

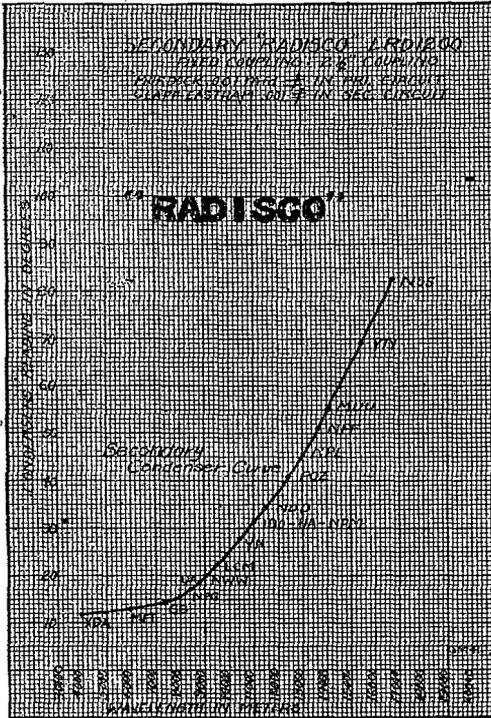
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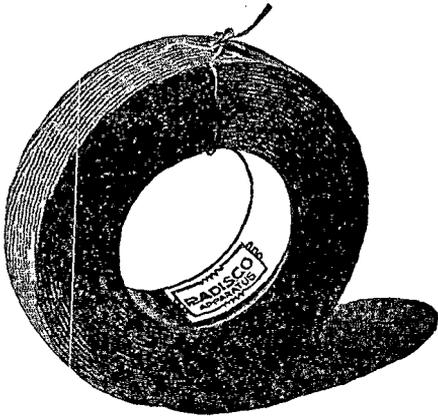
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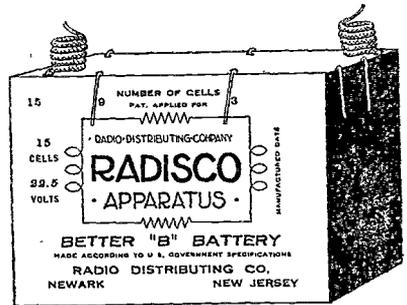
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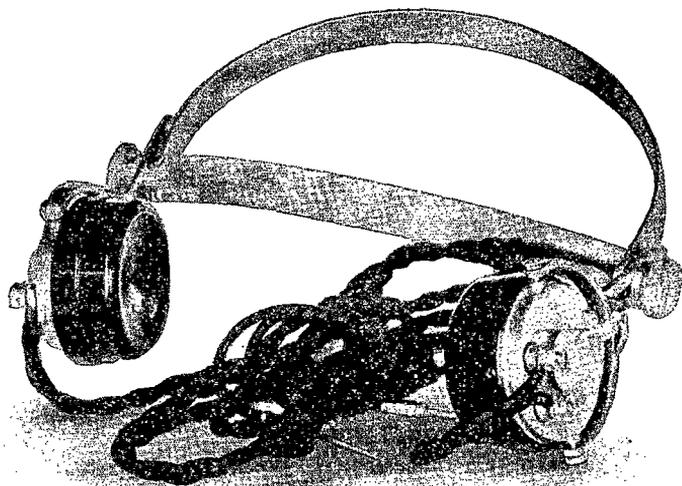
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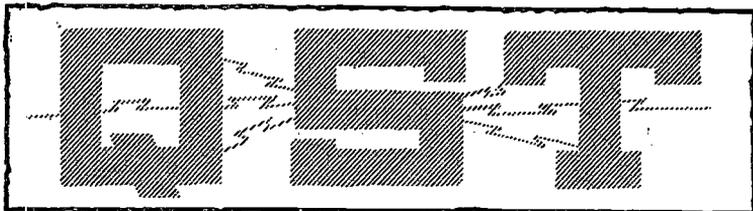
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VOLUME III

MARCH, 1920

NO. 8

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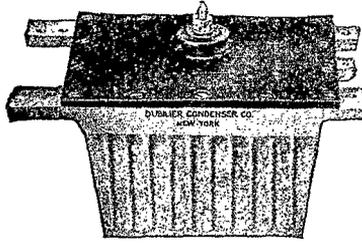
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D 101	1/2 K.W.	14,000	0.007 mfd.	25.00
D 102	1 K.W.	21,000	0.007 mfd.	35.00
D 110	1/4 K.W.	10,000	0.01 mfd.	19.00
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# Q S T

A Magazine Devoted Exclusively  
to the Radio Amateur

## Radio Club Organization

By F. H. Schnell and R. H. G. Mathews

### OUTLINE.

- I. Reasons for local organization.
  - (1) Educational advantages.
    - (a) Mutual benefits.
    - (b) Increased operating ability.
  - (2) Fraternal advantages.
    - (a) Social benefits.
  - (3) Material advantages.
    - (a) Community operation of station.
    - (b) Community ownership and use of measuring apparatus.
- II. Reasons for national organization.
  - (1) Traffic handling.
  - (2) Co-operation.
    - (a) With Radio Inspectors on interference control.
    - (b) Between different sections of the country.
  - (3) Legislation control.
    - (a) Prevention of unfavorable legislation.
    - (b) Promotion of favorable legislation.
- III. Methods of organization.
  - (1) Local club in small town.
  - (2) Local club in large city.
    - (a) Community club.
    - (b) School club.
  - (3) Affiliation of club in small town.
    - (a) Regular method.
  - (4) Affiliation of club in large city.
    - (a) When club is only one in city.
    - (b) When club is one of many in city.
      - (A) Individual organizations.
      - (B) Executive council under control of national organization.
- IV. Practical applications.
  - (1) Instances of actual operation of plans as outlined in foregoing.

**I**N these days of supremacy of the labor union, it should not require much argument to convince the most skeptical that there are advantages, to the participants at least, in organization.

In any community, however small, there generally are a number of radio enthusiasts, the radio bug being of such a nature that he cannot exist alone, but grows in a cluster, so to speak. There are many reasons why these "clusters" should actually organize, elect officers in the usual manner and begin active participation in affairs of the radio game from the broad national standpoint.

The educational advantages of such small local organizations are many. The association of a man with others interested in the same line as himself is bound to give him the benefits of the experience of his associates, and they, in turn, gain the benefit of his knowledge. Then, as the old saying has it, "Two heads are better than one", and certainly many heads are far better than one in thrashing out the many perplexing problems which confront the beginner in the radio game.

In addition to the advantages of association with other radio men, the participation in radio club activities will generally give a man considerable operating experience, since most clubs have facilities for practice of the code.

Aside from the purely technical side, the social end of radio club participation is worthy of consideration. We are never so much at ease as when in a gathering of men who are interested in the same things we are, and never do we have quite as much enjoyment as in such a meeting. We can look with much satisfaction to the heated argument in which we used to take part, and from the Old Man's articles in the past, we would judge that our experi-

ences have been the rule rather than the exception.

There are, of course, many material advantages to the formation of local clubs. Many amateurs do not care to invest in such instruments as wavemeters, hot wire ammeters, etc., and yet these instruments are practically necessary before intelligent and efficient operation can be accomplished. Club ownership of these things, to be used by the members, has solved the problem in many instances. Club ownership of a good radio station has also solved the problems of many amateurs who do not have the facilities for such an installation at their homes. In this respect, of course, things must be so arranged that difficulties over the control and ownership of such apparatus are eliminated.

After the formation of local organizations, it is extremely desirable that they be affiliated with a large representative organization. In the United States there is but one national association that meets the requirements of absolute freedom from commercial interests and represents lively interest in the affairs of amateur radio and amateur radio alone. That one association is, of course, The American Radio Relay League.

The advantages of a national organization, such as the A. R. R. L., are very evident. In handling nation-wide traffic, control of such traffic must be vested in one association of such size, scope and power as to be able to really maintain control. The practicability of such a scheme is shown by the present efficient operation of the A. R. R. L. traffic routes. In order to participate in these activities it is necessary for the individual local clubs to attach themselves to the A. R. R. L.

In addition to traffic control, but allied with it very closely, there is the problem of interference control and the enforcement of the law. In order to prevent the enactment of more strict radio laws, which are really unnecessary, the existing regulations must be enforced to the letter, and it is naturally the duty of every good radio-citizen who has the welfare of amateur radio at heart, to assist in the enforcement of these laws by the duly appointed representatives of the Department of Commerce. This can best be done through the organized efforts of our nation-wide League, and in fact is being done at the present time. It should be the duty of every organized local club to assist in

this work, and of course to participate in such activities, affiliation with the League is concomitant.

Aside from the foregoing reasons for a nation-wide radio organization, there is the primary purpose of such an association in the prevention of legislation unfair and unfavorable to the interests of amateur radio. We have witnessed in the not distant past several efforts to practically eliminate the radio amateur. These efforts were well thought out and planned, and would have succeeded, had it not been for the influence brought to bear by the organized amateurs of this country. Similar efforts are now in preparation, and it is incumbent upon us to increase the effectiveness of our own defenses so that future attempts will not be more successful than have those in the past. The officers of the League are awake to the dangers of this unfavorable legislation, but alone they can do nothing. In order to accomplish the desired result they must have the backing, and the ACTIVE backing, of every radio amateur in

#### THIS ARTICLE

is not the kind which can be illustrated. Because it is solid type, however, do not pass it by. It is important, and fills a long-felt want for information on club organization and control.

The A.R.R.L. Secretary will be glad to hear from clubs interested in becoming affiliated with the League.—Editor.

the country.

As a corollary to the prevention of unfavorable legislation, there, of course, is the promotion and preparation of favorable regulation. This also requires the active participation of every radio man in the country in order to be successful.

#### LOCAL CLUBS IN SMALL TOWNS

In forming a local club of any size in a town of medium size, a certain regular procedure may be followed. The first requirement for such action is one live radio amateur, with at least one friend (strange as it may seem, radio men occasionally have friends). This man can start a club on his own initiative by merely getting a number of his radio acquaintances to attend a get-together meeting to plan the organization. It is advisable in this respect to get the aid of the District Superintendent of the League for his particular territory, who can give him detailed advice as to the proper procedure in any particular instance. The usual officers may be elected and a brief constitution drawn up covering the primary purposes of the club. It is not necessary to prepare any elaborate programs for meetings, though this can be done if desired. Getting together and talking over the radio happenings of the week will be found interesting. Com-

(Continued on page 21)

## Rotten Hours

By The Old Man

Well, Gang, T.O.M.'s with us again, and the rest seems to have done him good, for this is a yarn which will find an answering 'Aye!' deep from the heart of every relay man. You'll get many a good laugh in this but no doubt will continue to observe—Rotten Hours!—Editor.

SAY, Mister, where is this thing going to end? Here I have sat up until gawdnose what hour in the morning trying to clear my traffic, have grown dark circles under my eyes, have aroused the suspicion of our Chief of Police that I have a hidden stock of booze in my cellar, and I am just exactly a little worse off than when I started. For a fact, I began this week with six messages on my pin and this Saturday night I have nine. And one night I went to bed at one thirty, another at two fifteen, still another at three ten and on the others anywhere between twelve thirty and one thirty. At this date I have all the symptoms of having joined the wood alcohol brigade, when in reality it is two weeks come Tuesday since that last near-beer went the way of all things earthy. It's fierce.

I think it was Wednesday I got peeved and swore I would sit the gang out, by heck. I sent the little wife to bed, loaded all the corn cobs and put them in a row, called in the cat for reasons best known to myself, and went at it. I think it must have been along toward twelve that I got rid of two to a certain gent whose spark comes into my place like a machine gun gone amuck, and around one when I managed to push one more on a duck over East who managed to read me in a lull in the din. From then on it was rough going what with the roaring of 8JQ, the howling of 8CB, the booming of 9ZN, the hoarse fluttering of 8CC and the bawling of 8ER. Seems like the loud ones are the late sitters. After one thirty in the morning these strong-voiced ones are about all that are going and between them they certainly do set up a clatter. But I stuck. I CQed, and yelled myself black in the face, got cross, called ten times and signed in eleven, got answers which could not be read through the racket, got mad, spat on the cat again for luck, hollered some more and got all heated up and groggy, what with the tobacco smoke and all. But it was not to be. At three ten my stomach went back on me. When a man's stomach begins to go back on him he reviews his past life and regards his future prospects from an ultra-conservative angle. He gets where he doesn't much care whether the

darned old message ever gets there or not, nor whether the other fellow sits up later than he does or not. That's where I got at three ten A.M., and thinking kitty and I had both had about enough, and possibly that kitty might be taken sick during the night, I let her into the cellar, pushed most of the burned matches and the ashes under the rug where they wouldn't show in the morning, and tired, discouraged and squiffy amidships, and more than half smoked to death, I hit the hay.

Next morning the little wife, who had shot a couple of narrow ones at me, asked pointedly what time I had gone to bed, to which I replied lightly, "Oh, a little after twelve"... "You look as though you had a sickness coming on." That settled me. She could not have hit me harder, and she knew it. I had been arguing with myself that I felt and looked like a poisoned pup, and now 'knew it. But it would never do to weaken, so after toying with the breakfast for a while I beat it to the office, where I arrived on time and soon became lost in the snarl of business. Several times during the day I harked back to amateur radio and the night's debauch, but as I began to brace up it didn't seem such a nightmare. By five o'clock I was interested again, and after supper all the fire returned and back at the old set I went, just as nutty as ever.

