner of the station in his territory who, each month, maintains the best operating practices, a whole year's subscription to QST. If you did not read the rules that would be followed in awarding the monthly subscription as they were announced in "Montana Ham Hooks" you should write Willson at once. We understand that another prize will be announced later for the station that maintains the best operating practice for the entire season which begins this month. One can derive a whole lot of satisfaction from being a good operator and from general recognition as such, but with this additional incentive we expect to see some keen competition among the Montana operators.

"Ed" Guerara, ch1EG, of Valparaiso, Chile is putting messages into the United States via 1PL and 9ZF. He shoots 'em along in Spanish at about 25 per. Look him up on 42.7 meters. We understand that he is ex-8AZD and one of the "gang".

### Use a Break-In

BER, SZE, and 6CW have written and urged that we tell everyone more about using a "break-in" system. Many amateurs already use a separate receiving antenna which makes it possible to listen to most stations with the transmitting tubes lighted by pausing just a moment when the key is up. The advantages of a "break-in" arrangement are many. Much useless calling and unnecessary transmission are prevented by it use. Everyone who has a separate receiving antenna does not take advantage of its possibilities. The advantages of the system cannot be

realized when calling unless the transmitting operator sends the letters, "bk in" or "bk me" at frequent intervals during his call pausing for a moment thereafter and listening for the reply from the station being called. If the station being called does not answer, the call can be continued. If the station called answers someone else he can be heard and the call broken off until he has finished his business and is again listening and there is a good chance of his hearing the call.

Two stations can use the system to mutual advantage. When messages are being handled, if some QRM comes in or if a word is missed because of swinging signals, a few taps of the key will set things straight in a jiffy. "Bk bk ga Chicago" (or whatever was the last word received correctly) will save time and unnecessary transmission. If the trouble is of long duration the other station can stand by and take traffic until local reception is improved.

Because of its many advantages and general value we urge the immediate use of a "break-in" by every reader of these pages who operates a transmitter. Let's get back to that snappy, clean-cut operating that makes it a pleasure to own a short wave receiver and transmitter.

## VIGILANCE COMMITTEE

We have wanted to devote some space to the activities of Vigilance Committees, but few reports have been received, and we can print only the information that comes to hand. Most of the Vigilance Committees have found work light during the summer. Although primarily organized to correct amateur interference problems, the work has been so light that many of the committees have taken on the work of hunting down other types of interference that came to their attention. From the report summaries that are sent to Headquarters each month on each case of interference investigated, it is evident that less than three percent of the complaints that are received are found to be caused by amateur telegraphers.

The Vigilance Committee at Oakland, California was most active during the past month. About 200 complaints were investigated. But five of the complaints were traced to amateurs. Improperly operated broadcast receivers and power leaks were found to be giving the broadcast listener most trouble. The cases of amateur interference were corrected to the satisfaction of both amateur and broadcast listener. The Oakland Vigilance Committee conducts a question and answer forum as a side line and everyone in Oakland makes good use of it. The chairman of each Vigilance Committee is requested to report to the Assistant Division Manager of his territory each month so that the ideas of each committee can be mutually helpful in improving our Vigilance Committee service.

The first active Vigilance Committee in the country was formed at Schenectady, New York where the complaints of amateur interference has been severe and numerous. Immediately the committee advertised its purpose in the papers, complaints to news-

papers, to the General Electric Company, and to the Assistant Division Manager stopped as if by magic. The inference made is that the chronic kickers did not care to have an unbiased committee investigate their complaints because they had been made unscrupulously. Amateurs who had been getting the blame from power leaks and "bloopers" were left in peace. The broadcast listeners who had been using the common non-selective types of receivers still marketed by certain manufacturers got "cold feet" because they knew that their own apparatus was not blameless.

A committee at Poughkeepsie investigated about ten complaints that were received and adjusted the amateur troubles to the satisfaction of all concerned. 2COV is chairman of this committee.

At White Plains 2CNS, 2BQB, and 2AHP are the amateur representatives on the local Vigilance Committee.

## CLUB ACTIVITIES

NEBRASKA—The Citizen Radio Club of Omaha has been very active of late. The Club is now conducting a "slide-rule" class to help the members in conducting their research and technical work to better advantage.

WESTERN MASS.—The Springfield Radio Association report that they are getting along very well with the construction of a new transmitter. IBWY will be on the air early this fall.

NEW YORK—Yonkers Radio Club is training some new operators. If more code classes were conducted by clubs everywhere, we expect that operating conditions would be much improved.

OHIO—The Toledo Radio Club offered the facilities of the American Radio Relay League to the National Convention of "The Grand Aerie of Eagles" which was held at Toledo August 10 and 11. Members of the club were on the job to collect and forward radio messages from the Convention delegates to all parts of the world.

INDIANA—The Old Timers' Club of South Bend holds its regular meetings throughout the summer. The attendance has dropped off some, however.

The Fort Wayne "gang" have been visiting different cities and different stations. Club trips have been made to South Bend, Indiana and to Lima, Ohio. The new club officers are 9AFY, 9BKL, and 9DBJ.

Indiana clubs are invited to send their reports to Mr. Maurice Wells of Indianapolis.

WISCONSIN—The interference committee of the LaCrosse Radio Association have improved local receiving conditions by locating a bad case of power line interference using a loop receiver in a car for the purpose. A defective arc lamp was finally located and it has been replaced by the local power company. The club committee, 9AZN, 9BKC, and Mr. Gerke, have helped hundreds of individuals, both amateurs and broadcast listeners, to a better enjoyment of radio by this excellent work.

The Milwaukee Radio Amateurs' Club had a "round-up" meeting and sent a fine delegation to the National Convention at Chicago.

## DIVISIONAL REPORTS

### ATLANTIC DIVISION E. B. Duvall, Mgr.

IT seems that each month something happens to set the Division back in the reports. While Western Penna. has come up to the top with a good report showing that renewed interest has been shown by everyone showing interest and helping the A.D.M., the Western New York report failed to come through.

Traffic is surprisingly good for mid-summer. A good deal of reconstruction work has been evident throughout the division. The 150-200 meter band is practically deserted, most of the stations being on the 40 and 80 wavelength band.

Work in selecting and appointing Official Broadcasting Stations has been slow, as it is necessary that these stations be carefully selected.

Attention is here called to many stations in Philadelphia and parts of Eastern Penna. who have placed themselves on record as being active, but failed to report. Investigations of this neglect are to be made through the D.S. and C.M.'s in the future and cancellations will be made if stations on the active list are not reporting. Stations who have reported, but fail

to find mention of it in this report, should trace their report through their D.S. or C.M. and see what happened to it. There are over 15 active O.R.S. in Philadelphia, under the jurisdiction of three City Managers. Certainly, some of these stations should report! A.D.M. Rau suggests a get-together meeting of Philadelphia stations and traffic officials. Something should be done to insure reports and renewed interest in this particular locality.

DISTRICT OF COLUMBIA—Most of the real "ham" activity in the District centers around the Washington Radio Club. 3CKG, with 3EM at the helm, has opened up on 40 meters with a 250-watter. 3CKG (Basin himself) mans the engineering staff of the station. 3BWT has converted his set to 40 meters. The 82 meter 100-watt set at this station will be the "standby."

3BPP reports no traffic and that his set is dismantled. 3AB, 3ZW and 3CKG will keep things open until 3CDQ gets her set on the air. At the 3ZW-3EE combination—reports repairing counterpoise in record time and getting QSO WAF. 3CDQ is on 40 meters now.

Traffic: 3ZW-3BZ, 65; 3BWT, 31.

MARYLAND—Jordan and Offutt of 2BUR have sent in a fine report from NVE, the U.S.S. Utah. With very limited apparatus they threw together a 50-watter in the radio room and the first night of operation, 500 miles from Balboa, they worked NFK and several eastern stations, among them 3HG. The results on short waves so impressed the Executive Officer that the set is now installed in the Captain's office and has been increased to 100 watts. "DX" worked so far: Japan, Somoa, Argentine, Hawaii, Tahiti, Alaska, Pago Pago, Mexico, all U.S. Inspection Districts and Canada. N.R.R.L. and KFUH are worked nightly. All night watches are stood on 40 meters. (FB) 3LL has connected with R2SH and is working A and Z stations. 3AHA is on again and worked WNP on 40 meters as a starter.

2WA, a new station at Catonsville, is reaching out well with a 5-watter on 80 meters. 3QI has dropped to 80 meters. 3APT-ZD has remodeled his set for 40 meter work. 3EU has been visiting hams in the 6th district. 3APV visited 3CHG, 2CRW, 2CYQ, 2ZO, 3GGG, 3GKL and 3RUR on a recent trip with 3AB. 3APV was also on the receiving end of the Excursion of the Merchants and Manufacturers Association from Washington lately and handled part of the 2500 words of press and 61 messages from 3BE located on the S.S. Southland. 3DW has been busy with division work and has neglected regular schedules and traffic work. 3LG was on a vacation at Round Bay. 3CHC was busy with a test on Defense Day.

Traffic: 3AHA, 17; 3WA, 18; 3HG, 46; 3APV, 80; 3DW, 22; 3PA, 1; 3HU, 3; 3CGC, 13; 3RF, 7.

DELAWARE—This state seems to be dead as far as radio activities are concerned, 3AIS being the only active station. 3WJ, a new O.R.S., has gone to sea. 3WJ is using one 5-watter with 500 cycle plate supply. Barkley of 3SI, reports he will have his two 5-watters perking before long, at his new QRA, which is about five miles from Wilmington. A gas engine will be used to turn over his MG set.

3RSS lost his 70 ft. mast in a recent storm, but will replace with a new one immediately. 3RSS is the only station in Delaware that has been successful in trans-atlantic "DX," and his sigs have been QSO in nearly every country.

SOUTHERN NEW JERSEY—Everything seems to be skidding along as usual throughout this section. 3BTQ is the star traffic man this month. 3GBX and 3SK are in line for O.R.S. appointment certificates. 3GBX is on 39 meters. 3SK is an old 8th Dist. "ham" and a real A.R.R.L. man. 3BRM is the most active station in Trenton this month, having handled good traffic. He is on the 80 meter band with a good QSP at last. 3RE has been working to improve his 40 meter transmission. 3BFF has tried to get down to 80 meters, but not very successful. 3ZI has been pretty much on the jump since the arrival of the new "junior" "op," but is keeping right on the job with his D.S. duties. 3HW is showing a great deal of interest in short wave work. His latest addition is a copper "gutter pipe" antenna. 3XAN will have a 50-watter this fall.

There was no interference reports from B.C.L.'s this month, so consequently no report from the committee.

Raser seems to be the only D.S. giving a detailed report of his District. From the traffic handled in the 8th and 7th indications are that there is a good deal of activity there. The A.D.M. will appreciate a full report from all D.S. and C.M.'s in the future. Braidwood seems to have neglected or forgotten to report this month. The 9th N. J. District should have some activity. The A.D.M. will also be glad to hear from some in the 5th N. J. Dist. There is urgent need for a man in that territory (Sussex, Morris and Warren Counties) to handle the work of reporting this District's activities every month.

Traffic: 3BEL, 5; 3WR, 4; 3BO, 5; 3RAY, 10; 3BWJ, 32; 3OQ, 4; 3BTQ, 32; 3SK, 7; 3XAN, 1; 3BRM, 8; 3RE, 4; 3GBX, 3.

EASTERN PENN.—Reports for this month show that activities are on the increase for better station equipment. 3BNU has been "QSO" with BER on 40 meters. 3CTZ is back from Bermuda and will work on 40 and 80 meters. 3BAQ, 3CJN and 3TP were all active in Defense Day tests. 3MQ was heard in Pacific waters while using a "fiver." 3AOL's tower blew down, the airplane he was to equip was smashed and in the bargain he got married. 3HD used his portable call while on his vacation. 3LW reports hearing N.R.R.L., Australians and New Zealanders. 3BOT is back on the job after his vacation. 3AM reports not much. 3TS will be operating on 80 meters next winter. 3BLC has a new 5-watter perking.

3UE blew a 50-watter. 8DBN is off the air. 3BPN is active and handled a little traffic. 3BPN is experimenting. 3BMM has little time for radio. 3BFE reports FB in Williamsport, all stations active and 3RU, 3CCQ and 3BFE very much on the air. 3BVU has been on about a month since school stopped and has been QRV for Traffic. 3BTU has handled traffic for the Signal Corps. The A.D.M. took an OW in August.

Traffic: 3HD, 5; 3BCT, 5; 3ZM, 4; 3BNU, 27; 3AYM, 3; 3PLC, 3; 3BLP, 34; 3BUV, 9; 3LK, 2; 3BAQ, 2; 3MQ, 6; 3UE, 20; 3BPN, 7; 3BPN, 3; 3BML, 2; 3ATV, 9; 3ZO, 87; 3BQ, 12; 3CFT, 6; 3EU, 14; 3CCQ, 13; 3BFE, 13.

WESTERN PENN.—This section is beginning to shape up with the approach of the fall season. Many new O.R.S. appointments have been made. Many of the old stations are coming back into the game. There are only two active stations in the 7th Penna. District at the present time, one being that of 3XE, Penn. State College, and that of 3BOY. 3XE is at present closed on account of the summer sessions of the school. 3BOY is on regularly, using 40 meters. Aughenbaugh reports that seven stations will be licensed around Altoona soon. 3AHK, 3AKI and 3AWH are stations in Altoona who will be active this fall. 3AOX at Waynesboro is using spark coil 1CW on 180 meters. 3CVU, using 10 watts on 80 meters, is on the job now for some traffic. Only six stations have been heard from as reporting from the 9th Penna. Dist. This inactivity is laid to the vacation period. Receiving conditions, especially in the early morning, on the short waves, have been excellent and a great many of the stations have been heard calling and working the A and Z stations that are coming through FB around 39 meters. N.R.R.L. has been heard consistently in this District.

3CEO and 3AGO, the Dist. Supt., and one of Pittsburgh's City Managers respectively, are spending their vacation together. They have been operating a portable station set up at State College with the call letters 3DHU. McAuly and Arthurs have visited hams in Scranton and Wilkes Barre and have helped the Division greatly in stirring up renewed interest throughout the State.

3DOC reports that traffic is fair. 3CES says that 40 meters is a great wave for "DX," but not so good for traffic this time of the year. 3DNF wired his report to McAuly at State College and it is a good one. 3CKM has also moved down to 40 meters and reports that results are very FB. 3DPE is satisfied with 80 meters at present. 3TW has been working at Cape May, N. J., during the summer. 3BJT took no chances of having his report left out this month, so he sent two. The D.S. reports that none of the stations used the new method of reporting this month and would lie to call attention to page 32, July QST 3BBL, 3GRK, 3AYH, 3DNO and 3CL reported, but too late to be included in the regular report. 3JQ, 3CLV, 3BIT and 3BHJ are the only active stations in Pittsburgh at present. 3JQ, the infallible, is always on the job for traffic. 3CLV, who has just received his O.R.S. appointment, is doing his share. He has been QSO France, England, Mexico, Bermuda, Canada and all U.S. Inspection Districts. 3BIT is also a new O.R.S. and is getting started on 40 meters. 3RHJ has been experimenting on 40 and 20 meters and reports good results. 3AGO is still "QRT" but promises action after Sept. 8th. 3CVX has been away at camp. 3AYW, 3CKO, 3PX and 3AIG will be on the air soon. 3ZD is on 42 meters. He believes the R.C.C. is the best thing that has come along for some time to improve amateur operating conditions. 3COK is a new O.R.S. and reported direct to the A.D.M. (This is a new station—C.M. please note.—A.D.M.) 3BY is also a new station.

#### CENTRAL DIVISION R. H. G. Mathews, Mgr.

OHIO—District No. 1: 3DND is operator of WHBD, a portable broadcast station. 3AVX is moving but will be on 20 and 40 meters about the middle of August. 3BN is on 40 meters now, always QRV. 3AA has blown a power transformer and his last 50 watt tube but will be QRV soon with a 5 watt set.

Dist. No. 2: Traffic is moving along in good shape this month. 3RY, 3DBM and 3ZE handled most of the traffic for this District. 3RV suggests that the gang use the break in system more when possible. 3DBM would like to know how some of the fellows get

pure DC notes on short waves. 8ZE worked NZ, Aust., Mexico, and P. R. consistently, and was reported by OA-4M in Johannesburg, South Africa, 8BCE with an input of 70 watts into a 203-A worked Z-2AC, Z-1AO, A-2TM, and KFUF while docked at Honolulu. 8BIE is rebuilding for 75 and 40 meters. 8AGS went to the convention but had lots of trouble with tires getting there.

Dist. No. 3: Most of the ORS in this district are doing fine summer Dx, but none have reached the brass pounders league. Reports this month, however, show that the boys are at last getting it in their heads to start some messages. (Keep it up gang and make the idea grow. DS) We are certainly sorry to learn that the old timer, 8AVT is leaving the game. We will be well pleased when he comes back—most of them do. 8DAE and 8BPL took a trip to Columbus, Ohio and visited stations 8DEM, 8BYN, and 8GZ. 8BWB and 8BWK are back on the air after operating a while on the lakes. The young squirt, 8BOP, has pulled down a white ticket. 8BF, is, as far as we know, the first Clevelander to work Brazil. 8DPN worked Australia with one "fifty" on an antenna 17 feet above the ground. 8AYO worked WNP a couple of times, taking a 300 word press message from him.

8BKM is back on the job after a short stay in Chicago where he built and operated 9AWT. 8ADA is pounding brass at 8UK this summer. He has had 8RY, 9AUA and 2BKJ as visitors at the station.

Dist. No. 4: Any amateurs who came through Cincinnati and desire information regarding the club rooms of the Union Central Radio Association, or other inquiries regarding the amateurs, will find Mr. Walter Winall, chief electrician of Union Central Building, who is there at all times and can give any information to out of town visitors. The association station is located on the 32nd floor and visitors are welcome.

Dist. No. 5: 8EI has not much time to operate. 8GZ worked Zedders 39 times in 3 weeks, but says that 20 meters seems dead. 8TJ is back on the air with CW now. 8PL worked NRRL and BZ-2SP.

Dist. No. 6: 8DFO is working on 77 and 170 meters. 8UR is now operator at 8DFO.

Traffic: 8GZ, 152; 8BYN, 146; 8EI, 106; 8BFO, 98; 8CVA, 90; 8RY, 44; 8DBM, 39; 8DPN, 23; 8DWB, 26; 8ZE, 22; 8BN, 19; 8BWK, 18; 8DMX, 18; 8BGF, 16; 8UK, 16; 8AVX, 16; 8ANB, 15; 8AWX, 8BGF, 16; 8UK, 16; 8AVX, 16; 8ANB, 15; 8AWK, 12; 8DRX, 11; 8BSA, 10; 8XAV, 10; 8PL, 9; 8DND, 8; 8BOP, 8; 8BMH, 7; 8ALW, 5; 8CNL, 5; 8AWN, 5; 8BHE, 4; 8BKM, 3; 8DO, 3; 8AIB, 2; 8CWR, 2; 8BZT, 2; 8KC, 2; 8APR, 1.

INDIANA—Dist. No. 2: 9DXI is not doing much, says it's too hot, and fishing is good. He is trying to get down to 20. 9BPT is finally going again in spite of YL QRM. 9DEJ is on 80 but is going to try 40. 9DYT tried to get down to 20 and 40, but with little success. 9BYL, complains of inability to find any traffic. 9EM has been away since May 4th traveling with a radio show portable station WKBG.

South Bend has a new City Manager, James Freyer-muth, 718 Lincoln Avenue, 9BBJ. Three of the fellows 9OG, 9CCI and 9BBJ went down to the Indianapolis Convention and brought back a flock of prizes. They hope to have the Convention at South Bend next year. 9ASX is a newcomer at South Bend. 9AM1 is doing fine work with a "fiver" on 80. 8DLZ and 9AIL are afflicted with the YL-ITIS. 9AQK is married, but will be on soon with a 50. DMC dropped his receiver and broke it. 9OG works Mexico and Australia. 9BBJ handles most of the traffic through South Bend. 9AKD is working in a radio store and will be on the air in fall with two "fifties". 9CUB starts kiddie cars at Playland Park. Some occupation for a ham. 9CP is working only on 20 now.

Dist. No. 3: 9CKH reports traffic slower than usual. He has tried 40 meters and seems to get out well. 9BSC is doing a great deal of experimenting on 20, 40 and 80. Amateur radio is getting a great deal of publicity in Evansville. 9BRK will keep his station on the air as much as possible even though a new position has taken one of the operators from the station.

Dist. No. 4: 9EJI held up part of a schedule with 8ZH on the police chiefs convention. He also lost a 50 foot mast. 9BVZ rebuilt their set and are changing to a sync after blowing a generator. 9B JL was heard in New Zealand. 9UT is rebuilding for 40 meters. 9CLO handled part of the schedule with 8ZH on the police chiefs convention. 9AXH has a

new "fifty" on 40 meters. 9DTL is using two 201's with a new m. g. 9CJW is reaching the west coast on 40 meters. Most of the Indianapolis gang were too busy with the convention to handle much traffic. The convention went over with a bang. Hams from seven states and four districts gathered at Indianapolis for a big time, and they had it. 9ES is moving his 50 watter down to 20 meters. He still has a "fiver" for 40 meters.

Traffic: 9CLO, 60; 9BBJ, 42; 9ES, 24; 9EJI, 22; 9AGU, 23; 9DXI, 22; 9BVZ, 17; 9OG, 17; 9ADK, 14; 9BPT, 8; 9DHJ, 7; 9AMI, 6; 9TG, 6; 9B JL, 6; 9DYT, 4; 9BYL, 3; 9CCL, 3; 9ASX, 1.

MICHIGAN—Dist. No. 1: The message total is higher this month, due to 8DOO. 8DOO is working press stuff for a local Editor while said Editor is in the West. 8AMS reports as usual and is trying to get down on 40. 8ACU had a vacation in Canada but is back on the job now. 8BDR says he will be with us again. 8DBO working F.B. on 50 meter band.

All ORS not reporting for two consecutive months will be recommended for cancellation. Stations desiring appointment as O. R. S. please write in for applications. 8ZH is starting on a two weeks' vacation in the north country. 8DIV had school work interfere for awhile, but he has graduated now. 8ADK is planning on a new antenna system. 8CEP is rebuilding for the short waves.

Dist. No. 2: Mr. Paul H. Grey of Lansing, is doing a fine job acting D. S. of this district during Mr. Pancost's absence. 8DFB is purely experimental work, mainly on tubes. 8CED is now FB on 40 meters. 8ZF is not on much on account of outside duties. 8NX is having transformer and condenser trouble on the short waves. 8CHK is working the experimental S. W. station at WREO. 8DCW is not on much on account of summer activities. Burrell of 8DOK leads the second district with message report. FB OM. He is now using a "fiver" instead of a fifty.

Dist. No. 3: Every one is away from home or has torn down his station. 8AQA and 8BDY have joined the Naval reserve and are operating NEU. 8MV is also with them. 8CPY blew another "fifty" and is off the air until October.

Traffic: 8DOO, 205; 8ZH, 42; 8DOK, 23; 8CZZ, 15; 8ZZ, 7; 8DBO, 5; 8CED, 5; 8CHK, 5; 8NX, 4; 8ADK, 3; 8ZT, 1; 8NX, 8.

KENTUCKY—9CMW is doing good work on 85 meters and has applied for an O. R. S. 9DWZ has departed the single life, but promises not to let his better half QRM his radio work. 9BAZ is back from college and working on 40 meters. 9WU made a good showing before he left for England. 9HP thought he was working a U5, but it turned out to be a G. 9CVR connected up with an Aussie, and is doing fine work on 40 meters. 9ELL has moved. 9QX has put in two "fives" and find they work much better than a UV 201. 9DNN had his antenna and counterpoise blown down in a storm. He will be on again soon on 80 meters. Several of the hams from Louisville attended the Hoosier convention and brought home some prizes.

Traffic: 9MN, 28; 9WU, 20; 9ELL, 16; 9OX, 10; 9DWZ, 7; 9CMW, 6.

ILLINOIS—Dist. No. 7: 9AIO is pounding brass on the lakes. 9DPC bought new tires so he can't buy tubes. 9DWH is out for a while due to a vacation.

Romberg, 9BE, is now Chicago Traffic Manager. 9EJY and 9DXG will soon have O. R. S. certificates if they continue their good work. 9APY worked hard on the Convention but is still doing fine work on the low waves. 9QD reports that 40 meters is as good now as it was last winter. 9BWP has been doing relay work for some friends who live on each side of the Continent. 9BNA can now be found on 40 meters. 9AHD is moving, but will be ready in fall to do some more real work. 9NV is closed until September 22nd, when school will start. 9BE reports that they have stations with regular schedules to such places as Manchester, Wis., Indianapolis, St. Louis, New York, Detroit, New Bedford, Mass., Fresno, Cal., and Kentucky. He has been after the gang to get schedules and they have sure been on the job.

Traffic: 9APY, 24; 9BE, 14; 9IX, 13; 9AW, 12; 9BNA, 8; 9EJY, 7; 9DXG, 7; 9GE, 6; 9BWP, 6; 9AIO, 5; 9DPC, 5; 9QD, 1; 9AHD, 1.

**DAKOTA DIVISION**  
Don C. Wallace, Mgr.

**T**HE Dakota Division is to be favored with a trip from NERK, the Shenandoah. At the present writing it is believed that the Shenandoah will leave Lakehurst during the first part of September, and will plan on having communication with amateurs in the Dakota Division, and especially those of the twin cities, during the entire trip and during the landing in the twin cities.

The communication received from Radio Officer, G. W. Almour of the Naval Air station, Lakehurst, New Jersey, indicates that the "Shenandoah" will use a wavelength of 40 meters throughout the flight.

A special telephone line has been run direct from the landing field to 9XL with provision to have this line switched over to other stations should it become necessary. 9XI will then handle the bulk of the communication, maintaining a twenty-four hour watch, and other stations are asked to stand by and to communicate for test purposes, and also to show the operators on board the Shenandoah that we are very much alive and on the job in this division.

At the present writing, six car loads of "hams" are planning on leaving the twin cities for the Chicago convention.

Assistant Division Manager Barker (USNRF) is taking a trip on the U.S.S. Paducah on the Great Lakes during August. 9AMD (USNRF) has a home set installed and operating on the Paducah, using a wavelength of 40 meters. This station will be in operation throughout the balance of the summer.

**NORTH DAKOTA**—Dist. No. 2: 9EFN is on the job again after a few months' vacation, but reports no traffic handled. He also reports that he is intending to start a code class to give some of the beginners practice. 9IK-9DFB and 9CRB are the new O.R.S. in this district. 9CRB expects to install a "fifty" this winter.

**SOUTH DAKOTA**—With the epidemic of rebuilding now in full force South Dakota should have some regular he-stations on the air for this reason.

Dist. No. 1: 9HH dropped to 41 meters and is on every evening. Nick Hensen, ex-A.D.M., is building a combined home and ham station in Sioux Falls. 9CKT is getting fine DX with a truck on a bridge gang.

Dist. No. 2: 9DXR is rebuilding. 9BDW has been working DX on 40 meters, even through strong lightning. 9EH has been experimenting with television. 9DZI is rebuilding and off the air, as also is 9AGL. 9NM reports too much work around the ranch. 9DBZ hands in his usual good traffic total. 9DD may move back to Webster. 9ERI is on with ten watts on the short waves and getting good results. 9CBF is busy selling cars for the wherewith to put up his big set. 9BBF built a fine lattice tower but had to go to work before he got it raised.