Now, what I want to know is just this:—How do those other night-owls work it? Don't their stomachs ever go back on them? They were still going in like mad when I bit the dust. How much later do they sit up? Do they never feel like a boiled owl when they get around in the morning? After a hearty mid-day dinner and a pipe, don't they feel like falling asleep at the switch, just for one sweet hour or so? Wouldn't they also give freely ten years off their lives for one brief hour of delicious snooze? Can they read the paper after supper without falling off the chair? I'm blamed if I can. My eyes get swimmy in just five minutes, no matter how exciting the story.

In the interests of science will not some of these young gentlemen write to QST and tell how they sit up all night and feel so grand the next day, and keep it up indefinitely? Take Mrs. 8ER for example. She interests me. Do she and Mr. 8ER

bunk at the key? Do they never sleep at all? Do they have a day and a night shift, or does she cook the victuals while he operates and she operate while he feeds his face or how do they work it? And that basso-profundo, 8CC up there in York State. Does he turn in at seven and arise by alarm clock at eleven and then proceed with his nightly programme of splitting the welkin to make up for lost time? He's a late bird for fair. No wonder he has contracted a swing to his fist, keeping the rotten hours he does. Somebody said once before the War that that twenty five cycle flutterer, old 2AGJ, used to crawl in after supper, sleep on a full stomach until midnight and then get up and proceed to pound the ether with messages until four in the morning. That's getting them off the pin, all right, but some pretty little pastime, as I regard it.

One of the things I hope to avoid, until I look more like the father of a respectable family, is the question, "WHY DO I DO IT?" To answer such a question truthfully would cause doubts to arise in the minds of my friends as to my sanity. It certainly would never do to say that I had to get off a lot of messages. They might ask me how many I had got off. I would have to lie or say four. What, sit up all night and work my head off and only get off four messages! No, that wouldn't do. Or some smart Aleck might suggest that the messages were very, very important ones, I suppose? As two of the four were "GREETINGS BY RADIO", and the other two were "MERRY XMAS AND HAPPY NEW YEAR FROM ALL", that would not do either, since the greetings could wait a while probably without anybody losing any money by it and the Xmas business had already waited more than a month. So you see it's a case of SOL if any one asks why you stay up so late. I usually manage to introduce a diverting element to the conversation when I think I smell a question coming.

Now, Mister, tell me. What is all this leading to, anyway? The whole blooming country seems fairly busting open at every seam with messages every night. I never knew there could be so many greetings and regards and things. The ether is so choked with the buzz business that if many more crawl in it will be case of insect powder, or traffic cops or something. I seem to smell burning insulation already on my grub and wherever I go. We cannot go on adding stations to two hundred meters indefinitely. There will come a time when old 200 will list to port, or settle down by the stern or founder altogether. We sure do not want to lose old 200 altogether. Anyway, there will come a down-slant in the curve when the saturation point is reached. The number of messages which

get through will be so small by comparison to the number of stations straining their gullets trying to send them, that the curve will approach zero. Then what? Answer me that, Oh ye wise ones. Forget the bulb business a moment and tell, Oh tell us, how to get more than four messages off a pin in seven and three-tenths man-hours.

## LIFTING OF THE CANADIAN LID

**W**E have received the following from the Canadian Deputy Minister of the Naval Service at Ottawa:

Department of the Naval Service,  
Ottawa.

30th December, 1919.

Sir:—

I have the honour to advise that the Minister of the Naval Service has been pleased to authorize all amateurs on the Great Lakes and River St. Lawrence from Port Arthur, Ont. to Quebec, P. Q. to use a transmitting wave-length of 200 meters until the re-opening of navigation, approximately the 15th April 1920.

The Department is anxious to accord to amateur stations every possible latitude compatible with the proper protection of Naval and Commercial services against interference, and the authorization of the use of 200 meters this winter is in the nature of an experiment.

Should no interference result the Department is prepared to consider a permanent amendment to the regulations regarding wave-lengths, and it accordingly behoves every amateur to see that his transmitting apparatus is sharply tuned and its decrement reduced to a minimum.

Your attention is particularly called to Radio telegraphy regulation No. 25, reading as follows:

"A distinctive call signal will be allotted to each station commencing with a figure eg. 3 A A etc. which signal must be sent not less than three times at the termination of every transmission."

I am, Sir,

Your obedient Servant,

G. G. Desbarats,  
Deputy Minister.

This is the first step forward, and we believe a permanent amendment in Canadian wavelength regulations will soon follow. Canadian operators are requested to see an Editorial in this issue on this subject.

# Minimizing QRM

By the Editor

THE circuit described below is one developed by the British navy during the war, and possesses very great selectivity. It was used extensively during the transmission of broadcasts which were protected by interference signals sent simultaneously on a wave so close as to make it impossible for the enemy, without this apparatus, to read the signals. Towards the end of the war every British and American vessel had this circuit, which was known as "the red plug" for the reason that the auxilliary apparatus comprising the QRM minimizer was connected in by inserting a red plug in a jack.

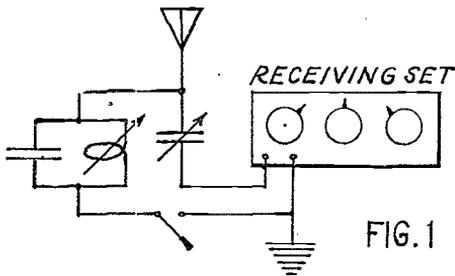


FIG. 1

This type of circuit is known as an acceptor-rejector, or wave-trap, and consists essentially of a condenser and variable inductance in parallel across the main receiving apparatus as shown in Figure 1. Such a circuit, as is well known in theoretical electrical engineering, possesses infinite impedance to oscillations of its own natural frequency. When values of L and C are so chosen that a large C and a very small L are used, the impedance to resonant frequencies remains as before but to all other frequencies the high value of capacity and low inductance provide almost a direct short-circuit.

The circuit employed on American vessels is shown in Figure 2. This apparatus had a wave length range of approximately 1500 to 5000 meters. The constants for this range were as follows:

- $L_1$  — 10,000 microhenries
- $L_2$  — .4 to .5 "
- $L_3$  — .09 to .5 "
- $L_4$  — 1200 "
- $L_5$  — 6600 "
- $C_1$  — 0.001 microfarads
- $C_2$  — 1.600 "
- $C_3$  — 0.016 "
- $C_4$  — 0.016 "

The inductances  $L_2$  and  $L_3$  with the capacity  $C_2$  from the wave-trap, shunted

across the main tuning circuit  $C_2L_4$ . The condenser must be of the utmost efficiency, with minimum resistance, leakage, and phase displacement. Ordinary "air" condensers are unsuitable because of comparatively high losses thru the insulation material supporting the plates, etc., but mica condensers are very satisfactory. The inductance must be of the lowest possible resistance, and minutely variable. Thus  $L_2$  may be used for rough adjustments and on the longer waves, while  $L_3$  consists of a single turn of brass or copper tubing or 1½ inch ribbon, 10 inches in diameter, with a roller contact very accurately adjustable by a rotating knob.

To operate, the circuit should first be tuned with the rejector cut out by opening the switch as shown; the rejector then cut in and adjusted until the signals reappear. When this condition obtains, the rejector elements have the same period as the desired wave, and the action is as follows: All incoming oscillations not in resonance with the rejector are shorted thru the small inductance of the latter direct to earth, instead of passing thru the higher impedance of the inductance  $L_4$ . However, incoming oscillations of the same frequency as the rejector (the desired frequency), encounter very high impedance (theoretically infinite) in that circuit and so pass thru  $L_4$  and induce an EMF in  $L_5$ .

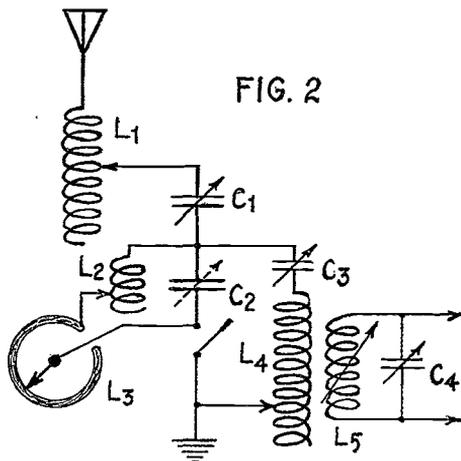


FIG. 2

A most amazing selectivity when working among fairly sharp-tuned stations is claimed for this system. Signals differing from those desired by one percent are said to be entirely eliminated, and without re-

ducing the strength of the desired signals. The elimination of considerable static is also claimed. To the best of our knowledge this circuit is not now in regular use in any amateur station. Our need for a QRM minimizer is most distressing and we feel that this circuit offers possibilities. We therefore present it in the hope that our serious workers will take it up and develop its possibilities for 200 meter work. It offers much of promise, yet we are not wholly confident that it will be a success, and for this reason: it does not eliminate the energy component on the desired wave—it merely rejects the non-resonant frequencies. When jammed by a strong signal of near but not identical frequency, it solves the problem if the jammer is sharp. In the case of broad-tuned amateurs, however, that component of the energy at the tuned frequency will still be accepted, and we therefore question whether it will be of much value in working thru untuned nearby spark coil sets. For general work, however, it should surely help, and particularly in one certain problem: Many of the good long-distance operators work late and dispatch their traffic after the evening's hubbub has died down. Nevertheless there may often be a dozen of them on at the same time and their strong signals jam each other thru actual forced oscillations in these days of high amplification. There is generally an appreciable difference in tunes in these stations, however, and the rejector should completely eliminate this very troublesome source of QRM.

This circuit is employed with a tuner using a series antenna capacity so as to accentuate the difference between the low C and high L path thru the tuner and the high C low L path thru the rejector. As to the constants for amateur work, LC in micro units for the lowest wave we will want is seen to be .01, and remembering that the inductance should be as small as possible the value of C for optimum results would seem to be about .1 mfd. with L variable from .1 mhy. to .4 mhy. This is a pretty large condenser and will be expensive if made of mica. We understand that the U. S. Navy has used ordinary paper condensers for this purpose, adjustable by S.P.S.T. switches, and if this will work out it will simplify matters greatly. However, it seems fairly logical that good results should be obtainable with a condenser as small as .01 mfd., with an inductance variable from 1 mhy. to 4 mhy. Bearing in mind that the latter must be of low resistance and delicately variable, it could consist of a single turn of copper tubing or wide ribbon, several inches in diameter, and with a sliding or roller contact; or a variometer of two turns of bus-bar copper, with small clearance, might be devised to most satisfactorily answer the purpose.

We hope the scientists among us will see what can be accomplished with this device in amateur work. Its possibilities justify hard effort to adapt it to our uses. The Editor will be pleased to receive communications on the subject.

## On the Use of Honey-Comb Coils

By A. Groves

Mr. Groves, an ardent A. R. R. L. enthusiast, is unfortunately so located that he can do no transmitting, and so for many years has been obliged to confine his activities to efficient reception, in which work he has made a name for himself in amateur circles. He will be remembered by QST readers as the author of some excellent articles before the war on long-wave receiving apparatus, back in the days when towering loading inductances were the fashion. He has more than kept pace with the new developments in long wave reception, and in this article gives us what we can accept as dependable information on the use of the honeycomb coils, particularly on the correct sizes to employ—a subject on which we have long needed accurate data.—Editor.

**M**UCH has been written about the merits and demerits of different apparatus for the most efficient reception; still I would like to express my present opinion regarding some of the newer receiving apparatus, in the hope it may be of benefit to some of your readers.

While we were closed up account of the war, I built a receiving set for ranges of 200 to 18,000 meters of the very best designs that my several years of experience in pre-war days had shown to be the best, so when the word came to open up

I strung the wires and tuned up, and the set met with my every expectation and more. I had several different bulbs and tubes, but only two that were really worth while, one an Audiotron and one a DeForest round bulb I had had "repaired" by the Scientific Laboratories. Both these were about the same sensitivity, the Audiotron being probably slightly the better in actual signal strength but easier to "go dead" than the repaired round bulb.

My first addition in the new line of apparatus was the DeForest amateur VT. This bulb showed a slight increase in signal

strength over any of the others, consumed only about one-half the current and never goes dead. This, together with the fact that it does not require fine adjustments of the A and B Battery, caused me to like it better than anything I have yet seen. Whether they are all alike or not, as claimed by the manufacturers, I do not know; but this one of mine operates on three 22½ volt batteries for plate potential and two volts filament current for maximum strength signals. That is, 2 to 3½ volts filament current operate it at the same efficiency. Below 2 volts and over 3½ volts it shows a decrease in sensitivity. It also operates on one 22½ volt battery, but not so well.

After experimenting with different current values in both plate and filament I decided to take the filament rheostat out and operate it on two dry cells (3 volts when new), which I am now doing; or, rather, am using 4 dry cells connected in series-parallel to prolong the life of the batteries, but this has no effect on the sensitivity of the bulb.

The general impression seems to be the VT is not as good as the old style bulbs, but if one wants a better operating bulb than this one, he is a hard nut to please, is all I have to say. The little boys on 200 or the big ones on the longest waves are all the same to it, which cannot be said of the old style bulbs, as some would work extra well on short waves and poorly on long waves, while others would work well on long waves and not so well on short waves. Even two filaments in the same bulb would show these undesirable features to a marked extent quite often.

My next addition was the purchase of a few Honeycomb Coils and a mounting. At first I did not like the operation of these coils, as signals could not be tuned in quite as loud as with my old set. Still I kept plugging at them until one night while listening to POZ I pulled the right "string" and POZ jumped up at me like he had suddenly moved a thousand or so miles nearer. I hung the phones up and went in the other room and still he could be heard pounding away, so I switched over to the old set to see what was doing there and, work over him all I could, I could only get him with the usual strength, which was about three feet from phones. I then commenced work on the other stations and soon had several of them amplified to an extent impossible with anything else I have ever seen. I must admit it takes time, study and patience to get these coils working best over the entire range of waves, and even for a few stations, but once the problem is worked out I feel that no one will be willing to go back to the old style couplers or any other form of tuners that were considered

"the best" in pre-war days.