Traffic: 9BDW, 23; 9DBZ, 34; 9EH, 7; 9AEO, 4; 9NM, 1; 9DIY, 1; 9BOF, 21; 9CKT, 6.

**MINNESOTA**—Things seem to be progressing fairly well considering the season, although activities that were are dying off somewhat. Guess the fellows are either rebuilding their stations or else the YLs are after them. A lot of the fellows are just getting straightened out after the several destructive winds that have visited our State.

Dist. No. 1: Our new D.S. is Al Palva. 9CDV. His fist is well known on the air, and with the full co-operation of the O.R.S., he will do wonders with his District. Let's help him all we can, gang. 9DXT, C.M. of Virginia, is getting his city organized again. He reports trouble with the low waves. 9EGF still complains of his location, but keeps irying with "10 watts." 9DKR, with 220 volts d.c. on a CVZ, works 850 Miles dalite. 9CWN is FB with traffic. 9CWS is at his usual summer rebuilding. 9AYQ will be off for the summer. 9AOG handles traffic on schedule with 9CDV. (There's a hint for a whole lot of us. Why not do more work on schedules?—A.D.M.) 9CDV works N.Z. regularly. 9EGN works out fine and will soon QRO. 9EEP sticks to 42 meters. 9EGU is experimenting with dry B battery plate supply for Burgess and is about through making a few rearrangements. 9ADF is out of town. 9BPW is a new O.R.S. as also is 9CKL 9DFD (ex-AEI) works regularly and is taking the Duluth gang to the convention.

Dist. No. 2: A lot of the fellows failed to report without having permission, but the D.S. is on their trail. Northfield is boasting 3 active stations again now—9BCN and 9DBW. 9SF and 9BVS are trying

to make their "50" perk on 40. 9BTZ can be on only for the Broadcast Messages. 9MF has trouble with 40 meters. 9AIR now belongs to the "X" section. 9EGG's "spark coil CW" rattles the Mexican diaphragms with no trouble. 9DMA is now on the 40 meter band. 9DDP knocked out his faithful "fiver" but worked NVE and Porto Rico with the replacement. 9DDB is on occasionally. 9BFU is rebuilding his home. 9CAJ is hard to suit on receivers—he built 6 different ones in one evening. 9CYX is also bothered with his receiver. 9EFD says he wants to hear from someone who has made a "fiver" perk below 80 meters. 9SW is trying spark coil CW. 9BBV is rebuilding completely. 9ATC is on 40. 9COF purchased a "250." 9CPO is still trying to make his mast stand the winds—it's down for the second time this summer. He's to both coasts in dalite on short waves.

Dist. No. 3: The Twin City fellows are hard to get anything out of, so this report is abbreviated again. 9DPX steps out to NRRL and MIAA with 50 watts. 9BVH worked Z4AR and NRRL. 9BOY used too many mills on his "250," so is rebuilding. 9APE is going strong again. 9BMX rattles the cans in great shape with 12 watts input. He and 9APE are still experimenting on 5 meters. WNP and WAP QSA often at 9ZT.

Traffic: 9CWN, 14; 9AOG, 9; 9CDV, 71; 9DKR, 5; 9EGN, 18; 9EEP, 12; 9EGU, 6; 9DFD, 8; 9CPO, 2; 9DDP, 6; 9EGG, 1; 9SW, 26; 9BMX, 5; 9BPY, 7; 9ZT, 21; 9DGE, 27; 9BNK, 24.

**DELTA DIVISION**  
Benj. F. Painter, Mgr.

**T**HINGS are looking brighter; More interest is apparent; and more messages are being originated. In Memphis another feud has started. Blood will doubtless be spilled before it is over. The DM being a bachelor will shortly go to Meridian to look them over.

**TENNESSEE**—The Memphis gang pulled a dirty deal on the much-tooted Meridian "gang." Not satisfied with swiping one of Mississippi's prettiest girls they decided to make an "op" of her and she can be found at 4-CU or 4-KB almost every night smashing the ether full of holes. They claim that they will boast the best "OW" in the league shortly. They thank the Meridian crew for rearing such a beautiful "OW." (Much to our credit, OMs-ADM.) 4-CU is a member of the RCC. 4-KB handles mugs Ib and the CM gives him three months to be in the BPL. 4-HH is active after months of study. 4-JJ gets out well. 4-DK has been adjusting his transmitter. 4-PZ steps out in great style but handles no traffic. 4-JN is experimenting on five meters.

4-KN is no other than Hansford, an old ham with a new license. 4-BU is saving his 250 watter for winter but punches brass with a fiver. 4-CK and 4-FC are rebuilding, so is 4-FC. 5-JV drew 4-NO for his lot. He claims to be the Official Trainer of Miss Elizabeth Wilson, the YL from Mississippi. (More power to you Sutton ADM.) 4-KM ex 5-CN of Bemis still exists on 40 meters, working Australia and N. Z. Chattanooga is still on the map with 4-EE and 4-EP, two new stations, getting out in fine style. 4-AJ is handling traffic as usual.

**ARKANSAS**—5-SN will be on shortly. 5-ANN lost his mast, but connected transmitter to loop and went right ahead. 5-ABI and 5-HN lost their licenses when the RI visited them. 5-GH on once in a while. 5AW QRM from work and burnt generator.

**LOUISIANA**—The New ADM makes his first report and we are glad to see the New Orleans gang represented. 5-NJ is doing his usual good work. 5-GI is on 40 meters. 5-AU is broadcasting under call WAAR. 5-AEN is a new-comer. 5-LH has moved but is back on the air. 5-UK is still heard all over the globe and is the most consistent station in the state.

**MISSISSIPPI**—5-AGM, the portable 201-A station at the boy-scout camp, is still on the job, and most of the Meridian gang are taking turns as ops. They report having worked eight states. 5-FQ has gone to 40 meters. 5-ANP is off the air with broken arm. 5-API is QSO Porto Rico and asks for traffic. We expect an answer from Meridian to the Memphis gang next month.

Traffic: 4-AJ, 10; 4-BU, 2; 4-CU, 78; 4-DK, 3; 4-EO, 25; 4-GY, 35; 4-IV, 37; 4-KB, 52; 4-KM, 36; 4-JJ, 5; 5-AEV, 3; 5-AGM, 1; 5-AKP, 11; 5-ANN, 12; 5-AQN, 9; 5-ARB, 1; 5-NJ, 5; 5-QZ, 11; 5-UK, 7; Total. 354.

HUDSON DIVISION  
E. M. Glaser, Mgr.

SEPT. 1st is the first anniversary of the Hudson Division. In the year of existence a sound and co-operating staff of officials comprising A.D.M.'s, D.S.'s and C.M.'s and backed by 130 O.R.S. has been functioning excellently. The D.M. wants to thank heartily all the officials and O.R.S. who have helped him put the little space on the map. The D.M. wants to congratulate the officials on not missing A SINGLE REPORT THE WHOLE YEAR. F.B., MEN, THAT'S REAL AMATEUR SPIRIT! KEEP IT UP! Schnell said the Hudson Division had the strictest requirements for O.R.S. in the country. That means something. Let's not loose our prestige. Start the new season with a bang. Get hot after real traffic and co-operate till it hurts. Stand back of the Vigilance Committee. Give them your wholehearted support; O.R.S. MUST FOLLOW TO THE DOT the operating rules in August QST. Post these rules where you can read them often. The D.M. wants any REAL amateur with a good station to apply for O.R.S. appointments to your City Manager or District Supt. Inactive O.R.S. will be weeded out during September.

2CTH leads the division with 71 messages. Congrats. OMI 2CPD comes second with 61.

Only one report on "DX" came in; that from 2CRB, who worked Ariz. with 180 volts on a 201A.

NEW YORK CITY—A good bunch, headed by Talley, 2PF, will attend the National Convention. 2BBX is doing fine work. 2CYX is on the road again. Some Manhattan fellows want to know why we don't have much news about them. How can we when they never send any in? We mention only the fellows who report. 2BEE has worked many foreigners lately.

2CLA handled more traffic than all the rest of us together. 2PF is going with "soup cells" and "S" tubes. 2UD has the same old punch and knocks 'em dead. "G.S." Smitty, is doing practically all the operating at 2BRB while the D.M. is away. A Hertz antenna is used on 19 meters. With 250 watts input he is heard everywhere in daylight with good audibility. 2WZ is going to college in the fall. 2CRB is away. 2EO is on quite a bit. 2CHY spends all his time at 2KW. 2ABK is working on 40 meters. 2CHU handled the Manhattan traffic. 2TT and 2CZR are away. 2BNI is there with the co-operation. 2BSL is temporarily 2AGM. 2AVE is away. 2AEP is keeping up the good work. 2CSX is a new station. 2ACZ has put in a better outfit. 2AKK is rebuilt and ready for real work. 2CIS has a new "fiver."

Traffic: 2BRE, 25; 2BBX, 30; 2BO, 19; 2WZ, 5; 2PF, 2; 2CHY, 4; 2CLA, 32; 2CHU, 47; 2CSX, 12; 2AEP, 8; 2AKK, 10; 2AGZ, 38; 2CEP, 4; 2CIS, 2.

EASTERN NEW YORK—2CLG gives promise of being our best traffic station. He is keeping schedules with five stations. His vacation cut heavily into his traffic this month, however. 2BPB is using "S" tubes and a horizontal "Hertz" antenna. 2AV is on the S.S. Saltaire.

2LA has moved from New York City to New Rochelle. 2DD finds his time limited. He is using a 20 meter wavelength. 2AJQ has a mania for glass panels. 2CTF has been on a trip through the first district. His station operated on 2CJE was the loudest one we heard. 2CJE is selling his low power apparatus with hopes of installing a "fifty." 2AII is wrestling with a Meissner circuit. 2HH is having difficulties in adjustment. The D.S. will be operating soon with a "fifty" and a new call. 2CNS has a vigilance committee organized in White Plains. 2BQB's chief "op" is away but the second "op" keeps the dust off the key. 2AHK, the Poughkeepsie traffic hound, has moved to East Orange, N. J. We're sorry to see him go and wish him luck. 2NW is a new station. The D.S. wants to hear from fellows in the smaller towns in his district. Send your reports to him, fellows, even if you're not an O.R.S. His address is Box 113, Yonkers, N. Y.

2AGM is rebuilding again. 2CDH continues his good work. 2CTH worked bz2SP, HER, g2LZ and nORA on "40." 2BM is doing fine work with a lone "fiver." 2ANM operates on 20 and 40 meters.

2AKH and 2AOK sent in fine reports and are doing good work. 2CXG has a job on a boat in N. Y. harbor for the summer. 2CYM is busy. 2AUO operates on 20 and 40 meters. 2AMD is touring in France and England. He says the French and British amateurs are giving him a good time. He has visited g2SH, g2NM, g2OG, g2DX, g2WJ and g2OQ. 2BSE has made an "OW" of his "YL." 2AGQ op-

erates mostly during week-ends. 2PV at Albany is reaching out in the usual fine style. 2AWF is keeping this city on the map. He is working east regularly. 2GK is working N.Z. and Aust. as well as Brazil, Argentina and Chile. 1CMP, now located at the "Electric City," has built a new station. The A.D.M. warns all stations here and now that laxity in reporting will not be tolerated. If things do not pick up around this neck of the woods there will be a lot of cancelled O.R.S.

Traffic: 2CLG, 11; 2BPB, 3; 2DD, 1; 2CNS, 1; 2COV, 1; 2AHK, 44; 2AJQ, 4; 2BM, 3; 2CTH, 71; 2ANM, 5; 2AKH, 30; 2CYM, 7; 2AUO, 16; 2AGQ, 38; 2AOK, 29; 2GK, 7.

NORTHERN NEW JERSEY—2AJF forwarded his report from Burlington, N. Y. 2AT is pounding hard on 20 meters. 2ARB has a new pole and vertical antenna. 2BKR keeps schedules with 2GKF for traffic handling. 2AXF has returned from Canada. 2AHK has moved to East Orange, N. J. 6AO is at Montclair, N. J. 2JC is working on a 40 meter wavelength. 2EY can work on 40, 80 or 175 meters at will. FB, OMI 2EW claims that North White Lake, N. Y., is a "ham's paradise." 2BAW found plenty of traffic to handle. 2CRP has reduced his power. 2CDD and 2WR operate occasionally. 2CQZ is at an Army Camp. 2FC is all set to go as soon as a tube arrives. 2CPD handled most traffic in Dist. No. 4. 2BZJ had the misfortune of burning up "the works." 2BUY is on as usual. 2CGK has returned to "75" after a long silence. 2AUH has a "50" working on "40." 2BGI is still "QSO" N.Z. and Australia. 2API, formerly 1AOA, is setting a fine example in traffic handling.

Traffic: 2AT, 12; 2AJA, 6; 2BKR, 14; 2JC, 11; 2CRP, 4; 2BAW, 14; 2BW, 7; 2EY, 4; 2AHK, 44; 2CDD, 6; 2ACH, 8; 2AEC, 8; 2ACO, 12; 2BUY, 16; 2CPD, 61; 2API, 26; 2BGI, 4; 2AUH, 12.

MIDWEST DIVISION  
F. H. Quinby, Mgr.

NEBRASKA—A record breaking heat wave; fierce static, heavy winds; swinging signals! 110 degrees in the static room with the fan running. Then what? A shorter antenna and counterpoise built into the attic; higher frequencies in the grid circuit; less power on the plate; the set in the attic with remote control to the ice box. Results? No static; greater DX; steadier signals; more miles per watt. Boy! That's what we mean by getting down on low waves!

9BFG and 9BNU have built new Schnell receivers. 9AIT is a new comer in Omaha. 9EB is "QRX" for more tubes. 9CGS and 9DUO are cruising the Great Lakes. 9CFM and 9NL are rebuilding. 9AWS is working on loop transmission. 9DXY, using low power, worked 8AVD with 200 volts and 10 mls on a 201A. 9BYG is making new daylight "DX" records. 9CJT and 9EW have recently visited the hams in Colorado. 9WN would like a schedule with someone on 40 meters to handle traffic.

9BDU worked NRRL but ruined his rectifier. 9DAC has gone down on the farm. He milks the cows with his cans on. 9BLK has gone to California. (Good luck, OMI.) 9EEO has left Lincoln for the summer. 9AER has bought a Ford to go to the Convention. 9CBK is a piano tuner. He ought to have a good note! 9AKS, using a "fiver," is now on forty meters. 9PN has been busy repairing phones in the wake of a "young" tornado. 9CGQ has been visiting hams in Denver. 9EHW is looking for an "ohm-saw" to trim down his wavy. 9DI reports that 150 meters is now like a graveyard.

The vigilance committees of Omaha and Lincoln report that everything is peaceful. (Fellows, the reports came through in fine shape this month! Thanks—D.M.)

Traffic: 9AKS, 7; 9DI, 15; 9CGQ, 7; 9PN, 4. IOWA—This month the "DX" honors go to station 9UQ, operated by 9EK-DNZ and 9BIK-DJD. Using 500 watts, on 38.8 and 20.7 meters, they have worked Australia, New Zealand, Hawaii, (Porto Rico, in daylight), NRRL, KFUH, NEDJ, NVE, and they have been heard in the Philippines. 9UQ was in the restricted class during the Midsummer short wave tests. 9CXX has been away most of the month touring the east and was present at the sailing of WNP and WAF. 9DJA and ex-9DMN are touring through the east. 9CGY reports his antenna still down and that the well known counterpoise has been stolen. 9AXD has been experimenting with a small indoor antenna and counterpoise. 9BCD has been getting traffic from tourist camps. (F.B. OMI!—F.M.) 9DAJ is rebuilding. 9DSI, is now on 40 and 80 meters. 9CS buried



out his tubes. 9CS was favored with a visit from our friend "Matty," ex-9ZN.

**ATTENTION: O.R.S. AMATEURS!** The new D.S. of District No. 1 is 9DMS. Please send your reports hereafter to G. A. Anderson, 24 Charles St., Council Bluffs.

Traffic: 9UQ, 27; 9DOA, 9; 9CXX, 9; 9BCD, 7; 9CS, 1.

9CZC is arranging a schedule with 9BEW and 9DL. 9DMS is working on 40 meters. 9BEW has a 40 meter transmitter. 9AED is trying to get a 5 point system going and expects to have it complete by fall. 9CTD is the only station in operation at Boone.

Traffic: 9DMS, 4; 9CTD, 2; 9BKV, 3; 9AED, 16; 9CZC, 2.

**KANSAS**—Because of the failure of the D.S. of District No. 1, 9CFI, to report and the resignation of the D.S. of Dist. No. 2, 9BIO, there was very little activity reported for Kansas. 9BRD and 9CPY took a low wave receiver out in the country in a Ford during the summer tests. 9BXG, as usual, piled up a good traffic total. 9AFP built a new short wave receiver and, along with the gang in Wichita, is getting down on the low waves for winter. 9CCS made a few changes and additions to his low wave equipment. He received several "Aussie" cards.

(We will now look for a house cleaning in Kansas—D.M.)

Traffic: 9BXG, 60; 9BRD, 4; 9CCS, 5.

**MISSOURI**—Many stations are active again after being absent for a time. Newcomers are noted, and there are a good number of individual reports. "Han" visits are popular in this section and are helping to revive interest and improve communication where it has been unsatisfactory, due to lack of schedules and the necessary co-operation.

9ZK reported in the absence of 9DXN, who is touring the Northwest with 9BEQ. 9DMJ is on "40" with an indoor aerial. 9AOT uses his regular aerial on the 3rd harmonic for 40 meter work. 9ZK has a 77 and a 39 meter transmitter. All U.S. inspection districts and Mexico were worked both day and night and many reports are coming in. 9BEQ was on often until he left the city with 9DXN. 9CHEX and 9ELY operate at times on 170 meters. 9ACI will be back shortly. 9IH pounds the keys at times to keep on the active list. 9PW is absent on the U.S.N.R.F. summer cruise. 9CW operates at 9ZK until he goes back to school Sept. first. 9DUW got his old call back. 9DZY has been captured by a "YL." 9DLB had trouble with his "MG." 9ZK had a good time at Kansas City.

9DUD has the old 20 watt set from 9SJ. 9BOC uses a "river." 9BYN, 9AYE, 9CUC, 9BWX, 9DBX and 9ASM are all new stations. 9CIG is on 40 meters. 9LJ is on 150 meters. 9BL burned out his plate transformer. 9ANO lost his aerial. 9CUC worked 650 miles with a 201A and 100 volts on the plate. 9CHE has a "50." 9BWX, 9DRW, 9DBX and 9ASM are inactive at this time. 9BVK is out of town. 9OI and 9BB are on 40 meters. 9DAD is working at St. Louis. The Carthage C.M. was much disappointed that a trip to 9DAE by 9AOB, 9DJI, 9CUA and ex-9EKP had to be called off. 9EAO had trouble with his set. 9DIX gets out well. 9CUA handled some good msg. 9DNT was busy this month. 9CYK hears NRRL often. 9BRU is back on the air. 9AOB reports his shack very hot.

9BSH and 9DWK are experimenting. 9BDS reports that business "QRM" is bad.

9TJ, 9FF and 9BND handled all the messages in this district. 9FF was heard in Worcester, England. He worked 22YI and 24AL. 9TJ works on 40 meters with one "river." 9FM, 9RR, 9DNJ, 9ADR, 9ELT, 9AYL, 9ZB, 9BKO, 9ACX, 9BVN and 9RR defied J. Pluvius and made a trip to 9DAE. 9ZD is putting the W.E. "250" on "40."

Traffic: 9AYK, 4; 9FF, 16; 9TJ, 33; 9BND, 23; 9BHI, 22; 9BRU, 2; 9AZL, 6; 9CYK, 2; 9CUA, 9; 9DIX, 2; 9AYE, 22; 9LJ, 25; 9DLH, 93; 9AOB, 7; 9DMJ, 2; 9ZK, 27.

**MISSOURI**—District No. 1 to District No. 4.

Dist. No. 1: St. Louis county and City.  
D.S. W. W. Schoening, 5010 Gravois Ave., St. Louis, Mo.

Dist. No. 2: Adair, Andrew, Atchison, Audrain, Barry, Barton, Bates, Benton, Boone, Buchanan, Caldwell, Calaway, Camden, Carroll, Cass, Cedar, Charleston, Christian, Clark, Clay, Clinton, Cole, Cooper, Dade, Dallas, Daviess, DeKalb, Douglas, Gentry, Greene, Grundy, Harrison, Henry, Hickory, Holt, Howard, Howell, Jasper, Johnson, Knox, Laclede, Lafayette, Lawrence, Lewis, Lincoln, Linn, Livingston, Macon, Marion, McDonald,

Mercer, Miller, Moniteau, Monroe, Montgomery, Morgan, Newton, Nodaway, Ozark, Pettis, Pike, Platte, Polk, Pulaski, Putnam, Ralls, Randolph, Ray, Saline, Schuyler, Scotland, St. Charles, St. Clair, Stone, Sullivan, Taney, Texas, Vernon, Warren, Webster, Worth, and Wright counties.

D.S. J. W. Stone, R.F.D. No. 1, Warrensburg, Mo.  
Dist. No. 3: Bollinger, Butler, Cape Girardeau, Carter, Crawford, Dent, Dunklin, Franklin, Gasconade, Iron, Jefferson, Madison, Maries, Mississippi, New Madrid, Oregon, Osage, Pemiscot, Perry, Phelps, Reynolds, Ripley, Scott, Shannon, St. Francois, Ste. Genevieve, Stoddard, and Washington counties.

D.S. A. B. Jordan, 1014 Good Hope St., Cape Girardeau, Mo.  
Dist. No. 4: Jackson county and Kansas City.  
D.S. E. B. MacDowell, 3145 Karnes Blvd., Kansas City, Mo.

## NEW ENGLAND DIVISION I. Vermilya, Mgr.

**A. D. M. Cushing's** "Prize Test Message" work is just starting as we write this report. The first message did not make an enviable record for speed by radio though it got safely to its destination. Next month we hope to have information from the six messages that are being released in the Division each month for checking the speed of our service. Everyone is urged to start the traffic season right by making and keeping some regular schedules. The "five-point" system is explained in June and July QST and all the information about "Prize Test Messages" was contained in this column of August QST. No prizes will be given for all-mail messages. We know what service the mail system can give anyhow! Hi! We want to tabulate the speed and routes of the different messages so please forward your tracers promptly.

**MAINE**—The general trend is now towards 40 meters. 1EF was the only Maine station to connect with WNP and WAP, taking a 3-4 word msg from the latter. 1BNL was heard by 1-ER on 40 meters using a Blue Bird uv202. 1BTT will be on the air soon. 1ACO has just installed a new vertical antenna and counterpoise. 1AAV has decided that just at present 201A's are cheaper than 302's, which he always seem to blow. 1PD sent his report clear from Conn. (That's the spirit we like, OM, A. D. M.) 1BHR is at Old Orchard for summer. 1FT is busy supplying the wants of the R. C. L. S. 1KL says he has a tuner that satisfies him. When 1BKK dropped from 160 to 40 meters he had to lower the natural period of his antenna system. He almost wept when he cut down his big antenna. 1EF is experimenting with antennas trying to find one to suit him. The YL's have gotten 1HB at last. 1BUB is high traffic man this month.

Traffic: 1KX, 1; AXQ, 2; 1BDH, 4; 1BNL, 6; 1BUB, 48; 1EF, 16; 1-1J, 2; 1KL, 7; 1CJR, 8.

**VERMONT**—1BIQ has shipped for Africa—chances are he will squeeze in a little work with US amateurs on the way. 1BDX has gone North on power work. 1APU has been having hard luck with tubes but is going to try a 250 this time. 1CQM is in New York. The rest of the gang all seem to be on the air more or less of the time, and doing fine. 1BDX, the D.S., has been away for the summer.

A few are doing some more or less extensive experimenting on short waves in their spare time, getting ready for real work next winter.

Traffic: 1AJG, 19.

**EASTERN MASSACHUSETTS**—1ZW has been appointed District Superintendent of District No. 1, so please send your reports to him. He is on 40 meters and doing some fine "DX." 1RF has sent in his first report—keep it up, OM! 1RV wrote in to have his ORS cancelled as he was "QRM" and thought he would have no time to be on the air. When it came to the point of sending it back he found he couldn't give up his first "love". He is now on again using a "RTty" on 40 meters. 1SN is having his ORS cancelled as he doesn't have enough time to keep up his station. 1NV has deserted 30 meters and is on 40. 1BZQ, C. M. of Arlington and Cambridge reports traffic slow.

1BUO hasn't been on much as he is remodeling his station. His best "DX" this month was Porto Rico. 1BCN says New Bedford is pretty quiet. 1CPQ is trying 40 meters, but can't get his set to oscillate above 30 meters. 1AVY has been working on 40 meters. 1AVF will be on very soon. 1AXA is doing



some good "DX." He is only at home week-ends, as he works for the General Electric Company in Lynn. He received a message which started at NRRL, came through 9ZT, 8UK, IAFI and landed at IAXA on June 22, having been started June 20. That certainly was FBI—ADM. IALL and LAQY are having their ORS certificates cancelled. ICJR is spending the summer in Maine, but has a set with him. IEW is in Cohasset. He has dismantled his set and is building it in much the same style as WNP's. ICH is on 40 meters, he is working all districts and logging Z's and A's. IAIR is D. S. of Nantucket and Martha's Vineyard. He is hoping that there will be some new stations down there this fall.

Stations not reporting for three months will lose their appointment certificates. There are several stations who have applied for ORS appointments who are not reported. Do you want that certificate or not?

**WESTERN MASSACHUSETTS**—Three new stations in North Adams are I-AMZ, I-BFE and IALQ. I-ARH and I-AAE are being heard regularly, the latter being located at 31 Boylston Street, Pittsfield, Mass. I-ARE worked Italian I-ER during the past month. Good work OMI I-CLN, I-VC and I-ARE are all handling lots of traffic and doing fine "DX."

The A. D. M. wishes to thank IWL and IAKZ. IADU, IAJK and IBOM for their good work in handling Defense Day National Guard reports which was mentioned in August QST.

IBX has been appointed an ORS. IAWW had a very serious short in his high voltage circuit, burning up several fingers of his remote control. He is now using high tension cable instead of No. 18 bell wire for 1700 volts. Hill IPY has laid to rest one 14 months old 50-watter and is now on a 5-watter. IJU is having trouble with tubes on 75-80 meters. IAPL is doing fine work with Spark Coil CV, and is covering a range of 300 miles daylight consistently. IBSJ has not had much time for work on his own set, as he is busy working on the S. R. A. set. IBVR, our Westfield standby, is now home from school. He reports traffic somewhat scarce, but is heard operating consistently. IAPF worked WAP during the month, taking a long message for the National Geographic Society, which he forwarded promptly. (Fine work.) Both WNP and WAP are heard nightly by many stations in this district.

IBIZ-SZ has been QSO French 8-FQ three nights in succession, as well as BER and Porto Rico in the afternoon. IBC and IICI are touring California by auto. IAKL took a trip through the Yellowstone Park, California, etc. also. Looks as if the Sixth District is busy these days entertaining "Hams" from Northampton.