There seems to be a misunderstanding among most amateurs as to the wave length ranges of the various coils, and they do not seem to understand why so many coils are necessary when one coil is advertised to cover an extremely wide range of wavelengths. In this connection it may be well to point out that although the coils advertised will respond to approximately the wavelength range as advertised (in the secondary circuit only), the greatest efficiency cannot be obtained from any vacuum tube where large values of capacity are shunted across the secondary coil. Hence, to get the greatest signal strength from a station it is absolutely necessary to use as little capacity of the secondary condenser as possible. For instance, suppose we wish to tune to NAA spark on 2500 meters; we can use coil L-300 as secondary with about 60 degrees of a .001 Murdock Condenser in shunt, or we can use coil L-500 with about 15

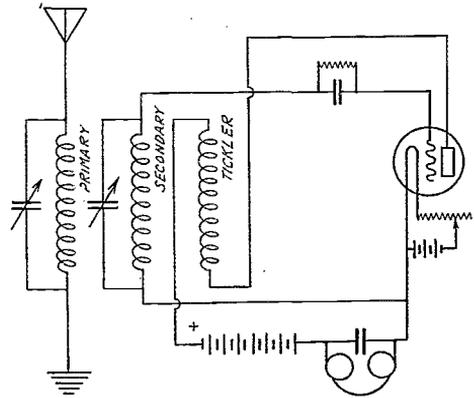


Fig. 1

degrees of the same condenser in shunt, or we can use coil L-50 with about 15 degrees of the same condenser in shunt, or we can use coil L-600 with about 6 or 7 degrees of the same in shunt. Now coil L-600 will give the loudest signals from NAA owing to the small capacity used in shunt with it and the other coils will give a corresponding decrease in signal strength owing to the increased capacity necessary.

As maximum strength signals are not always desirable, where interference prevails, greater selectivity can be obtained by using the smaller coils and higher capacity of the condenser, but for ordinary work, tuning will be much easier and signal strength greater if the largest possible coil and the smallest possible capacity of condenser is used in the secondary circuit.

The impression prevails that the L-25 coils are the proper size for 200 meter work and many an amateur has been sadly



about 3000 meters with condenser at zero, to the 4000 meter calling wave with condenser about 16, and to 4,800 meters with condenser about 20, so this coil can be used nicely for all waves between 3,000 and 4,800 meters. L-200 or L-250 may be used as the plate coil for these ranges of waves.

Coil L-1000 will respond to 4,800 meters with condenser about zero and to 7,000 meters with condenser about 32 to 34 degrees, so this coil will respond to a great number of stations, including the British "BZ—" stations, NPG, NAW, NAU, WUJ, NWO, NPZ, NAR, NBA and many others of similar wave lengths. Now this coil can be used up to the wave of POZ on about 12,600 meters by using the condenser at about 115 degrees, but except for extreme selectivity I do not advise any such capacities being used. Coil L-250 or L-300 may be used for the above range of waves, 4,800 to 7,000 meters, in the plate circuit.

Coil L-1250 will respond to a minimum wave of about 5000 meters with the condenser near zero, but this coil is not at all necessary for either secondary or plate purposes.

Coil L-1500 is called upon to cover a much wider range than any other coil, entirely too much range, and it would be much better if there were another coil, say one L-2500 to cover the waves from about 12,000 meters up. However, we haven't got it so have to make the best of the L-1500.

Seeing that coil L-1000 will respond efficiently to 7,000 meters, the lowest wave to which coil L-1500 is called to respond is this tune. This it will do with the condenser about 8 or 10 degrees, while it will respond to POZ on about 12,600 meters with the condenser at about 46 or 48 degrees. This should be the extreme range of this coil, 7000 to 12,600 meters, but fortunately there are very few stations that use waves longer than POZ and most of these are in the U. S. so we can get along nicely with it, although maximum signal strength cannot be had on the longest wave. NSS uses the longest wave of any station at present, which is officially said to be 16,900 meters and to tune this

station in the condenser has to be at near 85 degrees, using L-1500 as the secondary. However, by using two L-1500 coils in series (one as the secondary and another as a loading coil) somewhat better results can be obtained on waves of 12,600 meters and over, and to tune in NSS with the two coils requires the condenser at about 40 degrees, but as these coils are not designed to be used as loading coils no big advantage is gained by this arrangement—nothing like what would be gained if we had one single coil of near like inductive value.

Coil L-300, L-400 or L-500 may be used for the plate coil over the range of waves covered by the L-1500 coil.

No mention has been made here of the primary coil, as these will vary with every aerial, but knowing the secondary coil to use for any given wave or station is the most essential part, as it is then comparatively easy to find the proper coil for primary, and except for the short waves

(200 to 1000 meters) almost anything can be used for the plate coil, provided the coupling between the plate and secondary is properly adjusted.

As to the efficiency of these coils and the VT, I will leave it to your own judgment by quoting a few stations heard on an aerial composed of four No 16 wires 30 feet high, with them and a single VT. POZ and LCM are often easily read 25 to 30 feet from phones, while NBA, about 2,000 miles away, is often so loud it is really disagreeable to keep the phones on. IDO and NPM, which are over 4,500 miles distant, come in good and

readable all day long, except in cases of heavy static, and they are often loud enough to be copied several feet from the phones.

It is useless to attempt to give a further list of arc stations heard as I hear about all of them worth while, and the strength of those mentioned above will suffice to give you an idea as to how the others come through, so will take up the medium wave spark stations, where my greatest surprise came. On the wave of 1500 meters, stations down to and including NAU, a

(Concluded on page 20)

### TUBE CONSTANTS

The deForest tube used by Mr. Groves is the Marconi-Moorhead VT Class II—the high vacuum type. In this connection data on comparative tests of modern tubes made by the Bureau of Standards will be interesting. The values given below (averages for a large number of tubes) indicate the relative merit of the tubes as detectors and as amplifiers compared with an arbitrarily chosen standard tube in a test set designed to operate the tubes under conditions most favorable to the VT-1.

Type	Detector	Amplifier
VT-1	56.5	26.5
VT-3	54.0	25.0
VT-11	55.0	22.0
VT-13	50.0	22.0
VT-21	53.0	23.0
Moorhead	54.0	22.0

# Telephone Jacks in Amplifiers

By Benj. B. Skeete

THE readers of QST, who are identified with the best in wireless, will be interested in the method here described of connecting the phones in the circuit of the detector or amplifier at will by merely inserting a telephone plug in the proper jack.

This will be of value especially to those who are making plans for the construction of amplifiers.

we will see that when the phone plug is removed from the jack, the amplifier transformer is connected in series in the plate circuit. On inserting the plug, the outer arms of the jack J J' are forced away from the inner arms K K', cutting out the amplifying transformer and connecting the phones into the circuit by the contacts made by the arms J J' with the plug terminals T T'.

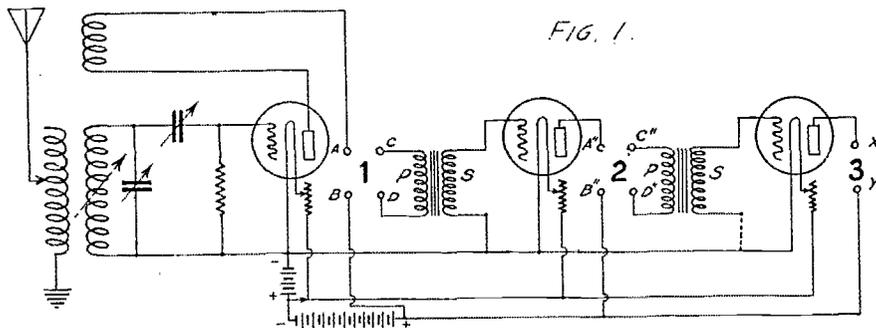


FIG. 1.

Figure 1 is a regenerative two-stage-amplifier circuit, complete except that the connections in each plate circuit are not completed but are lettered in groups, 1, 2 and 3, so that the manner of connecting to the jacks may be explained. A and A' are leads from the plate, B and B' are continuations of this path to the positive of the B battery, and C, D, C" and D" are the terminals of the primary windings of the amplifier transformers.

The plugs and jacks used above are of the "two circuit" type. A simple "open circuit" jack is used at 3 in Figure 1 with its terminals connected to X and Y. Normally open, the circuit is completed thru the phones when the plug is inserted. Jacks and plugs can be secured from QST advertisers.



FIG 2

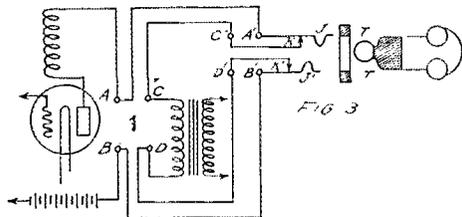


FIG 3

Figure 2 shows the jacks and plug, with the four jack terminals (A', B', C', and D') lettered similarly to the terminals in Figure 1. Figure 3 illustrates the method of connecting up the jack to the apparatus terminals, and because of the similar lettering confusion will be avoided.

With the exercise of a little ingenuity the builder can make use of a more complex jack in a similar manner but employing an extra pair of contacts in the filament circuits in such a manner that insertion of the plug in any given jack will extinguish the filament in the unused stages.

## HEARD AT SEA

by operator of S. S. "Curlew" while 500 miles east of New York, between Feb. 3d and 7th: 1AE, 1AW, 1CM, 1EA, 1FN, 1GP, 1JG, 1RN, 1UE, 1XE, 2AN, 2AR, 2BB, 2BN, 2CB, 2DA, 2IE, 2IR, 2JE, 2JU, 2NB, 2BV, 2NM, 2QV, 2QR, 2QM, 2SH, 2ZJ, 2ZS, 3AN, 4AT, 8AU, 8CX, 8DA, 8EN, 8ER, 8NO, 8FO, 8FP, 8US, 8JQ, 8UJ, 9BP, 9HW, 9QW, 9ZL.

## A Little Journey

By J. O. Smith, Traffic Manager,  
American Radio Relay League

ON the 28th day of October, in the "Year of Liberation of Amateur Radio from the Control of Naval Autocracy," I embarked upon a little journey that took me through the many cities, real and alleged, of twenty States, as follows: New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Texas, Oklahoma, Arkansas, Missouri, Illinois, Indiana, Ohio, and New York.

(I'll bet that nine out of ten people who read this article will count 'em up to see if they total twenty).

During the course of my wanderings, I had the good fortune to be able to meet personally many well-known radio amateurs, and the misfortune to look over many amateur stations, and while I have only pleasant memories of the personal element in my visits I can truthfully say that it will take me a long time to recover from the shock I received when I looked over the equipment of some of the amateur radio stations of the South and Southwest.

How some of those stations can possibly work over long distances, as they do, or, in fact, how they work at all, is beyond me.

Many of these stations were well set up in many respects, but poorly constructed in some one or two important details. In one case, I had the pleasure of listening in on a home-made regenerative receiving set, that really worked as well as a Paragon or a Grebe, but when I got into the details of the transmitting side of the outfit, I saw something that made me sad. The ground system for this 1 K.W. transmitter consisted of a No. 14 wire soldered to a washboiler, six inches under ground. The argument was that in the case of a telegraph line the ground consisted of only a single pipe driven into the ground, consequently, as a washboiler offered so much more surface, it certainly must be adequate. The owner admitted that he heard all sorts of long-distance stuff, but could never "raise" anybody. When I finally felt able to talk without hurting the young gentleman's feelings, I laid out a comprehensive ground system consisting of a 1 inch copper strip to a distributing centre, ten pipes, 2 inches in diameter and 8 feet long driven into the ground about 15 feet apart, 1,000 square feet of chicken netting under the antenna and the washboiler. After the noble effort that washboiler had made to hold up the ground end of the outfit, I didn't have the heart to leave it out of the scheme.

One of the first stations I heard after returning to Rockville Centre was this self-same station, and it is over 500 miles away. The owner has since written me that he is amazed at the difference in his transmitting range. He says he never thought the ground end was so important.

The owner of another 1 K.W. station that I visited pointed with pride to his hot-wire ammeter, which registered about 8 amperes. That had me puzzled until I looked at the oscillation transformer and found that the primary and secondary were jammed tight together, the owner explaining that he had set them tight together, of course, because the hot-wire ammeter showed the highest reading with them in that position. I guess he must have detected a look of sadness in my face, for he asked me, after a few minutes if I had lost any relatives lately, or if I had other troubles of any kind.

I replied that I felt sad only because of all the rotten radio stuff I had run across. After an argument lasting two hours he finally agreed to separate the coils by about six inches and try it, but he certainly was impatient and sceptical about it. However, he is now cured.

The fellow who recently wrote me that a friend had told him that his station did not carry because his oscillation transformer was full of ohms, and who wanted to know how to get them out, had nothing on the fellow whom I ran across who attempted to reduce the wave length of his station by cutting out one of his six leads to the antenna. When we found that the wave length of the station was about 350 meters and I had told him he was likely to interfere with commercial traffic, his face immediately brightened and he started to eliminate one of the six leads when he asked me how much difference I thought it would make in the wave length and I said about 1 2/3 meters, he looked pained. I could see he felt sorry for me. The next day, however he transformed the L antenna into a T, and to his surprise, the station still works well and on a wave length within reason.

In another town I ran across one of those fast-sending birds. A vibroplex had nothing on him. The only difference was that it might be possible to read a vibroplex, but I don't know of anybody outside of a clairvoyant that could ever determine what this fellow sent. He ripped out a long discourse to another station nearby about my being there and invited the owner of the station to come

over and meet me. After considerable pause the other station came back made a few dots, several V's and wound up by saying that "your signals are strong and tone fine. See you later." I told him not to bother repeating the invitation. I tried to reform him in the matter of slow steady readable sending, but I don't know whether he took my advice or not. But you certainly had to be a good guesser to read that bird.

Out in the middle west there is a station that does remarkable work. This particular station has been heard on both coasts. It frequently happens, however, that the operator of this station misses the first part of messages. It had occurred so often as to cause comment by other operators as to why it always happened at the beginning of messages. When I visited the station I learned why.

In changing over from transmitting to receiving the first operation was to throw up the antenna switch. Then it was necessary to open or close seven other switches, and adjust the filament current before any signals could be heard. Every time the change was necessary that operator was the busiest man in seven states. I left a diagram of a simple, efficient receiving circuit with him that will cut out all those switches and went my way. I don't know the outcome. He seemed to take as much pleasure in playing with those switches as he did in getting a message to or from a distant station. If that fellow ever dies, and happens to need eternal punishment for earthly sins, I am going to suggest to the Boss of the Lower Realm that he put him in a room with switchboards full of switches, handles, knobs, wheels, levers, meters, etc., but separate him from the whole works by means of a thick glass partition.

In another place I visited I discovered the cause of a lot of that QRM we are all so familiar with. The operator of this station was badly afflicted with "keyitis". In other words, he was suffering from some sort of an ailment which had affected his mind and caused hallucinations. He seemed to think that unless he transmitted continuously some terrible fate would overtake him. Explanations, arguments, etc., were of no avail and had no effect. As I left he stuck out his left hand, said tersely "good-by" and kept right on transmitting.

Another operator I listened to was afflicted with "callitis". This fellow had a mania for calling distant stations. As these different distant stations would ride in on the crest of a wave this fellow would go after them. To the best of my knowledge and belief he called stations in every radio district in the United States in one evening. When he had finished

calling a station so distant as to make the effort appear ridiculous the operator of the station where I was visiting broke in and called 10—XYZ, 10—XYZ, 10—XYZ, etc. After a minute the bird afflicted with "callitis" came back with "Say bo, QRA 10—XYZ, I can't find it on my list?"

It is true however, that while I ran across many things on my trip that made me sad, I also ran across many interesting and pleasant things, and one of the most interesting was my visit with Mr. John M. Clayton, 5ZL, Little Rock, Ark.

During the evening in the latter part of November that I was there, it was a real pleasure to listen and witness some remarkable amateur relay work. Mr. Clayton took a message for the Coast direct from 9ZN, at Chicago, and passed it on to Station LF, operated by Mr. Louis Falconi, at Roswell New Mexico. The air line distance between Chicago and Little Rock is approximately 550 miles. Little Rock to Roswell is 800 miles. At the time this message was given to Mr. Falconi, he was attempting to get in touch with 6EA, at Los Angeles. He was hearing 6EA very well, but couldn't raise him. No doubt that gap has been closed by now, making a quick relay from the Middle West to the Pacific Coast a certainty. As more stations begin operation from time to time, making the jumps shorter, a reliable relay route to the Coast particularly by means of Trunk Line C, will be assured.

It is a fact that the middle section of the country is far more favorable territory for amateur radio work than the east or west. Here in the east New England is shut off from New York as by a barrier. It is true that it is possible to work across the barrier at times, but the work is always difficult and uncertain owing to fading, etc. The air line distance between Hartford and Rockville Centre is 75 miles, and yet signals fade badly in both ways, and the two points, so far as radio is concerned, might just as well be a thousand miles apart. In fact, 1AW can work stations in the eighth and ninth districts much easier than second district stations. It frequently happens that an eighth district station will tell 1AW that signals are strong and have no trouble at all in working the station, and at the same time the signals of 1AW will be very weak, sometimes inaudible, at Rockville Centre.

These conditions are true between many sections in the east and radio communication is made very difficult because of them, as compared to the good parts of the Middle West.

However, it is true that there are localities in the west that offer the same problems as in the case of Hartford and New York, but as a rule these areas of the

(Continued on page 18)

## A Dutch Amateur Valve

**T**HROUGH the kindness of Mr. G. Roes, of Dordrecht, Holland, QST obtained from Mr. C. W. Ridderhof, agent for the Philips Lamp Works, at IJsselstein, Holland, a specimen of the Philips Receiving Lamp, which is the first Dutch-made amateur tube.

As will be noted in the photograph, the Philips Lamp is a tubular valve, constructed internally in a fashion similar to the old round DeForest audion but having two candelabra base connections, one at either end, one for filament current and the other for plate and grid connections. The elements are smaller than in the ordinary tube, the plates being  $\frac{3}{8}$ -inch square. Two plates and two grids are used, with a single V-shaped tungsten filament in the center.

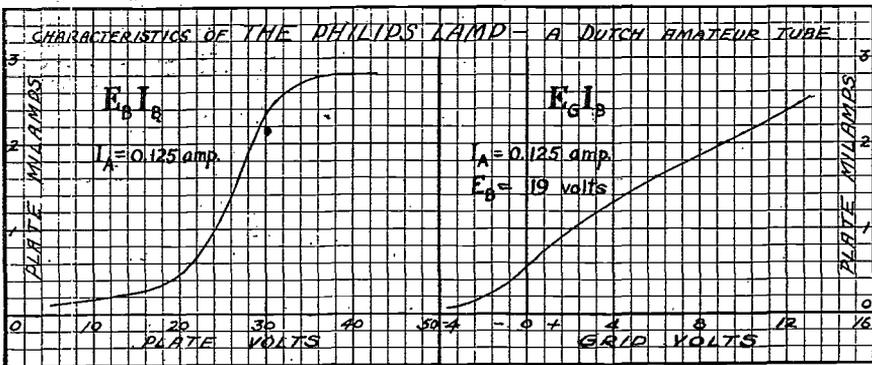
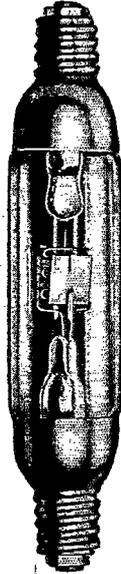
QST is indebted to Mr. Mathews and Mr. Hassel for the characteristic curves secured in testing this tube at 9ZN. Altho rated by the maker at 0.25 ampere normal filament current, our specimen obtained normal brilliancy on 0.125 ampere, at a potential of 4 volts. This is interesting, as the tube would work quite satisfactorily on dry cells with this low current consumption. The characteristic curves are what might be expected. The normal plate voltage is 24, and the specimen tested ionized

at slightly under 30 volts, and was found to function best as a detector with 19 volts, at which value the plate current with free grid was approximately 400 microamperes.

The vacuum is quite low, and as was to be expected, the tube proved a very fair detector, tho unstable in its action and not as sensitive as our American tubes, particularly the AudioTron. No data on its average life is available, but it is believed this can not be very great because of the brilliancy of the filament and the low vacuum. The one tested could not be made to oscillate under any conditions, nor would it function as a radiofrequency amplifier.

Mr. Ridderhof reports that on his 150-foot aerial the daylight signals of NWW, NSS, and NFF can be read on one tube.

The use of the candelabra bases for the terminals is most convenient. Unfortunately both threads are right-hand. If one were right-hand and the other left-hand, a mounting consisting of the respective sockets attached to spring metal arms would make possible the insertion of a tube by simply rotating it, turn-buckle fashion. As it is, however, it offers a suggestion to our American manufacturers of tubular valves.



# An Open Letter to Mars

By ? ?

This is one of the funniest contributions which ever drifted into the QST Factory, and we've seen some rare ones. This is supposed to be anonymous, but we've a sneaking idea who wrote it. Eh, VN?—Editor.

"The Earth"  
Feb 5th, 1920.

Chief Radio Inspector,  
Mars.

Dear Old Timer:—

We received your sixty-five mile wave this morning and we're very glad to hear from you. Hope you haven't been calling over twenty-nine years, 'cause your sigs sure are strong and I'm afraid you've been jamming Venus.

You see, Old Top, we've been busy down here for the last six years trying to make the Earth safe for the Democrats and it was necessary that we kill off a few million before we accomplished our end. Things have quieted down a little now so we just happened to listen up on the sixty-five mile wave for want of something to do. Sure nuff, there you were poking the letter "S" at us. Let us warn you right now, though, Marconi used that letter when he sent across the Pond and he may have a patent on it by this time like he has on DeForest's Audion.

The funny part of it is, Charlie, we've been hearing you for a helluva while and we just got wise it was you. Gee, we thought it was static and strays and we've been building all kinds of jiggers to tune you out. We're wise now that those X's were from the Arc on your key, Harmonics etc. You'll have to pardon the delay and our stupidity in not tuning up on that wave.

You will also pardon us for writing instead of answering by Radio. You see, we got a Navy down here, and they're peeved cause we know how to send the International Code while they themselves know it as far as the letter "J". When Peace is decided we'll send you a few V's on 100,000 meters.

Please excuse our abrupt manner etc., but there are a few important things we have to say to you before we close. Please answer at once:—What kind of a Rotary are you using—make, etc.,—also dimensions and can it be heard in the next room without a dictagraph? Have you heard about Alexanderson's alternator? Quite a toy in itself! Are you using a Mars

ground or a counterpoise and if so why? Do you get POZ up there? What's Venus' call and her first name? Does she oscillate? Know anything about jazz? What's her wave like? Is it a long train, damped or just moist? How long have you known her? Are there any Red Heads there? Does Venus work after Arlington sends his press to her? Is there anyone there that can do my washing; we can't find a dam soul in Marion. Do you know who W. J. Bryan is? Has Billy Sunday been there yet? What's the price of Booze? Can you get it without having the Flu? Have you heard of the American Radio Relay League? Can we handle any traffic for you? Do you hear 2ZS? How many amps do you put in your aerial? Was the meter made in Germany? Does your key ever stick? Where do you put that key? Who operates it? Did he go to the Eastern Radio Institute? Do you get the Boston Post up there? Will you tell us a good answer for Limerick No. 23? How many kilowatts do you use? Is it right your aerial is seven miles long? Do you want to buy a Marconi Spark Discharger? Do you want it with or without bearings? Do you know A. C. Forbes? Did he sell his coughdrop? Do you know who hit Billy Paterson? "Ask dad—he knows."

Last of all, Bo, Gawler says you've gotta cut your decrement down. Lord, but its broad—something fierce. You know the air ain't free like it used to be—we're running it down here to suit ourselves and what Gawler says goes. Get down to two tenths or he'll be up in that enclosed auto after you.

Yours truly,  
The Gang.

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## A LITTLE JOURNEY (Concluded from page 16)

west are not as small or confined, as is true in the east.

Why these things should be so, or what makes them so, are questions that, so far as I know, have never been satisfactorily and definitely answered. The ways of radio are dark and mysterious.

# A New Regenerative Receiver for Relay Wave Lengths

By William F. Diehl

**M**ODERN Short Wave Receiver design having resolved itself into the employment of the Armstrong Circuits, it remains for the Radio Engineer to design apparatus in which full advantage is taken of the possibilities of these circuits. Although there are several methods of using them for short wave lengths, there is one which is pre-eminently adapted to the requirements of Relay Communication. This is the tuned grid and plate circuit, employing continuously variable inductances.

The service in which a Relay Receiver is used and the conditions under which this service must be maintained demand the

vacuum tube detector unit are at the extreme right. Figure 2 shows the interior of the set.

The general construction of the Type CR-3 is along standardized lines. The panel, which is made of Bakelite Dilecto, 6½" x 19½", supports the entire assembly. The coupler unit is mounted on a shelf, which extends from the back of the panel. The primary is wound on a cylindrical Formica tube and is divided into sections, from which leads are brought to the selector switches operating from the front of the panel. The coupler secondary is rotatable through an angle of 90 degrees, and its position with relation to the primary



fulfillment of the following requirements:

1. Selectivity
2. Amplification
3. Flexibility
4. Rapid adjustment.

In the Grebe type CR-3, maximum selectivity is obtained by the use of a variometer for tuning the grid circuit, thus eliminating shunt and stray capacities. A high degree of amplification is accomplished by tuning the plate circuit with a second variometer. The comparatively small wave length range (150-375 meters) assures great flexibility, inasmuch as the change in wave length approximates 2 meters per scale division. Rapid adjustment is made possible by the reduction to a minimum of the tuning elements.

Figure 1 shows the front of the Receiver. From left to right will be seen the control dials for the grid variometer, coupler and plate variometer. The two binding posts at the extreme left are for antenna and ground connections. Terminals for the

is indicated by the beveled dial directly above the switches.

The grid and plate variometers are of the familiar Grebe design but have been specially wound for the wavelength range mentioned above. The positions of the dials indicate respectively the wave length and the point of maximum amplification. The use of large knobs assures easy and accurate operating control and the beveled and carefully graduated dials make the original adjustments and subsequent re-settings absolute.

Rigid and direct wiring results from the use of heavy nickel-plated copper bus, supplemented by flexible connections, which latter are covered with varnished tubing.