IBC-IBOM reports that I-BC on the top of Mount Shelburne is now working fine, and that he has a new copper tube aerial 80 feet high, and a new set like WNP. IAOF a new station in Greenfield, has some 250 watt tubes on order, and will be on this fall. ICCP is on 80 meters but reports that he is going to 20 meters soon.

I AAL has moved to a new location. He recently worked with NITC, some ship at sea who gave him traffic for Boston. IBBP of Leonminster has moved to Waltham. The "gang" hopes to work him from there in the near future. IAGM and IBIP have a bad attack of "Feminitis". ICPN has been away during August. IAFY is heard on the air frequently, and Gardener is on the map. IAKZ another Gardener station, is one of the most consistent in the district. He is usually on every noon and many evenings. Dr. Watkins is spending the summer at Block Island.

The Assistant Division Manager of Western Massachusetts is arranging to make the "Prizes" in connection with the "Prize Test Messages" worth while, and anyone wishing to donate to this good cause, please write him. REMEMBER no prize will be given unless the tracer is completed and returned, and the time made by the message is reasonably fast. So get set, make a few schedules, keep them, and see if you cannot be a prize winner.

Traffic: IEC, 5; IAEH, 8; INT, 0; IADM, 0; IACJ, 11; IJUW, 15; ISE, 7; IRR, 18; IBCN, 5; ICPG, 18; IAVY, 0; IAVE, 0; IBUO, 4; ICH, 8; IRF, 14; IEW, 24; IBBG, 0; IAXA, 20; IAJR, 12; IAO, 86; IBZG, 68; IZW, 17; INY, 37; IKY, 23; IARE, 35; IBVR, 1; IBIZ, ISZ, 19; ICPN, 5; IAKZ, 11; IASU, 7; IDB, 2; I AAL, 8; IPY, 14; IAWW, 20; IBLU, 6; IAPL, 10; IAMZ, 1.

**RHODE ISLAND**—IBIE has acquired a 50 watter and as he made an unearthly racket with a five he sure ought to rip the air open with this one. IAWV has lost his last five watter. IBHI rebuilt

his station for the short-wave midsummer tests. I AID has a new antenna and she is getting out much better now. IHI is still at his summer place and is working the anazac regularly. I AWE is also at his summer shack and working on 40 meters. IBCC is doing excellent work as usual. IABP is on 40 meters and getting out good.

I AAP has dismantled the 80 meter set and has built one that works perfectly on 40 meters. A new 15 to 150 receiver has also been constructed and works beautifully. IBVB is now on 40, using a Hertz antenna as per July QST.

Matthewson reports things at a stand-still again. IAOA has gone to New Jersey for the summer. He will be with us again next winter. He had four reports from New Zealand prior to his departure. IBQD is still silent due to his working for the Navy. Traffic: IAWV, 2; IBIE, 3; I AID, 18; IHI, 86; IBCC, 19; I AWE, 2; IBIE, 12; I AAP, 15; IBVB, 4.

**CONNECTICUT**—We regret that our A. D. M. IMY has been obliged to resign because of business. However, his station will continue to operate as usual. The new incumbent, IBM, former District Supt. of Bridgeport, Conn. earnestly requests the same co-operation as given Mr. Comstock in the past, and trusts he will be able to serve the cause as faithfully as "Don" has.

IBHM is operating exclusively on 40 meters and has worked Italy three times during the past month. IQV gets better results with one "five" than with two and is operating on schedule with 8DFN. I AOS is home from college and is attempting to burn up the ether with a fifty-watter on 40 and 75 meters. IMY is high traffic man. IARY is in Maine but sent in a report just the same. IADW, a new station in Danbury, opens a new section formerly dead to relay work and should prove to be of real value. IZL is a counselor at Camp Andover, Mass. for the summer and his station is silent. IIV says the 40 meter band is the "berries" but freaky. IXF-ZT is experimenting with picture transmission. IADP has been ill for some time and has not been able to operate but is getting around again OK. IBM expects to be on soon with a fifty watter. IBGC is on 20 and 40 meters and trying out a Hertz antenna. ICTI our banker friend, has moved and will be on soon. IAXN, City Manager, Stamford, sent in a fine report. IBLF is owned by two brothers who "knead dough" for a living and also for radio. IAPC is looking for traffic. IGC has just put up a new mast and is getting out fairly well.

Traffic: I AOS, 10; IBHM, 2; IMY, 140; IBGC, 7; IQV, 62; IAXN, 6; IIV, 6; IBLF, 5; IADW, 3; IGC, 9; IAPC, 9; IKV, 8; I AQN, 36.

IBUY, working on 40 meters, recently worked seven Inspection Districts, including 30 states, which is very FB. IBUY has been doing some experimental work with a portable set. SAEY is on the air regularly on 40 meters. SBFU is a new station and uses 40 meters. SCTE station is on 80 meters. SCGG acted as Traffic Manager for the U.S. Signal Corps in connection with the Defense-Day Tests. SFB is spending a great amount of time working on apparatus for 5 meter work. SBRB has just returned from a Naval Reserve trip to Bermuda, where he visited BER and BOA. SCPE is a new O.R.S. SADS will be active soon. SATB will be operating very shortly on 40 meters with 8AUD and 8BYI as operators. 8BYI is inactive on account of reconstruction work. SDQ, another new O.R.S., reported on time. SDQ is to be on short waves and prefers traffic to "DX" and is always glad to QSR. SCON will be on 20, 40 and 80 meters. SXAD is a new O.R.S. SDOF will be active soon. SDKI has been on the air consistently all summer. He would like to get traffic from Canada and New York State for the south. Evidently from the looks of reports, SBRG, Supt. of the 12th Penn. Dist., is taking care of the 13th, which has not been represented for some months. SBUN has been looking for a new location where he can set up his 100 watt fone and 200 watt CW set. SARM has been recently appointed O.R.S. at Grove City. SAAT has moved from Hadley to Elmo, Pa., and is at present working his receiving set. SBRG is handling some traffic on 40 meters but main wave is 178 at present.

8CXG is on low waves using five watts. SBGB and 8BDJ, who are new, are on 180 meters at present. 8CXG, 8XC and 8CQL just came back from a two weeks' camping trip, where they used portable transmitter with the call 8QJ. The portable set used two 201 A tubes with spark coil plate supply. 8XC promises to help out with traffic this fall. He has added another operator, 8CCJ, to his force. 8CWW is on the air and handled the Defense Day messages from

Erie. In the absence of Supt. Scott, 8BJV, of the 14th Penn. Dist., the report from that territory was handled by 8BBP. The D.S. is at present with the National Guard at Mt. Bretna. 8BVJ has installed a new vertical cage for 40 meter work. 8ABS has finally finished a receiving set for the 80 meter band and is now rigging up a 250 watt transmitter for 80 and 40 meters. 8BKY has been away for some time. 8BBP is working consistently on 40 meters. 8DCY has deserted the transmitter for the summer. 8CMQ burned out his five watt, due to a faulty kenotron. He will be back on the air soon.

The A.D.M. feels that this report shows a very great improvement over any of the past six months and also prophesies that another thirty days will work wonders, and when vacation periods are over and the weather conditions are more favorable, there will be many more stations on the air and active in promoting traffic activities throughout Western Penn.

Traffic: 8CLV, 25; 8JQ, 24; 8BIT, 9; 8BHJ, 5; 8AGO, 2; 8CPE, 15; 8DDQ, 4; 8DKL, 8; 8AXD, 5; 8BRC, 20; 8CQL, 10; 8CWQ, 3; 8BBP, 8; 8DNE, 53; 8GEO, 13; 8DOQ, 11; 8CES, 6; 8DPE, 6; 8CKM, 10.

#### NORTHWESTERN DIVISION Everett Kick, Mgr.

**T**HERE is no noted change in results of this month's activities, although we hope more life will come as the days grow shorter. Have you made schedules forming the 5 point system? If not, now is the time to show action. We need everyone's co-operation. The DM hopes to be with you soon, and promises to make up for all time lost this summer. Let's go.

WASHINGTON—40 meters seems to be knocking the static out of summer. Many of our stations using 40 meters declare that as far as radio is concerned there is no noticeable effect of so-called summer weather. All of which further convinces us that summer doesn't effect our sets nearly as much as our ambitions. A change is going on in district personnel and it is hoped better service will result. 7AO reports working N.R.R.L. on 40 meters with a Hertz antenna. 7WS has worked N.R.R.L. several times and has been heard in France. Married life seems to agree favorably with the Seattle C.M., as he sends in fine reports. He has a "fifty" regularly on all the popular waves. 7OY is active on 80 meters. 7BJ has been re-appointed D.S. 7GR is preparing to leave for the briny sea. Ditto 7VN. Several new hams have been licensed and we welcome them to our ranks. 7RY reports no activity on account of sickness in his family.

Traffic: 7OY, 33; 7AO, 32; 7AIB, 30; 7ZZ, 9; 7VN, 10; 7KU, 7; 7ABF, 5; 7AIM, 4; 7IJ, 4; 7BJ, 4; 7WS, 3; 7DC, 2.

OREGON—Things are about the same for the month with the old stand-bys on the air as much as usual. 7AJB takes honors for the Division for the largest message total, but did not send in his messages for recount as per July QST, page 52, and is not qualified for the Brass Pounders League. Sorry. He is a newly appointed O.R.S.

7PP works all kinds of DX. 7TQ is back home from a winter at College and is pounding brass again in great style. 7HH, 7LI and 7MF are heard occasionally on short waves. 7EC is working on 40 and 80 meters and is getting things perking for the coming winter months. 7SY and 7UN are again on the air after being off on account of school. 7URM. 7UJ is getting out in fine style, using storage battery plate supply. 7IT is going again in Portland and is using the harmonic system to get down to 80 meters. 7EO is applying for shorter waves on his ticket.

Traffic: 7SY, 2; 7KG, 2; 7PP, 2; 7MF, 15; 7AJB, 126.

IDAHO—7OB, the A.D.M., has gone to Canada for his vacation. Don't worry, he will come back. 7SI is home again from the sixth district, where she operated 6BTX and 6CRE. 7RQ was at Portland, where he met quite a few of the gang. 7VU is QRX until he gets his "fifty" going. 7ZN's "fifty" finally "went west" after a year and a half's service. Once more the B. L. was here and several new licensed hams is the result. 7MU promises to be active soon; he had to move his set because of QRM from a power-house close by. 7AHS and 7ACE are consolidating for more power and better work. 8BQA and 8BQB believe in "See America First." They have visited many sixes and sevens and confidently told one of the gang that they came 2000 miles out of their way to see the YL of 7SL.

Traffic: 7SI, 17; 7RQ, 16; 7YA, 11; 7ZN, 4.

MONTANA—PRIZE!! Each month, starting with September, the Montana A.D.M. will give a prize of a year's subscription (or renewal) to QST to the owner of the station in his jurisdiction who maintains the best operating decorum. The main points which will be considered are: Reports must be in the mail by the 12th of the month. At least one letter a month to the A.D.M., giving the following information: That you have followed the CQ rules; that you have forwarded all messages within 48 hours; what wavelength or wavelengths did you use; what changes did you make to your station, antenna or operating practice; what was your best DX. What station whom you worked or tried to work did not show the "Ham Spirit," and any news about other stations or new men who are about to join the gang. The idea is to pass the prize around among the Treasure State gang, but any one station which shows six months of continued good operating practice will be awarded another prize, to be announced later. (What do you suggest, fellows? Have a heart, your A.D.M. is just an ordinary Ham with the usual financial limitations, MIM!)

7XM leads again, he is Butte's new C.M. and is after your news OMs. 7NT came second. He has a new 20 and 40 meter transmitter with all short leads and remote-controlled keying relay. 7ACI of Hamilton has been pitching hay, chopping trees and shaking a wicked hoe. Understand he is all toughened up—came home one night and wrapped a message in 40 meters and landed in Chile—FB, OM, they tell us that Reinartz and McGee are listening for chaps like that. 7DD has also remodeled his set and has it perking FB on 41 meters. 7MP is leaving for Washington after having a set in Boseman for the last five years. Sure sorry to lose you OM, GB es GL. 7FL took a vacation. The set is perking to the tune of 40 meters now that he is back. 7GK is QRW mining, so no DX till September. 7GS is over in the Big Hole pitching hay all day. 7MB is home in Forsyth for the summer. 7EL is too busy with irrigation ditches to get much time for the famous spark coil set till school opens. 7HY says that it is impossible for him to be on the air for an indefinite time. Since 7HY is the first D.S., his office is suspended for the time being. All reports in this territory should be written direct to the A.D.M. 7AGF, HM is at Edmonton, and won't be back until school opens up. Mrs. 7AGF, his mother, is expected to be running the set soon. Welcome—I'm sure you will find the gang will be glad to RC with you. 7WP is off for a short time.

Traffic: 7MX, 55; 7NT, 36; 7ACI, 3; 7DD, 3; 7FL, 3.

ALASKA—The warm weather must have melted the ice off the sky pieces as they are now brought to action after a winter's hibernation. 7BW (7AFN of Tacoma) is at Dundas Bay some 90 miles west of Juneau with a receiver but no transmitter. FC, a station at Unalaska, comes in here at the States in fine shape. It is run by D. R. McCulloch of the Coast Guard who is on shore duty there. 7KN works the States often, but it is not known at present what he uses. 7RA, also unknown, but is believed at Cordova. 7DE is working but no news. Persons in Alaska, or those knowing of any activities going on there, are requested to please write the Division Manager with a little news, so as to continue to have Alaska represented.