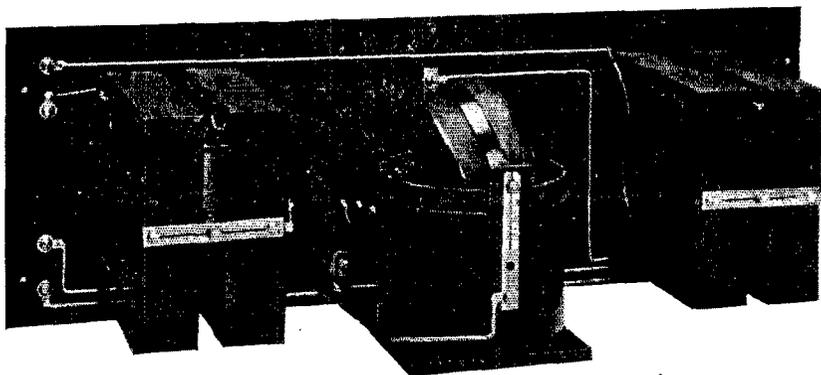
The cabinet is constructed of quartered oak, stained and wax finished. Its hinged cover permits of instant inspection of all parts of the set.

The operation of the CR-3 consists essentially of bringing three circuits into resonance—Primary, or antenna circuit,

Secondary or grid circuit, and Oscillating or plate circuit.

For tuning to a given wave length (assume 200 meters) the Grid Variometer is adjusted to the setting corresponding to this wave length. A curve furnished with each set shows the correct settings for the various wave lengths. It may be noted that 200 meters corresponds to a setting of 25. Having set the Grid Variometer in this position, bring the Plate Variometer to the position where the oscillating condition is just reached. This is indicated by a faint click followed by a soft hissing sound in the telephone. The grid and plate circuits are now in resonance, and it remains to adjust the Primary to the same period. Starting with the switches in the

than compensates for the reduced tuning limits. Furthermore, the agitation in favor of using wave-lengths below 200 meters in order to improve traffic conditions justifies the sacrifice of the higher wave lengths in order to include the lower. However, as there are often occasions when it is desirable to tune in wave lengths including 600 meters, provision is made with this set to change its normal wave length range of 150-375 meters to 250-680 meters. This is done by the addition of a very small, low resistance mica condenser, which is placed in shunt with the secondary circuit. The capacity of this condenser is so small, compared with the value of secondary inductance, that the working efficiency of the set on the upper range is unimpaired.



zero position, add turns of primary inductance until the resonant point is reached. At this point the hissing sound in the telephones will decrease and may be eliminated entirely by a final adjustment of the coupling.

The best results may only be obtained when the vacuum tube detector is operating at maximum efficiency, which depends largely upon the correct values of plate voltage and filament current, as well as the use of a proper grid condenser and leak.

There is a decided difference of opinion among Relay men as to the most effective method of tuning the Primary circuit; i.e., by variable series capacity or by fine inductance variation. In the Grebe Type CR-3 both methods may be employed, as the double selector switch makes possible the elimination of the series condenser. However, the inductance value of the Primary is sufficiently large to allow the use of a series condenser, when desired.

It might appear that the wave length range of the CR-3 is inadequate, but when it is considered that the vast majority of amateur stations are transmitting on a narrow band of wave lengths, the great increase in flexibility afforded by this instrument on these wave lengths more

A number of these receivers are now in active service in some of the most prominent Relay Stations, and from reports thus far received, it is believed that this receiver will play an important part in American Relay service.

#### USE OF HONEYCOMB COILS

(Concluded from page 13)

distance of about 1640 miles, are heard throughout the day nicely. Other spark stations on these short waves are NJK, 950 miles; VPN, 1000 miles; NAR, 1050 miles; M, 1150 miles; NAW, 1350 miles; NSC, 1500 miles; US, 1540 miles; NJG, 1550 miles; together with all others between NBD and NJK and several of the Texas Forts whose exact location I do not know, but all of which are well over a thousand miles. This is all absolutely daylight work, and I think speaks wonders for the efficiency of the honeycombs and single VT. On the 600 meter wave the combination is equally as effective as on other waves, and as I note "One Dee Eye", on page 28 of your December issue, asks some one to shoot at his range, will say his long distance station, BZL located at Demerara, British Guiana, is heard here almost every night strong enough to copy nicely with

phones held at full arm's length. While this station is about 125 miles closer to me than to 1DI, the little difference doesn't amount to much, considering the total distance covered. Mr. Gisburne is doing fine work, of which he has a just right to be proud, and in his article on page 17 "On Handling Traffic" I heartily agree with his remarks about "phoney" hook-ups and a multiplicity of tuning devices which tend to decrease rather than increase the everyday working efficiency of a set.

The enclosed hookup is without doubt one of the most simple and efficient ones for all around work for use with the Honeycombs. It is nothing new, but one of great merit and the same as used by me in obtaining the results previously described.

#### ADDENDUM

The curve of Figure 2 shows the tuning of the Honeycomb Coil No. L-1500 and Murdock 43-plate variable as used in my set. While not correct in all details, this curve represents the exact condenser settings for the different stations, and the approximate waves correspond very closely to the waves said to be used by those stations. Differing lengths of secondary leads will give variations from the curve, but they will be slight, and it will answer the burning question of where to locate a station.

#### RADIO CLUB ORGANIZATION

(Continued from page 6)

parisons of experiences and results of experiments on the part of the members are always of interest. Radio men of prominence from neighboring towns may be invited to address the club, and it will be found that they very seldom refuse, since radio men are always glad to talk before an interested audience, in common with the rest of humanity.

#### CLUBS IN LARGE CITIES

The formation of a club in a large city presents more complicated problems than does that in a small town, inasmuch as relations must be made and kept with other clubs, and individuals. There are two classes of clubs in large cities, namely community clubs and school organizations. It is an unfortunate fact that more or less unpleasant friction is usually existent between such associations. A method of organization will be discussed later in this article by which such friction may be eliminated. A community club should be organized in almost the same manner in which the club in a small town was formed. However, the membership should not be subject to any iron-clad restrictions as to membership being limited to any certain locality. The community club should be

representative of the locality in which it is located, but members living in other parts of the city should not be excluded, as such action leads to sectional feeling, which is undesirable. It will usually be found that a city park or other civic organization is willing to assist in the provision of meeting places and other such facilities, if the club members show themselves to be in earnest. It is suggested that there be two classes of memberships to such clubs, senior and junior, the boundary lines between the two being age and ability of the members. This provides an incentive toward the improvement of the ability of members who are not the equal of the rest of the club, and also keeps the executive control in the hands of the older and more experienced members, if the junior memberships do not carry with them the right to a vote.

#### SCHOOL CLUBS

School clubs are formed at the instigation or with the assistance of the faculty of the school and are usually organized primarily for the education of the members. The other activities are subordinated to this, especially if the faculty member behind the club is strong-minded. In these clubs, of course, membership is limited to the students at the school, and their organization is considerably simpler than that of the community associations. School clubs have the advantage of the co-operation of the school laboratory departments in providing apparatus, and accordingly there should be no difficulty in sustaining interest in such organizations. There should be no restrictions on the members of these clubs affecting their membership in other organizations, such as community clubs. The actual organization of community, school, and small town clubs is the same in each case.

#### AFFILIATING SMALL TOWN CLUBS

The affiliation of local clubs with the League requires different handling for different cases. In the case of the small town club, the affiliation should be accomplished in the regular way, by application to the Board of Direction of the League, through a local traffic department representative, or through the Secretary of the League, at Hartford. A point often not appreciated in this respect is the fact that it is not necessary that every member of a club be also a member of the League in order to effect the affiliation of the Club. All that is necessary is that the resolution of affiliation as given on page 7 of the August issue of QST magazine, be passed by a majority vote of the membership, or in some cases a plurality vote will be sufficient, depending on the constitution of the club. This resolution should be duly

signed and forwarded to the Board of Direction of the League through the channels outlined above, after which the application will go to the Traffic Department of the League for approval and will then be referred to the Board of Direction for final action. The affiliated club will then receive its official charter and will be admitted to full participation in the affairs of the League.

### AFFILIATING CITY CLUBS

The affiliation of a club in a large town is handled in exactly the same manner as that in a small town, when the club is the only one in the city. When there are other existing clubs, a better plan has been formed. Such an organization now exists in the City of Chicago, and for this reason it has been given the name of the "Chicago Plan". In order to eliminate friction between the various individual clubs, a closely-knit-together association of these clubs must be formed. This can best be done by forming an Executive Council composed of the President, Vice-President and Secretary-Treasurer of each club. This Council will be under the control of the League, and it is extremely advisable that it be under the control of the City Manager of the city in question. This Council should control local traffic and interference and should in general administer amateur radio affairs in the city. Meetings of the Council should be held as often as necessary. Its activities should not interfere in any way with the individual rights and activities of the individual clubs. These separate clubs may hold their meeting whenever they wish and the only interference with any of their actions by the Council will be in regard to traffic regulations and interference control. It is extremely advisable to hold combination meetings of the entire membership of all the local clubs at intervals of about a month. These meetings will be under the direction of the Executive Council and will be held for the purpose of promoting co-operation and good feeling between the members of the individual organizations. In the case of clubs being formed in cities operating under such a plan, application should be made through the Executive Council for affiliation with the League. The application will be approved by that body before being forwarded to the League. As fast as clubs in any given city are affiliated their officers should automatically be given membership in the Executive Council and should take part in the administration of local affairs. This plan

gives every club an equal voice in the action taken about all local radio matters and has been found to be the most equitable method of handling the complicated situation that exists in most of our larger cities.

Few cities have a more effective organization of this type than does Chicago. In this city there are four existing clubs, each of considerable size, the officers of which form the Executive Council as outlined in the foregoing paragraph. Radio matters are handled efficiently by this body, under the direction of the Chicago City Manager, who is Chairman of the Council. Very close co-operation is effected with the local Radio Inspector and on this account excellent regulation of traffic and interference is secured. This plan can be heartily recommended to all cities of size comparable with that of Chicago. In Indianapolis we have a very efficient example of a large city with but one radio club under the direction of the District Superintendent of Southern Indiana, Mr. F. H. Hamilton, who has administered the affairs of the city in excellent fashion. St. Louis is another example of this type of organization. In most large cities the formation of one single club with all the local amateurs as members is not possible, because of the existence of high school and college clubs which cannot of necessity abandon or merge their individuality. The use of the "Chicago Plan" is recommended in such cases.

Whichever plan is followed, it is certain that the radio art in general will be improved by the formation of local clubs in every community in the country and their affiliation with the League, and we look forward to the time when we have an organization representative of every radio man in the United States.





## OUR NEW DIRECTORS

**J**UST as this QST goes to press our Board of Direction has had a meeting at which a new Board for the coming two years was elected. For the most part the names are the same, but there are a few new faces.

Because the A.R.R.L. is wholly non-commercial and must never be in a position where it can be criticized from that standpoint, our constitution provides that no person engaged in the manufacture or sale of amateur apparatus is eligible to membership on our Board. Through that provision, wise as it doubtless is, we lose with deep regret the services of two old and tried members who have entered the amateur apparatus field: Mr. Clarence D. Tuska, of the C. D. Tuska Co., and Mr. R. H. G. Mathews, of the Chicago Radio Laboratory. These men are well-known to all of us—they have helped in glorious fashion to make amateur radio what it is today. Our best wishes go with them in their new work—but may they ever be Amateurs at heart!

Filling these places and two other vacancies on our Board are four new men, Messrs. John M. Clayton, Francis H. Hamilton, A. E. Bessey, and M. B. West. Mr. Clayton's photograph appears elsewhere in this issue, so we won't say much about him here. We all know 5BV-AF-ZL anyway. Mr. Hamilton is that live-wire organizer you've heard about in Indiana; the A.R.R.L. District Superintendent for the southern end of the state, in other words. He is the proud possessor of what has been called the prettiest amateur tone—FH, now 9ZJ, Indianapolis. Mr. Bessey is a new-comer in our ranks but his present rate of speed promises to make up for lost time, and he has been working hard for the A.R.R.L. organization in his territory. He's 6BR, of Sunnyvale, California, with an efficient station (hears 9ZN) and the keenest interest in League affairs—which are the main essentials, nesspah? Introduction of Mr. West is wholly unnecessary. As old 8AEZ of pre-war days he acquired everlasting amateur fame beyond the need of our poor boosting. His present location at Waukegan within the shadow of NAJ has kept him from the enjoyment of a station this season, but he's there with the knowledge and the ideas.

These four men we welcome to our Board with the old A.R.R.L. spirit. We're glad to have you with us, and know that the strength and inspiration you bring to us will do much in furthering the onward march of Amateur Radio.

We've never had a meeting at which all the members of our Board could be present, for it takes considerably longer than the speed of radio waves to get up this way from Texas or Florida or California. But don't you know, fellows, sometimes when we lean back in this old bow-legged chair and refill our pipe, we get all enthused over the idea of an A. R. R. L. convention. It may be this new jar of Prince Albert, or it may be the general state of happiness induced by this letter we've just got from our girl, but we do like to think of all the fun we would have when we can succeed in rounding up all our

organization to a convention to be held in some central point, such as Chicago. Think of all of our officers and all of our operating organization meeting face to face and having a chance to ask the question, "Really now, how do my signals come in?" And we would have the ability to adequately defend ourselves against unfavorable legislation, a matter we must always be prepared to fight, because our enemies are not all dead by any means.

That's what, fellows. That's what comes to a man when he leans back in an old bow-legged chair and re-fills his pipe.

### An Announcement

**H**ERETOFORE QST always has been obtainable by non-members of our League at \$1.50 a year, the \$2 membership dues also including it. Now that the League wholly owns QST that policy has begun to seem inconsistent, and we just recently gave it a test which convinced us—on our expiration notices we printed two forms, one for straight renewal and the other for joining the League. That settled it—it has been almost solid for the League.