#### PACIFIC DIVISION

M. E. McCreery, Mgr. Southern Section

**T**HE writer wishes to thank all his loyal supporters for their backing and to wish Mr. Dann and Mr. Cautin success in their greater responsibilities as Section Managers. Plans to attend college have made 6PL "Don" Brockway, give up his A.R.R.L. work for a while. Southern California loses a good man. Elmer Burgman, 6CTO, of Hollywood, is the new A.S.M. Hot weather is slowing up general traffic work, but a few stations operate consistently, handling traffic and letting the world hear a "six" now and then. Most everyone can work on 20 meters, but practically everyone does operate on 40 meters, which is a good wavelength to use despite the summer weather.

Vigilance committees are working overtime, but the B.C.L.'s are little interested despite the appeals in newspapers and radio journals. Perhaps consistent advertising will bring results in the future, and with this in view, standing notices are posted in many of our newspapers. If your town needs a Vigilance Committee, don't be bashful about letting the A.D.M. know about it.

Dist. No. 1: Amateurs in San Diego have a hard time getting in touch with Los Angeles. They want schedules with reliable Los Angeles stations, and they are writing to arrange some schedules soon. Most of the "ops" are on vacations or rebuilding to make a real relay station. 6ZH and 6AIV did good emergency relay work during the Santa Barbara earthquake handling traffic for the U. S. Marine Corps. 6AHQ and 6CNK are working several foreign stations regularly. 6CHS leads in traffic handling again. 6OP, 6ALK and 6BIK expect to be on with a "woolop" soon. 6HU works everything in sight and handles traffic. 6CHX is putting up a new 40 meter aerial. 7BAS continues to do good work.

Dist. No. 2: 6BUR is now D.S. He is thoroughly experienced in A.R.R.L. affairs and will keep District 2 on the map if everybody will co-operate. 6CHZ is new City Manager for Whittier; show him you are alive, gang. 6UA and 6RUW have been out of the city. 6CQA is a new O.R.S., starting out in fine shape. 6CIX has a schedule with Hawaii; give him plenty of traffic, fellows. 6BUR keeps his ears peeled for messages. FBI 6CSS will be troubled with no more power leaks when the power company finishes its work. Most of the Los Angeles gang are away for the summer, but traffic moves quickly. 6BJX went to "Frisco" and visited a few amateurs there. 6BBV has a husky 250 watt, but 6OF's big "jug" has been dark for some time. 6CSW can always be relied on. 6BQR has moved to Hollywood. 6AFG handles traffic and no messages hit the dust at his station. 6CTO works on 20 and 40 meters. 6LJ has a wicked punch on 40 meters. There is no summer slump in this district. 6US leaves for two months in the east. 6NE has moved to Long Beach permanently. 6AJI bought a Ford. 6L2LD was worked in daylight on a 40 meter wavelength. 6BKX has a schedule with NRRL. 6CIA felt that he could not handle the work of an O.R.S., so handed in his appointment certificate. We're sorry for your lack of time, OM. 6CDY has had the scarlet fever. 6AGK is working on 20 and 40 meters occasionally. 6TS has been moved to 6CNC's address. 6CGW works the Anzacs and South Americans whenever he feels like it. 6CAE, using an 80 meter wavelength, worked NITP in the Bering Sea. 6CGK is rebuilding his transmitter into a Master Oscillator rig.

Dist. No. 3: 6CDG is trying to put some life into his bunch. 6CAQ and 6ASV are heard occasionally. 6AKZ was "QSO" New Zealand. 6CMD is using a portable set at a mountain camp. 6CMD took a two weeks' Naval Reserve cruise. Few messages pass through the stations in the Fresno district; let's make some reliable schedules, fellows.

Traffic: 6CGW, 30; 6CAE, 5; 6CGK, 2; 6AGK, 7; 6CDY, 14; 6US, 30; 6AJI, 30; 6BJX, 180; 6RF, 1; 6BQR, 2; 6CSW, 34; 6BBV, 14; 6CTO, 52; 6IH, 2; 6AFG, 75; 6CIX, 3; 6AHP, 13; 6CHZ, 13; 6CQA, 33; 6BUR, 58; 6OP, 1; 6CHS, 129; 6CNK, 14; 6HU, 30; 6ZH, 7.

P. W. Dann, Mgr. Northern Section

Dist. No. 4: 6NX wrestled lead from 6CLP. He has the high message total this month. Most all his messages were to and from the yacht Idolia. KFVT and KFVM were both worked one night. 6AOI worked NFM and took a "TR." 6CJF has built a new receiver. 6MP tried several antennas. 6CLP was the most consistent station, handling many messages with one "fiver." 6HC got out well on 40 and 20 meters. 6BMW has a Jenkins' Photo Machine. He would like to hear from other stations for schedules. He gets out well to Australia and N.Z. 6UW moved to Knowles. 6COL, the portable station of 6CKV, is located right on the coast line. WAP, NRRL, Australia and N.Z. were all heard. 6AMM heard stations in N.Z. and Australia five. 6AJZ is waiting for a replacement of his poor tube. 6ALW is installing a new 1500 volt "MG." 6CEI has a new 40 meter transmitter, 6BON-6GY, 6CKV, 6HC and 6BDT all cooperated with 6NX and ran the set in shifts during the San Francisco to Tahiti yacht race.

With WAP already logged by 6CKV it seems that the West Coast stations will get their share of the business of the MacMillan Arctic Expedition.

Dist. No. 5: 6FL has gone south for a few weeks' vacation. 6JP worked N.Z., Australia and the Philippines. 6WS reports things good. 6RW says "business is as usual." 6CLV operates on a DOLLARE ROUND THE WORLD liner. He listens for the "gang" in his spare time. 6CHU is on the verge of the FIFTH AGE of radio amateur. Hi! 6AWT is on the air little but keeps a schedule with KFUE. He is following 6CHL's footsteps now.

There is no reason for this slow activity with traffic and "DX," as it is on 20 and 40 meters. 6CEG and 6CLZ were active this month. Others reported but were not on the air. Traffic is easily moved in all directions. When you get schedules it will be your own fault if you can't "QSR." 6AJF is now in Alameda. Good luck, OM! 6BFU had a dandy antenna but the rope broke. He is building a real "HE" station. 6CEG is going strong. He is now the most consistent station we have in Berkeley. 6BQB has moved down from the hot place. He is an O.W.I.S. 6CKC is going east soon. 6CLZ heard YDGB in Ceylon, India.

Dist. No. 6: 6EW is doing good work on low power. He worked 1700 miles with 2 1/4 watts input. His station is equipped with emergency plate and filament supply. 6BCU expects to be on soon with 50 watts and a motor generator outfit. 6CON is another new station. 6ANW is rebuilding his station. 6CTX has a new antenna system. He is expected to be on 40 meters. 6AKU and ex-8CWJ and 1BGK will set up a low wave station in Vallejo.

In the opinion of the Oakland C.M.'s, No. 6 Dist. is the best on the coast. The East Bay has grown from 9 to 119 members in one year. It boasts the best Vigilance Committees and the liveliest League members in the country. 6CCT handled a bunch of messages but didn't turn 'em in for checking. 6NH has a "fiver" going on 40 meters. 6CMG has been adjusting his transmitter. 6UR-XBX is rebuilding. He will be able to work on any one of the three wavelengths.

Traffic: 6AWT, 60; 6CLV, 41; 6CLZ, 15; 6ANW, 5; 6CTX, 6; 6NX, 40; 6AOI, 12; 6CJP, 3; 6MP, 10; 6CLP, 21; 6BMW, 16; 6CKV, 4; 6AMM, 13; 6ALW, 2; 6CLZ, 15; 6AUH, 3.

NEVADA—6UO handled a good bit of traffic received from tourists stopping at his service station. He has a new precision wavemeter for short wave work. 6ATN has been installing a 40 meter portable transmitter in a mine. A spark coil is used to supply a high plate voltage. 6AJP is saving the pennies to get a "big bottle." 6APR is relief operator at 6ZO, who is putting in three large tube transmitters for the air service.

Traffic: 6UO, 11; 6ATN, 2.

K. A. Cantin, Mgr. Hawaiian Section

HAWAII—Summer QRN failed to put a damper on 40 meter work this year. Stations here made a fair showing considering the poor operating conditions. 6AIF is on the air again with a "sink rectified" transmitter. 6ASR has no difficulty in working the mainland and will take traffic to and from the Islands. 6CST with his "fiver" does the work of a 50 watt station. He handled the bulk of traffic this month. 6ALS has contact with the Coast once in about three months. He has increased power to a hundred watts hoping to do better work.

The Radio Club of Hawaii, 6BUC, after using a 50 and a 100 watt set, have installed a 500 watt. They got on the air on 40 meters about July 15. Mainland amateurs are requested to try to work 6BUC. Traffic schedules are desired by 6BUC with Mainland stations. Arrangements can be made with Mr. S. O. Halls, Secretary, Box 2450, Honolulu, T. H.

FX1, the U.S. Army Experimental Station at Fort Shafter, Honolulu, Hawaii, uses one 250 watt and a forty meter wavelength. No local amateur station has worked NRRL since leaving Hawaii.

Traffic: 6ALS, 1; 6CST, 2.

ROANOKE DIVISION

W. T. Gravely, Mgr.

MR. MCALEB of Station WJS paid the DM a visit giving us some dope on a new receiving and transmitting circuit which he claims will work. He also brought along pictures taken on the expedition and some photographs of the portable sets with the expedition. We enjoyed the visit from Mr. McCaleb immensely.

NORTH CAROLINA—Due to failure to report on the part of some of the O.R.S.'s, a warning is hereby issued. Any ORS who fails to report for two consecutive months, will have his ORS certificate cancelled. If you are unable to be on during the summer, send in a report to that effect. Inactivity is no excuse for not reporting. Report anyhow, OM, we are always glad to hear from the fellows—D. M.

Let's show that Florida gang that they can't beat us when it comes to orderly operating.

From the reports sent in it looks as though the "gang" in Dist. No. 1 really means business. Several new stations are under construction and a number of the old "Spark hounds" have quit "groaning" and taken up the short wave CW. 4OG, a real live wire, has been appointed City Manager for Winston-Salem. All local stations are urged to report to him each month. 4LO is on 80 meters with a fifty-watt. 4AF is on 20 and 40 meters and doing fine work. He was "QSO" and WNP. He also worked the YL at 7SL. 4OG still leads the district in traffic handling. 4RF is back on 80 and 40 meters and is being assisted by 4TW who is spending the summer at High Point. 4DJ built a new 90 "footer" and lost both the tower and his disposition in a wind storm. 4SE also has a new tower and hopes for the future. 4EN is working a new 100 watt—truly the dead have come to life! 4AA is on at times.

Traffic: 4OB, 23. 4LO, 2.

The summer slump has departed as far as this bunch is concerned, and they are showing what can be done in the way of summer work. They are now all "QRming" on 40 meters, although some of them have had a hard time getting down. 4RY is rebuilding his tuner at present, he has been reported in Sweden. 4NJ is getting out better than ever now on 40 meters. 4GW is having trouble getting his big set to perk on 40 meters. 4UM has had trouble raising anyone on 40 meters. 4TS is at Camp Glenn with the National Guard. He is operating SC-1 while in camp. 4MI has been experimenting with antennas on 40 meters. He is using a Hertz now and likes it fine.

Traffic: 4RY, 28; 4NJ, 3; 4MI, 31; 4UM, 10.

Activity has been rather lax in this district as there have been no active stations except 4JR. 4JS is rebuilding his set and the shack is undergoing repairs. He has been doing some fine receiving, namely, 2ME, NRRL, IER, WAP, etc. 4BX is at his new location and will be on the air soon. 4KK, formerly of Jacksonville, Fla., is now in Charlotte and will be on the air. 4JR, badly handicapped by power leak, managed to work a little through the "QRm." 4AAI at Troy reports that he is greatly in favor of a Roanoke get-together meeting this summer, in this summer.

Traffic: 4JK, 23.

A new D. S. will be appointed soon to take 4BX's place, and all stations are requested to please give their co-operation to the new man. 4RW has been off the air on account of moving. (He is the last ORS in this district to desert the 150-200 meter wavelength band for the 40 meter band—A.D.M.). 4NT-MA hasn't been on much due to the extreme heat. 4UN has been having trouble with a power leak which he finally located in the mercury arc tubes at the city power plant. He has remodeled his set and will be on when he can get the power leak fixed.

Traffic: 4NT-4MA-22.

WEST VIRGINIA: 8BTD was on the air for the first time this summer and handled many messages. 8ASE-8AXG is not active as he has been. Ex-8DFM is in Salt Lake City, Utah working with Western Union Engineering crew and visiting sixes during spare time.

8BSU is working on trolley DC and getting out good. He blew a tube and is now working with an input of 25 watts.

8BSK, on 80 meters is getting out FB. SAUL is getting out better than any of the stations in the Wheeling district. He has been heard in France, Spain, England, N. Z., and Australia and worked CB-8 in South America. 8CVD works Porto Rico often and is "QSO" traffic there. His DX is done on 40 meters. 8DES is back from school and working on 80 meters. 8ZW is back from school and has left for Omaha, Neb. 8ARN will be located in Florida soon. F. C. Stroebel, old WX of old 8ZW, is with an electrical concern in San Antonio, Texas. He is the "bird" who installed and operated SPC for the Westinghouse at Rio de Janeiro, Brazil. On account of hot weather 8BLL has been working spasmodically recently. 8BJG is at Camp Know, Ky., as is most of the Charleston gang. 8AIP is experimenting with RF chokes for the Experimenters' Section and has at last achieved his ambition, a good note. 8ATP is taking flying lessons. 8DSN has put a new roof on his shack since the fire and is now on 40 meters. 8CQH, 8ATC, 8AYP, and 8AMD attended the A.R.R.L. convention at Indianapolis and visited several stations while going to and from the convention. 8AMD won second prize in the Radio Nuts' Contest and also two other prizes. He says it was all luck, but the prizes more than paid his way. 8CHQ has a new 81 foot tower and a 250

watt "jug". His apparatus is mounted on plate throughout. 8DOI works everyone he hears which is going some. 8AYP is very active. Ex-8DKB is moving to Detroit. 8BBM is on 80 meters.

Traffic: 8BBM, 4; 8AYP, 92; 8DOI, 13; 8BLL, 6; 8CVD, 23; SAUL, 11; 8BSU, 9; 8BTD, 86.

VIRGINIA—Here we are, the tail-enders. Just exactly what 4JR says to his "gang" about not reporting also applies to ORS in this State and we are going to make a clean sweep and get rid of the drones. Let's get a good report in and stop this lagging. We can never accomplish anything by pulling backward,—let's strive to put the Old Dominion on the map and keep her there. Let's go!

3CJU is working and has no time for radio. 3MK has a 40 meter tuner going. 3CKA, working on 40 meters is changing to one wire aerial at this writing. 3SB is working on 40 and 80 meters. 3AHL is at camp. 3CKK has gone into insurance business and will be off the air indefinitely. 3TI has put up a one-wire aerial.

3BMN finds a little time to punch the key between tennis and the swimming hole, and can be found on 40 meters. 3ATB is in Asheville, N. C. this summer. 3HM is a new ORS on 80 meters.

Traffic: 3BMN, 3; 3HM, 4.

3BFE has gone to sea but promises to be back in the fall. 3BGS close on account of no power. 3AAI a new ORS. 3IW has applied for an ORS appointment.

3RHS has sold his transmitter and quit the game. 3BDZ will soon be on the air. 3CKL was logged by a station 350 miles Northeast of Calcutta, India. Not so bad for a couple of five watters. 3BZ is tinkering with Hertz antenna and likes it fine. 3CA got the four coil Meissner to work on 40 and 20 meters.

## ROCKY MOUNTAIN DIVISION N. K. Hood, Mgr.

COLORADO—Most of the stations in this State take their operating month from the first of the month to the first of the next, and so few of them reported according to the new style. Hence the reports will all go in as per the past, and the new system will go into effect next month.

DENVER—8DED comes to the front this time for the number of messages handled. He is doing his part in originating messages, too. FB, 9CJY, the city manager, has left on a trip to Chicago and hopes to be able to stay for the Convention. 9EEA is going to the Convention, and is all ready to work DX as soon as he gets the old Master Oscillator to oscillate. 9CDW got tired of "no traffic" towards the end of the month and made two appear from the neighbors. 9WO put in a "fifty" but says it doesn't work any better than the old "fiver" did. 9QL says S tubes are fine. 9EAM has had trouble but finally found the trouble in a poorly insulated lead-in. 9DQG has been sick. 9CAW will be on the air soon. 9AMB got back from the coast and is just getting going again. 9EFY is off the air as a result, as AMB wrecked his high voltage supply when he called for his stuff. 9CAA gets in about an hour per night. He also plans on taking in the convention at Chicago. 9DUN is moving to Florida for a few months and may stay. Sure sorry to lose u OM. 9BXQ shows up at all club meetings, but doesn't seem to be on the air much. 9BUN is selling out, and his O.R.S. is therefore cancelled. 9BV is a new station on the air.

Traffic: 9DED, 108; 9QL, 5; 9WO, 35; 9DQG, 25; 9CDW, 2; 9EFY, 21; 9CAA, 35; 9EAM, 4.

9AOI hasn't been on much on account of numerous fishing trips, etc. 9DVL is a new O.R.S. and promises to be a good station.

Traffic: 9AOI, 4; 9DVL, 34.

9CLD, 9CHT and 9DFH are on their vacations. 9CDE was right on time with his report as usual. (Want to congratulate you OM. Records show you have reported every time for the last two years. FB). 9EAE is working on photographs by radio and wants to get in touch with someone else that is interested. New O.R.S. in Colo. are 9OO, 9DVL.

Traffic: 9CDE, 8; 9EAE, 15.

UTAH—6FM has been visiting numerous amateur and broadcast stations in Los Angeles and San Francisco. He is busy rebuilding his station.

6BLH is rebuilding his station for operation on 20 and 40 meters. He expects to get started with traffic about September 1st. 6BTX is applying for an O.R.S. 6CRR has just buried a "fifty" and is temporarily using a "fiver." 6CRS has just installed

a 50 watt set on 40 meters and is doing good work with it. 6RM is working on 40 meters and handled considerable traffic in daylight. He reports doing most of his work at noon. 6ZT has a 40 meter set in operation now. New O.R.S. in Utah are 6CRS, 6CRS, 6TRV.

Traffic: 6BTX, 25; 6CRR, 14; 6CRS, 9; 6RM-6ZBS, 20.

### SOUTHEASTERN DIVISION

W. J. Graveley, Mgr.

**FLORIDA**—Our sympathy is extended to 4XE in the loss of his seven year old son. He has a new daughter, born this month. Lee will not be on so regularly now and his absence will be felt.

The Florida hams are flivvering around, visiting and getting acquainted with the fellows throughout the Division, and much good is coming of it.

Midsummer is causing no let-up in activities. 4XE worked a 2YI d TEC during July, and 4ASK, a new 500 watt station in St. Petersburg, worked WAP and WNP several times.

There is not much change in the lineup of the traffic handling stations. The old reliables are holding the fort, the most notable being 4FM, 4QY and 4CH of south Florida; 4TR, 4XE, 4TV and 4ASK of central Florida and 4DU, 4KK and 4EZ of North Florida.

Traffic: 4TR, 79; 4FM, 48; 4ASK, 31; 4XE, 35; 4TV, 12; 4PB, 12; 4EZ, 10; 4CH, 2.

**PORTO RICO**—Traffic is increasing with the United States. All of our stations are now on the 40-45 meter wavelength band and work the mainland each night. 4SA has worked Z2AC in broad daylight at noon, using a 20 meter wavelength. He has worked 7 "Aussies", 6 "Zedders" and dozens of Europeans. 4KT and 4RL have added Australia and New Zealand to their list of stations worked. 4UR is now doing transatlantic work on 40 meters. 4JE is in the United States and occasionally operates at 2BEE. 4OI is on the air and handles quite some traffic.

Traffic: 4SA, 32; 4KT, 15; 4RL, 28; 4UR, 12; 4BJ, 3; 4OI, 23.

**SOUTH CAROLINA**—Connecticut. Here's an answer to your request in the July QST. Every O. R. S. in South Carolina attends school. Radio permitting, we hope, to have an occupation other than this. Maybe some of us will be manufacturing .00000000003 meter sets for B. C. L.'s in 1960. 4SH led with a report from Egypt. Traffic handling honors were won by 4IT. 4HW is beginning to get out on 40. 4RR bought a 50 but it was found to be defective.

Traffic: 4SH, 20; 4RR, 18; 4IT, 48.

**ALABAMA**—District No. 1. 5AMH leads the district again. 5VV has had another operation which ruined his traffic work for the month. 5WS is on the air after an absence of 8 months. He is pounding brass on "40" with a "flfty" and he promises to get busy and win back his appointment that the DS cancelled for inactivity. 5AWF handled some traffic. He is one of the most active stations in this district. 5MI and 5ZAS have been busy shattering world records. 5MI, using a forty-meter wavelength worked N. Z. twice, NRRL, bz IAB thrice, 2AF once and cBD who gave him QRA as Ceylon, India before midnight one night! The call 5ZAS is used on 20 meters and reports on both 20 and 40 meters are appreciated and answered. 5ARI is the active station at Tuscaloosa. He works on both 20 and 40 meters. The Dist. Supt. gives notice to all ORS in Dist. 1 that unless there is more activity among some stations and unless reports are sent in, there will be a wholesale cancellation of ORS certificates.

District No. 2. 5QK has traffic position rebuilt for 40 meter work. The chief has a permanent position in New Orleans, second "op" 5DL will be in charge of station in the future. He expects to handle a bunch of traffic in the coming months.

5AOM handled several messages from WNP. He has communicated with several English stations. 5AOM is one of the best stations in this district and can be counted on doing good traffic work. 5AC is a consistent station on 40 meters. His signals are heard by FMH in San Salvador. An increase in activity was noted as soon as 5AOM worked WNP. All stations "QRV" for traffic and raring to go; let's continue the good work.

Dist. No. 3. 5ADA, the veteran brass pounder has placed a large placard in the front of his house begging for messages. (FB, TM) 5DI works 'em right and left. 5WI is the ham with the 100 foot tower whose mighty "siga." reach unto the ends of

the world. A card was received from 5ATP, post-marked Peru, Indiana. 5ASU is preparing for big work this fall. 5AJP is doing well. He changed to bigger quarters. 5NL finds some time to pound the brass. 5AIT is adjusting his transmitter.

This is warning to all ORS in Alabama that unless a station reports promptly each month his ORS will be cancelled for lack of interest.

Traffic: 5AC, 11; 5ADA, 20; 5AJP, 9; 5AMH, 20; 5AOM, 39; 5ARI, 7; 5DI, 25; 5VV, 6; 5WI, 21.

### WEST GULF DIVISION

Frank M. Corlett, Mgr.

**I** NSTRUCTIONS from the Traffic Manager are to not mention the stations that DO NOT report! If you reported the activities of you station, look for it below.

**NORTHERN TEXAS**—Interest is decidedly down on the 20 and 40 meter bands now; Schnell Tuners are being built by the dozen. Everyone reports them "FB."

5ATZ has completed a new tuner covering 5, 20, 40 and 80 meter bands. He has also overhauled the transmitter. 5SD advises any who wish to get ship jobs for next summer to put in their applications now. Hi! He went to Galveston and found a mere 108 signed up and waiting for openings—ahead of him—so he's back at Home Sweet Home on 40 meters. 5CV of Waco has left for Kentucky for a six weeks' trip. While in Kentucky he will go to the Convention at Chicago. 5AKZ has completed a general overhauling of equipment. 5ACL is still "QSO" Australia regularly. He maintains several schedules with the assistance of a "YL" asst OP.

Let's have more reports next time.  
Traffic: 5ACL, 6; 5AKZ, 7; 5CV, 3; 5ATZ, 15; 5ADD, 6; 5LI, 2.

**SOUTHERN TEXAS**—5ZF has gone to Sea and sends in his resignation as C.M. of Galveston. He expects to be back in the fall operating on 40 and 20 meters. 5OX worked Bermuda, N.Z., Australia, Argentina and Honolulu.

5ZU is off the air at present but will be back on with a 100 watt on 80 meters. 5ALR is back and was heard in South Africa. 5APM is rebuilding his transmitter.

5AEP is back at San Angelo with a 50 watt set on 80 meters. His addition opens an outlet for West Texas traffic. 5EW is now "OP" at KWWG.

Traffic: 5OX, 35; 5AEP, 31; 5EW, 43; 5HS, 1.

**OKLAHOMA CITY**—Dist No. 1. 5ATK is sporting a new receiver. 5AGN has been having a hard time making the big bottle "perk." 5KW went to New Orleans to get a job as "OP" but was too slow getting there. Hi! 5ATK, 5APG and 5AAV tried 20 meters but 5ABG is the only one with any luck. 5AAV finally made a three coil Meissner circuit work on 40 meters. 5ATV and 5AHR were "QSO" Z's and A's several times this month. The "gang" at Enid seem to be too busy making "home brew" to do very much. 5JU had a hard time getting through the "QRM" on "40." 5APZ is using a "river" on a 40 meter wavelength. 5PI worked all districts last winter with a 201-A, using 210 volts of "B" battery. There are nine amateurs in Cushing now. 5ADO worked with a "river." 5ADO and 5ASK made a trip through Texas and Louisiana.

Dist. No. 2. 5ATU is still trying to get his equipment working efficiently on short waves. 5GJ has given up meter work and will soon be going on a 40 meter wavelength. 5ED wants to arrange some schedules with seventh district stations.

Dist. No. 3. 5TW "did his stuff" and handled a lot of messages in half the month. He is now away on a vacation.

Dist. No. 4. 5AHD is an aviator for the summer. 5ABO has rebuilt the set and is moving. His cartoon of a "real ham" is a whiz.

A lot of the fellows are away on vacations, but those who are still with us are active. New stations continue to line up and traffic seems to be on the up-grade. A good motto might be taken from the good book: "It's more blessed to give than to receive." If everyone would practice that it wouldn't be long until the leaves would be multiplied many fold. Remember to report messages on the new Form 1 card. Send your report about the twentieth.

Traffic: 5ABO, 18; 5FL, 1; 5ADO, 4; 5ATK, 10; 5AGN, 2; 5AV, 5; 5ATV, 32; 5TW, 108; 5UJ, 5; 5APZ, 11; 5ED, 14; 5ANL, 6; 5APG, 25.

**NEW MEXICO**—5LGS-SC had some tube trouble but did mighty good relay work this month.

Traffic: 5LGS-SC, 43.

# CANADA

**T**HE summer slump has hit the Canadian Divisions like a tornado and at no time during the past year can the C. G. M. remember such inactivity. Everybody seems to be on holidays or busy playing golf, tennis or other outdoor sports. The last month the 120 meter wavelength has been conspicuously unsuccessful, static being very heavy and stations on the air few.

The Arctic, VDM, sailed for the north about the 1st of July but the bad luck which followed her caused a joint disaster of broken-down engines and burned-out radio dynamo before the ship had gone many miles down the St. Lawrence with the result that she was tied up for nearly a week just slightly below Quebec. At this writing no word has been heard from her as to whether repairs have been effected to the radio equipment but it is hoped that Foster will be able to get his gear on the air again to enable him to let us know somehow about the conditions up north.

## MARITIME DIVISION W. C. Borrett, Mgr.

**B**EFORE giving a report of the activities of the division for the month, the D.M. wishes to call to the attention of every member of the Maritime Division the fact that we want a report of the activities of all stations besides the O.R.S. The O.R.S. are hereby instructed that in reporting their traffic figures each month to carry out the new system and report number of messages originated at their station, number delivered and number relayed by radio. Traffic figures then have a meaning. Jim Palmer of 1AM, Fredrickton, New Brunswick, sent in the following report of his traffic handled for July which is an example of what is wanted. "Message report of 1AM for July, 1925."