And so the separate subscription arrangement is going by the board as outgrown. With the next number the newsstand price of QST goes to twenty cents—meaning we'll have a better QST—and the yearly rate will be two dollars, including membership in the League just as before. To start off the new system and reconcile the differing dates of membership and subscription expirations now on our books, we will issue membership certificates to our present non-member subscribers up to the date of expiration of their subscriptions, without charge, so that thereafter the two will expire simultaneously.

You're asked to spread this news. We suppose for the next five years we'll be getting those little red coupons (remember the old blue ones in 1917?—they still come in!), and it will be some time before the dollars-and-a-half stop reaching us; so you can help. Meanwhile whatever amounts we receive will be credited for as many months' dues as they will cover.

The QST reader who is not enthusiastic for A.R.R.L. organization and what we can do thru teamwork is a rare bird. Of course QST will be available separately on the newsstands, but we'd like to have him as a member and make a believer out of him. Let's build up our membership.

### The H-T-L Club

**O**UR President walked into our sanctum the other day with a new one. Like his other efforts it is based upon a desire to get better results and have a

little more fun. This time it is a new Club. It is to be formed from among the members of the A.R.R.L. who GO HOME TO LUNCH. That's where it gets its name—THE HOME-TO-LUNCH CLUB. Anybody in the A.R.R.L. is eligible if he goes home to lunch and therefore is in a position to work his station between 12:30 and 1:30 mid-day. Of course everybody is not able to go home to lunch and in consequence only a limited number can work, and hence down goes QRM. In other words, an automatic method of reducing interference so traffic can be cleared which hangs up at night. In addition to its limiting the number of stations which will be in the air it will also have the beneficial effects of cutting down long distance QRM because day-light will attend to that. Strikes us as quite an idea. It strongly suggests Mr. Hebert's "EARLY BIRD CLUB" of pre-war days. In Mr. Hebert's case, however, one had to get up at 5 A.M. This is not as easy as it sounds and probably would make for still greater exclusiveness. One dislikes to miss the fun that goes on late at night, but one simply must in order to get up at five in the morning. So, it looks as though the HOME-TO-LUNCH outfit would be an improvement because one can enjoy both the night life effect and also take in the mid-day working—provided always, that one goes home to lunch. Join up, you chaps who are fortunate enough to have a business which enables you to go home at noon. It is already in working operation and all you have to do is to send out a CQ between 12:30 and 1:30 any mid-day to become a member. Next, please.

### The Canadian Lid

**I**T'S our time to congratulate you, Canadians, and it gives us lots of pleasure to do it.

Canadian stations along the Great Lakes and St. Lawrence River have been authorized to use the 200 meter wave until the opening of navigation as per the copy of order appearing elsewhere in this issue. This is splendid, and it comes most opportunely, with the opening of A.R.R.L. activities in the newly-formed Canadian Divisions. Now for some good work, and again our best wishes!

But let us say a word of warning. The opening order makes it plain that you are on your good behavior. The consensus of Canadian opinion is that if the law is respected and no trouble is caused, the privilege of using 200 meters during the winter months—the relay reason, when ability to work is most needed—will be made a permanent one. We therefore urge upon you the greatest care in seeing that you do not exceed 200 meters and

that your tune is sharp. Don't let this permit be rescinded because of someone's carelessness—let your authorities see that their trust was well-founded, that the feature may be extended to the rest of the country and made permanent. We're for you, and want to help.

### Patience!

**Y**OU'RE having trouble getting hold of the equipment and materials you ordered? Patience! So are we, and our neighbor, and your neighbor, and everybody else.

The stuff doesn't exist—that's the reason for the delay. Can you visualize the amount of business which was heaped upon our manufacturers and dealers when we opened up in October? Just think of the hundreds of thousands of dollars worth which it totals—the accumulated needs of a nation of amateurs. The logical happened; the surplus was immediately exhausted and the factories struggle vainly to keep up with the demand. But now they're catching up, slowly but surely. We know one factory which a month ago was three months behind in its order; now it's only two months behind.

We know all our manufacturers and dealers are honest and that they're doing their best for us. The rush has just been too much for any business which did not have vast reserve stocks of everything from solder to pliotrons. Soon things will be normal again. Until then, patience!

### The Sixth District

**I**S the Sixth District backward? We hope not, and really we do not believe it is. In pre-war days the amateur activity there was remarkable, and everybody knows the good work which was accomplished.

The Pacific Slope is very important territory, containing the terminals of all our coast to coast routes, and it must not drop behind. But something seems to be the matter. Several good A.R.R.L. men in the Ninth District are weeping bitter tears because they hear sixes but can get no response to their calls. And the sixes don't seem to hear any nines at all. Right there seems to be the trouble. Our West Coast correspondent tells us that one- and two-stage amplifiers are just coming into adoption among the Pacificers! 6EA is heard in St. Louis, 9BT reports sixes regularly, and other stations in the Valley hear them. Doesn't it seem logical that if the standard of equipment there were as high as in the other districts, some nines would percolate thru and communi-

cation have been established across the Rockies long ago?

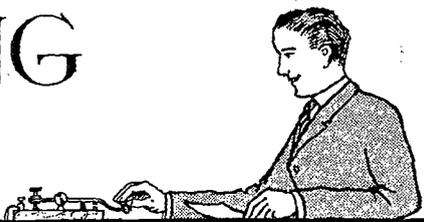
Give it a thought, West Cost Amateurs. Fix up your amplifiers and let's get thru to you.

### QRM—and QRM

**T**HERE is no use fooling around with it; we must take up the question of QRM. We do not mean the old pre-war variety of QRM. We mean that which comes legitimately from stations which are working and have a perfectly good right to work. It is like the commercial brand. And like the commercial it is getting worse every night. Of course we can reduce it by improving the operation of certain of our members. Some of them certainly need a gentle hint about calling too many times, repeating too many times and holding the air too long on a stretch. This is especially bad when it comes from some of the very loud amateurs, because actually the whole country East of the River has to stand by when they work. An example is that we here at Headquarters in Hartford often cannot work Springfield, Mass., only 25 miles away, when 8ER is going or 8CC either. We suppose 1AW causes similar trouble. This can be improved by being economical of signals and of time also. But the real solution is in SELECTIVITY. We amateurs have always been away ahead of the commercials in sensitiveness of our receiving sets. The reason is that we are perfectly willing to put up with little troubles and to struggle to get signals. Little matters like instability of a bulb do not bother us. We go ahead and put up with them. But now we must go up to the head of the class in other things too. We must exceed general practice in sharpness of transmitting wave and in selectivity of receiving. Only then can a large number of us hope to work on a narrow band of wave lengths. In theory we really have no chance at all, because if the whole bunch of us were right on 200 meters it would be some thick. But in practice we are not all on 200. Some are below and some are above. But the variation is small, or should be, and this is where we must apply our superior patience, skill and brains and secure super-sensitive selectivity. Our manufacturers can afford to consider this fact. We will buy all right. We listened in on a set the other evening which promises big things. Stations which ordinarily would absolutely kill working were tuned down so that the weak one could be read easily. The laws governing selectivity have not been ventilated very much. It is the big question of the immediate future in amateur radio in our opinion. Let the scientific ones among us come forward and tell the rest of use what we can do and how to do it.

# THE OPERATING DEPARTMENT

J. O. SMITH  
Rockville Centre, L. I.  
TRAFFIC MANAGER.



The reports of the various division managers of the traffic department show a gradual resumption of pre-war activities on the part of amateur radio stations in general. This condition, however, strange to say, seems more true of isolated, widely separated sections, such as the Rocky Mountain Division and Pacific Division, than the congested territory, between New York and Boston.

The plain fact is that we cannot handle traffic with any certainty of promptness or regularity between New York and New England. The same is true between New York and the south and west. Of course some traffic is being handled at intervals over long jumps, but only at infrequent, irregular intervals.

There is one way to successfully handle traffic and only one, and that is in short relays that will make possible reliable communication under daylight conditions. There are many station owners, members of the League, good fellows, and of sound mind, apparently, but who will not, for some reason, be content to be part of a successful system of relaying in short jumps. It must be 1,000 miles, or bust. And frequently they bust.

Of course, the temptation to work long distances is great, but the real test of any station is its ability to give regular service during daylight over 75 or 100 miles. If station owners will once try this method, it is pretty sure to become a habit. It certainly is much more satisfactory. On the other hand, if a dozen stations are going to attempt to handle all the relay work of the League, what are the other 4,988 going to do? What reason will there be for their existence?

The policy of monopolizing traffic on the part of a few stations is wrong and is hereby condemned. Traffic should go by short relays, requiring only the use of low power approximately 75% of the time instead of full power 100% of the time as under present conditions. The unnecessary QRM caused by continual attempts at long-distance work is one of the greatest handicaps of amateur radio at the present time.

The first official report of Canadian amateur activities is included in this

month's report. The new manager of the Ontario Division, Mr. A. H. K. Russell, 353 Markham St., Toronto, Ontario, reports that the amateur wave length in Canada, from the Gulf to the Lakes, has been raised to 200 meters, until opening of navigation in the spring. There is a possibility that it may be allowed permanently.

Mr. Albert J. Lorimer, 243 Mackay St., Montreal, Quebec, has been appointed manager of the St. Lawrence Division.

It was hoped that appointments of managers for the other Canadian divisions could be made in time to announce them in this issue, but this was not possible.

The managers of the, Atlantic, Central, Rocky Mountain and Pacific Divisions report, however, that considerable traffic is now being handled across the border. In connection with this, all members of the traffic department are requested to note that all messages to or from Canadian points are properly dated or addressed, that is, that the address contains a town, Province and specifies Canada, and that messages from Canada carry the town, Province, and word Canada, in every case, as point of origin.

All members of the Operating Department are requested to carefully observe the Traffic Rules and Regulations, as printed in the February issue. In order to maintain an efficient and orderly organization, it is necessary that definite rules of conduct be followed, and the Traffic Rules and Regulations as adopted by the League provide the foundation for a successful organization, if observed at all times by the individual members of the Operating Department.

Another enlargement of the League's traffic department has been made. When our cousins up in our territory of the Midnight Sun read of our expansion and the creation of our four Canadian divisions, they immediately requested recognition, with the result that a new division, embracing Alaska, and called the Alaskan Division, has been created. It is hoped that it will be possible to announce a manager for this new division in the next issue.

The reports of the Division Managers in detail follow:

**ATLANTIC DIVISION.**

**Mr. C. A. Service, Jr., Manager,  
Bala, Penna.**

At the writing of this report, relay conditions in the Atlantic Division have taken a considerable stride forward over those reported in last month's, reliability of transmission between large centres is fairly well assured, the Canadian amateurs are being heard from and are included in the present scheme of our League Operating Department, and all other conditions indicate that we have a real live organization of stations working in this Division. Each section will be taken up and reported on separately.

Reports from our New England Assistant are very encouraging, as usual, and show he is getting the best work and co-operation from his District Superintendents in keeping them constantly on watch to place new stations.

Much attention is being directed toward the development of Branch Lines into outlying districts of New England, now that through lines are in fairly satisfactory operation.

We note with pleasure that the Canadian government has temporarily allowed its amateurs the use of a 200 meter wave in all places and if no interference is experienced by commercial stations, it will become a permanent institution and amateur relay work in Canada should experience a decided boom.

Mr. Entwistle's report also shows all sections in the central part of New England are wideawake to handle relay work with the best dispatch.

As regards the Middle Section of the Division, Mr. McIntire's report shows conditions between large centres satisfactory but the outlying districts are still sluggish and need constant pushing to get them in line.

The route to Buffalo is working well and a letter from the new Ontario Division Manager states that he hears Buffalo stations in Toronto without trouble; he is particularly anxious to connect with the Buffalo stations and amateurs in the adjacent part of the Atlantic Division should communicate with Mr. Fraser, the District Superintendent for Western New York, if they want to get in on this work.

The appointment of Mr. Frye of Vineland, N. J. should result in increased activity among amateurs in South Jersey. A seacoast branch is badly needed, and organization of it now will assure its satisfactory working during the summer months when traffic will be heavy. Mr. Frye has been working on a route from Vineland to Washington and it may be possible to use him as an alternate route to Trunk Line "D" from Philadelphia to Washington.

The Division Manager has accepted with regret the resignation of Mr. McIntire as Assistant Division Manager for the Middle Section of the Atlantic Division. His successor will be appointed in the course of a few weeks.

Relay conditions over the Southern Section are not as satisfactory as could be wished; the route from Philadelphia to Washington and Danville is still inoperative, notwithstanding the efforts of the Assistant Division Manager, Mr. Stewart, and his District Superintendents. Mr. Gravelly, 3BZ of Danville Va., is waiting to connect up with this line and forward traffic southward into the East Gulf Division but so far has confined himself to long distance work in other directions.

Stations through Pennsylvania are slowly opening up and getting in touch with their District Superintendents, which latter should be able to report the satisfactory operation of Trunk Line "B" and Branch Lines as shown in Mr. Stewart's report of last month.

Amateurs in Baltimore seem to be devoting much time to the study of amplifiers and short wave reception so we will hope for the fruits of their labors to ripen into a real live relay route before the advent of the summer months.

**ATLANTIC DIVISION (Northern Section)**

**Guy R. Entwistle, Ass't Division Mgr.  
136 Sutherland Road,  
Brookline, Mass.**

Latest reports from the office of the Radio Inspector show an increase in the number of second grade amateur licenses, or out of town radio stations. This is encouraging inasmuch as our long distance relay men are included in this division. Vermont is gradually coming to the front. Mr. Sanford C. Lyons of Bennington, Vt., has offered his services to the league. Several others appearing on the call list have approached but as yet nothing has been heard in these cases. We are looking for some live wires around the Canadian border to assist Mr. Lorimer in breaking thru to New England.

Lorimer writes, "From Montreal, Mr. Milette (Can. 2AI), has established daylight communication with Three Rivers and Farnam, Que., the latter being 40 miles east of Montreal and 25 miles north of the Vermont border, our stations there signing 3Z. The former is 90 miles northeast of Montreal. There are many other stations that are copied 60 miles east at 2AS, Cowansville.

"Station 3Z has been called by someone signing 2BN or 1BN whose sigs were QSA. Also heard in Montreal. No answer to our calls to him. May be man in St. Johnsbury using pre-war call. The Jesuit College in Montreal have been using 600

meters and call of XAA; now 2BC. He is QSA at Quebec. Government permits wave of 200 meters here until April 15th as an experiment. If satisfactory, will be made permanent.

"Amateurs in Northern New England should try to establish communication with 2AI, (Canadian). He has no difficulty in picking up the New York stations and 1AW. Other Canadian stations around Montreal who are coming along are 2AW, 2AK, 2AU, 2AM. Several stations around Nicolet and Three Rivers with special licenses using calls of, 9AA, 9AB, 9AC."

1BH, Hardy (D.S.) reports as follows: Stations have been appointed at Essex, Lynn, thru to Portland. I have been co-operating with Mr. Ham for tests thru to Scarborough and Westbrook, Me., via Waterville, Bar Harbor and Bangor, where D. F. Alexander, our Northern Dist. Supt., is located. 1RV, Mr. Ricker of Essex, will alternate with 1BH in handling relay traffic in this district. Stations located in New Hampshire and Vermont are requested to write Mr. Hardy, 776 Hale St., Beverly Farms, Mass., for tests. A direct line between Beverly, Greenfield and Brattleboro, Vt. is in operation. Assistant Radio Inspector, 1st District, Mr. Walter J. Butterworth, has obtained fine results from local amateur operators around Lowell, his home town. The Lowell Radio Club is the direct result of his efforts to organize the serious amateurs into "the best radio club in the world". Quarters have been secured at 256 Merrimac St. A 1-KW set will be installed, with letters 1LL. At present there are 28 members. The club has applied for affiliation.

Bates of Worcester has at last won out with the electric light people and should be heard any time now. 1DL comes QSA there. The local radio club is making headway on controlling QRM. Stations in Fitchburg, Leominster, Millbury, Athol and Spenser are being lined up. Long distance stations come in QSA at 1GY.

Bowen is coming along fine down in Southern Massachusetts. He was up to see us a few weeks ago. The writer welcomes any A.R.R.L. man at Room 20, 18 Boylston St., after 2p. m. 1AW reports working Fenton, Michigan on the 11th.

(Lt.) E. A. Gisburne, our recently appointed City Manager, has been laid up for a while at the Naval Hospital. His leg has been troubling him again.

1CM is doing excellent work west and south but can't seem to unload his traffic for Boston. Stations here report him "swinging".

Stuart Briggs and Fred Bowditch of Brookline are victims of the undamped transmitter and can be heard most any afternoon or evening testing out. Both are old N. E. A. W. A. members. Francis

Pray, of Somerville, is also one of the CW short wavers.

That amateur activity is increasing in this district is evident from the number of calls assigned up to date. Mr. Gawler has started in with 1CAA in the latest list of calls. This is in the third alphabet of the second series.

Pulley reports some interesting observations on swinging. He finds that on the evenings that the western stations come QSA the 3's are weak while when the 3's come strong the 8's fade. Amateurs should try and complete data on the subject of fading or swinging and send it in to Editor QST for tabulation. What have been your observations? 1AW swings in Boston.

The condition of the atmosphere along the coast as compared with that inland has probably something to do with it. The writer has had much experience with swinging in commercial work around Long Island Sound which is as erratic a section as any, from reports.

Why was the ether so quiet on Feb. 12th in New England? We were all at the banquet! Turkey, entertainment, speakers and everything. Hope to see you again next year.

**ATLANTIC DIVISION (Middle Section)**  
M. A. McIntire, Ass't Division Manager,  
1127 Ave. G., Brooklyn, N. Y.

The holidays being over, we start upon a new year in radio, and upon one which undoubtedly will be one of the best. New stations are springing up everywhere, the old ones again getting back on the job in real earnest and with the publication of QST's Directory of Call Letters, we are again able to know whom we are working with.

From the reports of the District Superintendents, we find that things are moving along in fairly good style. As before the war, we have a number of long jumps to account for, and this makes it difficult to get "rush" messages through, and traffic is subject to delay.

2ZM reports that things in New Jersey are coming around in good shape. Traffic south has been handled mostly by 2RE 2CB, 2LO, and 3CS. 3CS is in almost every night and has no trouble in working through to Philadelphia. There being a number of good stations around Newark Paterson and the Oranges; delivery is very prompt in this section. Most of the easter traffic is being sent direct to 2JU or 2Z with an occasional few to 1AW when sig get through. Traffic direct north to Buffalo is being handled via 8CC and 8AD. The possible traffic west of Pennsylvania is sent direct to 8ER.

No reports have been received from M Runyon or Mr. Fraser; hence we cannot report anything for their Districts. W

have heard Mr. Runyon working a number of long distance stations and know that he is in touch with almost everybody that shoots a spark; however, we would like to hear from him. The Hudson River Valley is being well covered by the following stations: E. M. Williams of Troy, N. Y., 2EH; Troy YMCA Radio Club, Troy, N. Y., 2SZ; 2EM at Hudson, N. Y.; 2FG at Albany (old 2AGJ's set); 200 at Poughkeepsie, N. Y.; 2DA at Poughkeepsie, N. Y., and several others.

Things up Connecticut way seem to be more or less at a standstill as far as trunk lines is concerned. We have not heard from Friend Nichols in some little time, and with the exception of 1AW and 1AS have heard very few fellows sign off from that section.

2JU reports that things are in good shape around Brooklyn and Long Island. The following stations have done considerable work in getting traffic through: 2CS; 2OW; 2QA; 2PF; 2WO; 2EC; etc. We have heard from a few Long Island Stations and expect to have them lined up in the near future. We want to get the line out on Long Island in the shape we had it at one time before, when we could get stuff into Connecticut without much trouble.

As most of us are near a good sized city, where QRM is abundant, it is urged that we all comply strictly to the rule of using minimum power in transmitting to nearby stations. As we well know, this is one of the Radio Laws and we should comply with it.

**ATLANTIC DIVISION (Southern Section)**  
**Chas. H. Stewart, Ass't Division Manager,**  
**St. David's Pa.**

Reports received from the various District Superintendents indicate that relay conditions in this Section of the Division are not improving to the extent that we had been looking forward to. There has been some long distance work accomplished on the part of stations located in this Section with stations in the Middle Section and stations in the Central Division, but the present state of organization of the Trunk Lines through this territory can by no means be considered satisfactory.

On Trunk Line D, for messages between New York and Philadelphia, conditions may be looked upon as reasonably satisfactory, but the situation south of Wilmington, Del., remains as yet unsolved.

As regards the work on Trunk Line B, while no satisfactory results have yet been attained, the situation is a much more encouraging one, and stations are being located which we believe will later fit together into a working organization.

Since the last report Mr. Malcolm Ferris, 3409 Baring Street, Philadelphia, has been

appointed District Superintendent for the Eastern Penna. District, and entered upon his duties with a supply of enthusiasm and energy that is most encouraging. Mr. Ferris is an old-timer in radio, and should have the hearty support of station owners in his District, who are urged to get into communication with him as promptly as possible. It is especially desired to hear from stations in the vicinity of West Chester, Coatesville, York, Gettysburg, Pottstown, Reading and Pottsville. With good stations at some of these points, reliable communication ought to be had as far west as Milton, Pa. in the Central Penna. District.

Mr. Ferris reports that outside of stations at St. David's, Pa. (3ZS) and Norristown, Pa., (3BH), no stations have been definitely located on Trunk Line B but that efforts are being made to locate additional stations on this Line. On Trunk Line D, he states that traffic is being handled in large volume between 3CS, Trenton, N. J., and 3CC, Abington, Pa. (Philadelphia District) and that 3CE at Norwood, Pa., can connect with the Philadelphia stations and also work reliably with 3BE at Wilmington, Del.

The report from the Central Penna. District Superintendent, Mr. Cawley, of Milton, Pa., indicates lack of known stations between that point and Curwensville, Pa. to connect up Trunk Line B. He has hoped that the station of Mr. Irvin at the latter named point could be depended upon, but no communication has yet been had with Curwensville. Regarding Branch Line No. 3, Mr. Cawley would like to locate stations in the vicinity of Towanda or Sayre, Pa. Mr. Cawley, in connection with his Assistant, Mr. Walleze, is expecting to get a reliable station working in Milton within a very short time.

Mr. Devinney, Superintendent Western Penna. District, reports that he has not yet been able to get sufficiently in touch with operations in his District to make what he considered a satisfactory report. He states that the station of the Alexander Brothers (8JQ) at Washington, Pa., has handled about 150 messages; also that the station of B. P. Williams (8EN) in Pittsburgh, has handled about 100 messages.

The report of Mr. Horn, Superintendent for Delaware, is to the effect that conditions appear to be more encouraging, and he is hoping to be able to locate a station to the south of Wilmington soon, to connect up with Baltimore stations.

Mr. Duvall, Superintendent Eastern Maryland District, reports that radio activities in the Baltimore District have increased during the past month, and that the Baltimore Radio Association has been devoting considerable attention to the study of amplifiers and short wave re-

ception, and it is hoped that this will result in increasing receiving ranges in stations in that vicinity. He calls attention to the fact that Yearly (3AN) has done some excellent long distance work. Duvall calls attention to the fact that Yearly will be on until midnight every night for relay work, and that he is arranging for a watch after mid-night in order to avoid local QRM. Mr. Duvall states that his call is 3EM, and requests that anyone who hears him, especially in the Philadelphia District, should write him.

No report has been received from the Superintendent for District of Columbia, nor from Mr. Gravely, of Danville, Superintendent for Virginia, but it is hoped that a complete report will be forthcoming next month.

#### EAST GULF DIVISION

**J. C. Cooper, Jr., Manager,  
Atlantic National Bank Bldg.,  
Jacksonville, Fla.**

Development of regular relay lines through this territory is still not as fast as had been hoped but progress is being made. Mr. W. B. Pope, Assistant Division Manager for the Eastern Section of this Division, reports, among other things, the following:

4AN at Boston, Ga., is getting his station into line and his signals seem to be covering considerable range. 4AE at Jackson, Ga., is capable, apparently, of covering longer range work. 4AT of Ft. Pierce, Florida, is doing good transmitting work and as soon as he can get an efficient receiver installed will be of great assistance in handling messages into South Florida. 5XA, Auburn Polytechnic Institute, Auburn, Ala., are getting their station into shape and with temporary apparatus have communicated with 9AC, 5AU, 5AG, all of whom report signals QSA.

No definite report from Atlanta this month but it is understood that radio telephone experiments are being carried on there. Superintendent Rice, at Jacksonville, has not yet gotten his transmitter into operation, due to condenser troubles, but reports that he has heard, at his station (4AO) the following: 1AW, 2CS, 2CX, 2JU, 2ZS, 4AG, 4AX, 4AN, 8ER, 8JQ, 9FD, 9KV.

The weather has been unfavorable for amateur work in this section for some time, with considerable static and signals fading badly.

Mr. John M. Clayton, Assistant Division Manager of the Western Section, at Little Rock, Arkansas, is now 5ZL. He reports that his station is temporarily down and has been out of commission for three weeks but that his new station is about ready for operation. Traffic has been pouring through to Roswell, New Mexico, and out to the

Pacific Coast. Most of the messages have passed through 9BT, 9BR, 5ZC, 5AC or from Mr. Clayton's station direct to Roswell.

Mr. Clayton reports that on Christmas Eve he handled 34 messages and cleared every one. This is certainly an excellent record.

Mr. Greenlaw, now 5ZK, has his station in operation again and is doing splendid work; this also applies to Mr. deBen, City Manager at New Orleans. Mr. Greenlaw is getting the Louisiana situation into much better shape than it ever was before.

Mr. W. L. Barrow, 918 Convention St., Baton Rouge, La., has been appointed official relay station in that city and is combining his efforts in Baton Rouge with Mr. Raymond. Mr. Arthur H. Kopper, United States Radio Inspector, at New Orleans, is giving his most hearty co-operation to the members of the league. The "Nola Radio Club" of New Orleans has just been formed and has applied for affiliation with the A.R.R.L.; its officers are as follows: Prof. Auguste J. Tete, President (Tulane University); Arthur H. Kopper, Vice President (U. S. Radio Inspector); Hubert R. deBen, Secretary-Treasurer (City Manager, A.R.R.L.). At a recent meeting of the Club, Mr. deBen gave a short talk on the A.R.R.L. and Mr. Kopper, the Radio Inspector, voluntarily spoke on the recognition the Government gave the members of the A.R.R.L.

At last the Division Manager has a license and almost a station. If you happen to hear the signals of 4BL hesitating in the ether you will recognize that the Division Manager is again learning to operate. However, before hot weather sets in it is hoped that at least one message will travel from Jacksonville to the Pacific Coast and from Jacksonville to Headquarters, at Hartford, Connecticut.

#### ROCKY MOUNTAIN DIVISION

**M. S. Andelin, Manager,  
21 N. W. Temple St., Salt Lake City, Utah.**

The lack of a Rocky Mountain Division report in last QST was due to the fact that conditions in this division had changed very little during that month. But now we have some things to report that will be very much of interest.