Messages (Originated at this station .....	2
Messages Delivered .....	4
(1 local, 3 mailed).	
Messages Relayed .....	6
(Does not include Mgs rec'd and qrs).	
Messages—Total handled .....	12

Many of our stations are copying WAP and WNP these days on the 40 meter band, 1AR and 1AM being among the leaders in this work. 1DD, while having copied the MacMillan expedition many times, has only once been QSO with WAP since he has reached Greenland.

The second visit was the call into Halifax of the Auxiliary yacht "Speejacks," with Mr. Vanderpoel of 1UBEP as the "OP." Several of the boys worked WAYG when he was here and hope to work him again often.

Another yacht, the "Spray II," is cruising in Canadian waters, using the call letters "KFKW" on 120 meters.

**NEW BRUNSWICK**—1AM reports working mostly on the 40 meter band and has been QSO with G5DH. 1AK is rebuilding and has visited several of the Fredrickton gang this month. 1AI of Millerton reports lack of power as the reason for not being on regularly, but nevertheless takes a turn at the key whenever possible. 1AN has a regular schedule with u1AAO. 1AQ is the call of a new station opening up in Fredrickton. More the merrier! 1AD and 1AB have returned to the fold and are welcome additions to the NB gang. 1AF, as usual, is the most active NB station on the job.

**PRINCE EDWARD ISLAND**—Angus Mackie of 1CO spends most of his time on the 40 meter band and has worked WNP once on that band. 1BZ reports that he is now ready to pound brass.

**NOVA SCOTIA**—1AR has returned from his trip to the U.S.A. He is now winding a new transformer to increase input. (Hold your ears, gang!) 1ED has been putting out a fine signal and has been reported in North Ireland. 1EB has moved back to the 75-85 meter band after a month on the 40 meter band, and also has been heard across the pond. 1DN is working with a 201-A at present. 1DD was on the forty meter band every night for several hours.

**NEWFOUNDLAND**—8AW reports that he is making tests with St. Johns on low power and is only waiting the return to Newfoundland of Loyal Reid to do some real "DX work." (Go to it, boy—we are waiting for you. D.M.). Through the kindness of

Mr. Hiram Percy Maxim, the Halifax "gang" were shown "movies" of the trip of the delegates to the International Amateur Radio Union. All the boys express their thanks. They agree that Messrs. Maxim, Warner and Borrett are rivals of Douglass Fairbanks. HI! By the way—have you joined the I.A.R.U. yet? Traffic: 1DD, 10; 1AR, 4; 1AM, 12.

## QUEBEC DIVISION J. V. Argyle, Mgr.

**J**ULY has not been as active as we wished, this being due to the misfortune befalling VDM who has not been worked or heard since leaving Quebec.

2BV has a new antenna and has his 10-wattter going well on 82 meters.

2BE worked f8QQ. 2CI is now on the 40 meter band. 2AB of Levis, visited Montreal to obtain parts, etc., for his big set. 2CG was appointed a restricted period station for the 48 hour international tests on 21 and 40 meters, operators 2BV junior and 2FI assisting. 2AU is visiting our U. S. friends. 2JC gets out well on 80 meters. 2BG is heard occasionally. 2HV gets the stuff in the papers whenever anything is doing. 2AM has been heard on the air. Attendance on the 120 meter band for the "prayer meeting" has dwindled due to static. 2BT is rebuilding. 2GW and 2FI have been visiting the c3's. 2CG and 2DO are on the 150 meter band.

2FO got him a big bottle and was found by the Doctor under the table. He says 3,000 volts has more kick than 500.

2AX has been to Ontario. 2FB, is busy with the Y. L's.

Traffic: 2CI, 6; 2BE, 9; 2CG, 2; 2AU, 5.

## VANCOUVER DIVISION William J. Rowan, Mgr.

**T**HE whole division seems to be in a state of reconstruction, all stations rebuilding their sets for forty meter work.

The division held its convention in Vancouver on August 29th.

NRRL continues to pound in our ears and seems to be so "QRW" that we can't get a word in edgewise.

How many of you are members of the I. A. R. U.? Now then fellows do your stuff!

**VANCOUVER**—5AN is still undergoing treatment in the hospital and is progressing favorably. 5BA, his side kick, broadcasts "ham" news for him every night. 5HP has a bug key and he is getting on fine with it. 5GO is working for the Governor. 5GF reports that he heard very few signals the night before the "quake" in Calif. "DX" was "rotten" and "QRN" terrible. 5HB reports an upward trend in messages. 5DS and 5CU spent their holidays touring the 7th and 6th dists. 5AS is still pounding away on 75 meters yet and doing fine biz. 5AH has AT LAST got his set going. 5HG is talking about tearing up everything. 5BJ had a new arrival at his shack the other day, the "gang" are all disappointed with him, it was a "YL". (Congrats. OM!) A "ham" came on the air the other day, it was 5FK. 5EJ and 5BF have both been dropped from the O. R. S. list. Traffic: 5GF, 37; 5HB, 24; 5HP, 15; 5AF, 2; 5HS, 6.

**VANCOUVER ISLAND**—5CT says the static is terrible. 5HK is still struggling with a refractory "QSB" and can't do much. 5AY was off on a holiday but will be back again soon.

Traffic: 5CT, 5; 5HK, 2.

**BRITISH COLUMBIA**—Conditions continue to be the same as usual, namely that there is considerable traffic moving out of this DIST. but NONE moving in. Shoot some traffic this way, gang. 5GGT is the only station on the air and clears traffic with same regularity. 9BP is still inactive. The Vancouver gang are to be commended for their "fine" traffic handling.

Traffic: 5CT, 5; 5HK, 2; 5GT, 38; 5GF, 37; 5HB, 24; 5HP, 15; 5AF, 2; 5HS, 6.

**CALGARY**—The Calgary gang have just held their annual Association Meeting during the "Calgary Roundup." It was attended by practically every "ham" active or interested in Southern Alberta. A number of new members were initiated into the Association. 4AL, a new O. R. S. is welcomed.

Traffic: 4GT, 17; 4AX, 9; 4IO, 3.

**WINNIPEG DIVISION**  
W. R. Pottle, Mgr.

**T**HE "Official Carver" at Headquarters must have been a censor during the great war by the way he carved chunks out of some of our recent reports. (Sorry, GM's, but due to limited space this was necessary.—T.M.)

**WINNIPEG**—Things have been quite active here this month and most of the work was done on the 75-85 meter band. The Trans-Canadian Relay on Wednesday nights has again been a success and many new stations are logged in spite of considerable QRM. 4DY has been reaching out in fine style. While 4AW was quite surprised when he got a "Q. S. L." from Wisconsin, while using a pair of 20's. 4CE has been QSA every district as well as England and New Zealand. 4EA and 4FZ are amalgamating their shack which will sure make a Two-Man-sized station.—A.D.M.

**MOOSE JAW**—4BF is getting fine "DX" on 40 meters, having worked 800 miles in daylight with a "difer." 4ED is rebuilding for 20 and 40 meters. 4ER and 4AO have been away on a well-earned vacation.

Saskatoon, after a lay-off, is back on the air again stronger than ever. 4FN is on 40 meters doing good "Biz." 4BG is giving code lessons every Sunday

morning and by all accounts has a big bunch of new "hams" under way. (Good work, O.M.—D.M.) 4HL and 4BA, both new stations, have just opened up on 80 meters. Prince Albert, 4AV, is doing FB on 40 meters. 4FA has worked 1000 miles with a 301A. 4BO, a new station, has just opened up on low power. 4FH is still Y'ing. 4FC is rewinding his transformer for a 50 wattier.

4AJ is experimenting. 4EV was doing good work till his pole tried to stop a cyclone. A "Lizzie" ran into 4AQ's "stick" which has put him out of commission for awhile. 4AA and 4EZ have combined resources for short wave work.

Traffic: 4DY, 14; 4AW, 10; 4PV, 8.

**SASKATCHEWAN**—In the absence of 4AO, who was on his vacation, 4CB, D.E. for Saskatchewan, reports that activity is not very great. 4GH in Buchanan has a fine new mast and is rebuilding for the shorter. 4CE and 4EZ will be on in the fall. 4BV of Lorburn has returned from New York for a holiday and has his old set going strongly on the 20, 40 and 80 meter bands.

By the time this is in print, Mr. Joseph A. Watson will be on the air with a "difer." 4CB has returned from his vacation, during which he looked over the installation at 9ZL. 4ER continued to work nearly all the foreign countries with one 5-wattier. 4AJ has been appointed G.M. of Regina.

**TRAFFIC SUMMARY BY STATES**

**T**HIS month most of the reports came through on the new Form 1 reporting cards. We do not yet have a complete check of our message handling work, as some officers neglected to send the reports through on the new Form 2 blanks. Less than a thousand messages were originated in the whole country if we are to believe the reports that were received. Each A.D.M. is requested to send in the information that will make his section of the country completely represented. We are now at a low point in traffic handling and these figures will grow from month to month as more stations get on the air and originate traffic. If every Official Relay Station will do his part by originating and reporting one good message this month, we will have a better looking set of figures next time. We have been told that Official Relay Stations who cannot originate and report at least one message each month should have their appointments cancelled. Would such action be unjust? Next month we want to see just how closely the number of messages originated and the number delivered in the entire country checks. The comparison of Traffic reports by states follows:

ATLANTIC DIVISION					
State or Division	A. D. M.	Originated	Delivered	Relayed	Total
MA.	G. L. Deichmann, Jr.	28	87	19	297
Del.	H. H. Layton	—	—	—	—
D. of C.	A. B. Goodall	99	28	9	96
So. N.	J. H. W. Denstam	23	7	68	115
W. N.	Y. No. Report	—	—	—	—
E. Pa.	J. P. Rau	32	9	173	226
W. Va.	P. E. Wiggin	49	24	215	267
		206	135	484	911
CENTRAL DIVISION					
Ohio	C. E. Nichols	17	5	76	953
Ind.	D. J. Angus	—	—	—	276
Mich.	C. E. Darr	27	19	76	318
Ill.	G. W. Bergman	—	—	—	310
Ky.	J. C. Anderson	—	—	—	87
Wis.	No Report	—	—	—	—
		44	24	152	1744
DELTA DIVISION					
Delta	B. F. Paluter, Mgr.	—	—	—	334
HUDSON DIVISION					
N. Y. City	F. H. Marden	7	30	35	198
E. N. Y.	G. Kastenmayer	—	—	—	271
No. N. J.	A. G. Wester	18	10	244	267
		20	40	279	736
DAKOTA DIVISION					
So. Dak.	M. J. Jenkins	11	34	10	66
No. Dak.	M. G. Monson	—	—	—	—
Minn.	C. L. Barker	64	39	130	293
		75	123	140	359
MIDWEST DIVISION					
Iowa	C. M. Lewis	13	11	45	69
Miss.	D. E. Watts	—	—	—	27
Nebr.	L. B. Laibure	—	—	—	295
	H. A. Nielsen	—	—	—	23
		13	11	45	419

NEW ENGLAND DIVISION					
Conn.	C. E. Nichols	1	—	7	410
Maine	A. F. Wheeler	—	—	—	63
W. Mass.	T. F. Gaining	—	—	—	189
E. Mass.	Miss Gladys Hannah	47	36	242	345
Vermont	W. M. Hall	—	—	—	19
N. H.	No report	—	—	—	—
R. I.	D. B. Faucher	—	—	—	161
		48	36	249	1167

NORTHWESTERN DIVISION					
Wash.	L. C. Mayne	—	—	—	139
Oregon	F. H. Hoppe	—	—	—	155
Idaho	R. S. Norquest	—	—	—	48
Montana	A. E. Wilson	—	—	—	100
Alaska	G. Starley	—	—	—	—
		—	—	—	442

PACIFIC DIVISION					
So. Sec.	M. E. McCreery	—	—	—	364
No. Sec.	P. W. Eann	62	37	—	155
Nevada	M. E. Smart	—	—	—	13
Hawaiian	K. A. Cantin	—	—	—	9
		62	37	—	1032

ROANOKE DIVISION					
W. Va.	J. L. Beck	—	—	—	244
Virginia	J. F. Wolford	—	—	—	7
No. Car.	R. S. Morris	25	77	100	144
		25	77	100	395

ROCKY MOUNTAIN DIVISION					
Utah	A. Johnson	12	2	54	68
Colorado	C. R. Steadman	—	—	—	298
		12	2	54	366

SOUTHEASTERN DIVISION					
Florida	C. E. Clark	41	42	146	229
So. Car.	A. Dupre	—	—	—	86
Alabama	A. T. Trum	15	22	121	158
Porto Rico	Luís Resach	—	—	—	213
Georgia	No Report	—	—	—	—
		56	64	267	586

WEST GULF DIVISION					
No. Texas	W. B. Forrest, Jr.	—	—	—	59
So. Texas	E. A. Sahn	15	14	39	110
Oklahoma	K. W. Elbert	24	12	148	236
N. Mexico	—	3	1	42	50
		42	27	236	435

MARITIME DIVISION					
Maritime	W. C. Borrett, Mgr.	7	11	3	23

QUEBEC DIVISION					
Quebec	J. V. Arayie, Mgr.	—	—	—	22

WINNIPEG DIVISION					
Winnipeg	W. R. Pottle, Mgr.	—	—	—	32

VANCOUVER DIVISION					
Vancouver	W. J. Rowan	—	—	—	91
British Col.	—	50	—	—	158
Calgary	—	—	—	—	29
		50	—	—	278

TOTAL FOR COUNTRY			
Originated	Delivered	Relayed	Total
643	567	2318	9011