We have our official A.R.R.L. station at Richfield, Utah, in operation at last, and Mr. Salisbury, the operator, has been working successfully and has accomplished results that are satisfactory. Messages have already been handled between 9JE, Colorado Springs, and 5ZA, Roswell, N. M., thru this station. 6EA and 6BQ report sigs QSA.

Salt Lake City has always been a dead zone as far as long distance was concerned, except in a few cases. I have noticed,

however, that the farther south in the city we go, the better are the results; so I am erecting a station in the southern end of the city near where old 6ZV was located in the pre-war days. 6ZV was the old stand-by station of Salt Lake City and did some real good work. The call of my new station is 6JT. Mr. Kaar, 6ZA, was in communication with Colorado Springs for a time but it did not hold out long. The station is now being remodeled in an attempt to gain more efficiency.

Colorado Springs has been in the game for a long time and has worked 6ZA, 6AL, LB, 9BT, and 5ZA. It also has been heard at Bear Creek, Mont., and El Paso, Tex. Mr. Reynolds has put forth every effort to put Trunk Line B on a working basis east and west of him.

We have a new station in Idaho who has done very good work, having worked over 500 miles. This station is located at Moscow and will probably be the gateway to Portland, Ore., on Line G.

Mr. Dawes, Superintendent for Montana, reports that he has been very busy lately getting the radio game in that state lined up. He has sent out circular letters to possible stations and is getting a few replies. He has located promising stations in Helena, Butte, Havre, Jordan, and several other places, and has been in mail communication with 9EE at Valley City, N. D. He has received a special license, new call 7ZD.

The Rocky Mountain Division has been very slow to progress in some parts, due to scarcity of amateur stations, so that long distances have to be covered to bridge gaps. In addition, the topography is such that it interferes with long distance work, and is a great handicap to amateur relay work.

#### PACIFIC DIVISION

Seefred Bros., Division Managers  
343 So. Fremont Ave., Los Angeles, Calif.

Well, fellow relayers, at last the west coast is "booming-up" in "L.D." amateur relaying. Relay traffic can be relayed from the east coast via 5ZA, 6GQ (ex-6LZ), 6EB or 6EA or 6JD or 6TX (license pending) and several others in or near Los Angeles, 6VS (license pending) of San Fernando, Calif., 6CS, 6BR, 6AT, 6CO, 6BZ, 6AE, 6AM, 6CL, 6CL, 6AK or 6EJ, 6BQ, 6FE, 7ZB or 7DK, 7YS, 7CE, 7AU, 7AK, 7BF, 7AN, 7AD, and from there to 7CH, at Lewiston, Montana (license pending), ex-6AL of Richfield, Utah, to the east. About a dozen messages have been handled with 5ZA direct from 6EA or 6EB at Los Angeles. Also about the same amount have been handled with Portland, Ore., direct. Fresno is now strong on the relay map with three good relay stations, 6CS, 6DK, and 6DH.

Our test messages were started on Monday, January 12, 1920. Station 6EB broadcasted them and they were received direct by 7ZB at Portland; Oregon, who in turn, relayed to 7YS. On Thursday, January 15, 1920, station 6EA, broadcasted another test message which was received by 7YS, 7CR, 7DK, George Cameron, 7ZB, 6AK or 6EJ, 6BR, 6CO, and 6CS direct. Hereafter, stations 6EB or 6EA will broadcast test messages every Thursday night at 10 P. M. for all relayers of the League.

Mr. J. L. Webster, Dist. Supt. at Seattle, Washington, reports the following:

The amateurs around Seattle are just beginning to see what they can accomplish in long distance work. So far it has not been very successful, due, I think, to inefficient receiving apparatus. So far, 7AD has made the best record by working 6FE, and was heard by 7CH at Boise, Idaho. The amateurs with fairly good sets that ought to be able to do good work, and are in most every night are, 7AU, 7AK, and 7BF. 7AN is also in sometimes and has been heard by Portland, Ore. 7CE is about the only Tacoma amateur that has been heard in Seattle to date.

Mr. L. E. O'Brien, Dist. Supt. of Tacoma, Washington, reports the following:

"The relay fever is taking hold in the west and we are hearing sigs from all over the Pacific Coast. Trunk Line F has been completed thru Washington extending from Tacoma to Portland. The line thru Oregon is covered with a few long jumps. Washington line is as follows: (Seattle, 7AU, Louis Webster, 2568 12 Avenue W,) (Tacoma, 7CE, Howard Riechart, 917 N. L. Street,) (Lacey, 7YS, St. Martins College,) (Portland, Oregon, 7ZB, 63 E. 68th Street, John D. Hertz.)

"In Tacoma we have reorganized the Tacoma Radio Club, of which I was elected President. We have 40 members, a Wave Meter and a Wave Meter Squad, also an Interference Committee. Local QRM ceases at 9:00 P. M. We run out a test message for the Beginners to practice on at a speed of 5, 10 and 15 words per minute. The club has practically every amateur in town, so the control will be an easy matter. The club has taken up the educational side of radio and at present is negotiating with the City School Board to give a free radio course to our members and the public at large during night school period. This will secure additional members as well. The club is intending to affiliate with the A.R.R.L. shortly.

"No word from Eastern Washington. Will have to work that end thru efforts of 7CH of Boise, Idaho. I can't get in touch with anyone to take over the work.

"Mr. Louis Webster 2568 12th Ave. W., will act as Dist. Supt. for Northern Wash-

ington. Anyone contemplating relay work in any part of Washington, will please write to Dist. Supt., Washington, for appointments of City Manager and Asst. Dist. Supt. Also have some work for City Traffic men. Don't delay and let someone else get in on this work before you do. Washington needs some good trunk lines and now is the time to act.

"In addition, 7YS sends a weather report at 9 P. M. "QST" on 375 meters. He uses a 1K.W. set. We sincerely hope to have a line thru to Spokane along Trunk A."

Our Dist. Supt for Portland, Oregon, Mr. J. D. Hertz, reports to us that he has handled eighteen messages transmitted and eight messages received to date. He has had the best success to the north with 7AK in Seattle. Is able to work 7YS the next best. Has only fair success working with 7CH. To the south 6FE seems to come in by far the best, but he is not much on the key as yet, though think he would be just the ticket between San Francisco and Portland if he could hear 7ZB and could handle the business. 6BQ is next best of the southern stations to work. Seldom have trouble getting him at Portland, but he has more trouble with QRM from the Californians.

We are promised a station at Corvallis, Oregon shortly. They have a receiving set working there now and from what he hears they will be on with a transmitter of some sort before long. Also there is a station signing 7AN in southern Oregon somewhere near 6FE, but have not been able to locate him as yet, and 6FE in a letter received today says that he doesn't know either. Also 7CC has all of us guessing. He is heard by 6BQ and 7YS, also comes in QRK at times there. George Cameron is installing a half K.W. Packard and will be with us in a few days. He is doing some fine work receiving. The other night he copied 5ZA working Lewistown, Montana and on another night heard him again.

The radio club in this city is progressing fine. Last night at its regular meeting the subject of affiliating with the American Radio Relay League was discussed.

Have several stations here at Portland that are getting in on the relay game. 7CR and 7BP have been in communication with 7YS and 7AK, and are busy making efforts to work south. There are several others working hard on their sets so that before long we will be sure of at least a couple stations on every night. Some of the coming ones look quite promising, too.

Mr. F. E. Terman, Dist. Supt. for Stanford University, Calif. of the San Francisco District, reports the following:

1. Relay work is progressing very satisfactorily at present, with the possible ex-

ception of the route north. Stations 6AT, 6BR, and 6AE have been handling practically all the long distance work of the district. One or more of these stations is operating every night, and barring unusual circumstances, is able to carry on successful relay work with 6BQ at Reno, Nevada, and the Los Angeles amateurs. 6AT and 6AE have handled relay work very successfully with 7DK of Portland, Oregon upon a number of occasions, and at times relay work is carried on between 6AE and 7ZB, but not so easily.

2. Mr. Wise and Mr. Mealer of Walnut Grove, Calif., have been appointed as assistants in the Sacramento Valley, and are attempting to improve the situation in that region. Mr. Mealer, formerly 6KU, expects to have his station in operation February 1st, and will run his set and 6EJ's together, with Mr. Wise's assistance. At present 6EJ is the only station operating in the valley doing any long distance work.

3. No success has attended efforts to obtain a route north that divides the 600 mile jump, although a possibility has opened up in the station 6FE, in Shasta County, who seems to communicate with the 7 stations at times, and reports 6AE as "QSA". However, he has not been operating long enough to have heard from him as to the possibilities.

4. At present there is a dearth of local stations in the cities. Most messages going to Oakland, Alameda, and Berkeley, are distributed by 6AN, while 6AM handles most of the San Francisco work, but as yet there are no well defined relay stations in these cities, although many stations at times help in relaying messages.

5. Routing of messages for most efficient transmission: All messages which require long distance transmission should be given to 6BR, 6AT, or 6AE.

(a) All messages for bay regions should be given to anyone who can be raised in this region, but this will ordinarily consist of 6BR, 6AT, and 6AE as mentioned before. Ordinarily, messages should not be given 6EJ, as for some reason communication as yet between him and the bay is slow and difficult.

(b) All messages from the bay regions should be given these three stations directly, if possible, and also before ten P. M., if they are on file at that time. Stations that cannot work these stations directly should have another station relay for them, preferably 6AN, 6FN, 6AM, etc.

(c) Messages for Portland will be sent either directly to Portland by 6AT, 6BR, and 6AE, or will be sent by way of Reno, 6BQ, the latter route being usually slightly quicker, under present conditions. Messages for points south and east are to be sent by way of Los Angeles, while those for the valley are sent to 6EJ or 6AK.

6. Points for which messages are accepted:

(a) All points around the bay, including San Jose, Napa, and San Rafael, including intermediate points.

(b) Reno, Nevada.

(c) Portland, Oregon, with messages to other parts of the northwest doubtful of transmission, but perhaps possible to some points, since 7YS is now on the job.

(d) The following points in the Sacramento Valley, as reported by 6EJ: Sacramento, Isleton, Ryde, Courtland, and Walnut Grove, while not to Lodi, Davis, Stockton, Rio Vista, Folsom, Lockford, and Acampo, until further notice.

(e) Los Angeles, and vicinity, but not for San Diego, or Phoenix, Arizona.

(f) Points east of the Rocky Mountains. Messages that come under this class will be slow in transmission, as they all have to go through 5ZA in New Mexico, and this long jump is not working too smoothly as yet.

7. In conclusion I wish to state that we have lost one good relay man in 6BA, who has moved, to Los Angeles, where he is in the radio manufacturing business with another amateur from his home town, and gained another, in ex-6SI, now 6FN, who for a time was Pacific Coast Manager, and is now back at Hayward, after some time in Seattle.

#### ONTARIO DIVISION (Canada)

A. H. K. Russell, Manager,  
353 Markham St., Toronto, Ontario.

Relay business is still very backward in this division, owing to the lack of high powered amateur stations in Southern Ontario, except in the immediate vicinity of Toronto. No regular communication has yet established with the other side of the border, though it is hoped that this may be achieved very shortly.

The most news from Canadian amateurs comes in a rather unexpected communication from the Naval Department, who advise all Canadian amateurs from the Gulf to the end of the Great Lakes are to be allowed to transmit with 200 meters wave length all during the Winter, until the opening of navigation in the spring. The Naval Department also says that this is in the nature of an experiment, and if there is no trouble from this extension there is a probability that 200 meters will be the permanent wave length for the Canadian Amateur as well as the American.

This fact should stimulate long distance work by Canadian amateurs more than anything else. Before the war there were at least half a dozen Toronto amateurs who could be counted on to work Buffalo comfortably in the day time, and that was in 1913. Judging by the receiving results of these same men now, the same work should be easy.

The Manager has been endeavoring to get a trunk line which will work around the shore of Lake Ontario and connect up with the American amateurs at Niagara Falls, N. Y., or Buffalo, but so far without success, principally owing to the backward state of the smaller Canadian towns in wireless matters, and partly to the fact that we have been unable as yet to get in touch with a good Buffalo station. The proposed route at present is from Toronto to Hamilton, then branching into two routes, one to St. Catharine's or Niagara Falls, Ontario, and the other to Brantford, where there are several experienced men with good receiving gear; but as yet they have not been heard from in the sending end of the game.

It is hoped that any amateur who has a good transmitter and who is situated either east or west of Toronto will write and let us know what he has, and how we may connect up with him.

So far as the Toronto amateurs are concerned they are nearly all members of that very much alive organization, the Wireless Association of Ontario, now over eight years old, and a very flourishing club. The Association holds meetings every three weeks, generally in the Central Y.M.C.A. at Toronto.

In concluding this, the first report from the Ontario Division, we wish to convey our 73's to our cousins across the "line" and hope before the next report to be able to send them via radio.

#### WEST GULF DIVISION,

F. M. Corlett, Manager,  
1101 East Eighth Street, Dallas, Texas.

Traffic in this Division in most cases is getting thru OK. Line "F", Grand Forks, N. D. to Dallas, Texas, is working OK in this Division, connecting with the Central Division via 9BT at Topeka, Kans. As QRM and QRN will no doubt be on the increase from now on we should have at least two stations in Oklahoma to shorten this jump and insure reliable communication. Line "F" can now be extended on south to Houston, Texas, in fact traffic is being handled regularly from Dallas to Houston via Waco, 5BG, and Austin; 5AS or 5BO.

No appointments of traffic officers have been made this month. Mr. William Wolover, 5DO, at Perry, Okla., is heard QSA in Dallas at times and so far is the only station in Oklahoma that Texas stations have been able to handle traffic with. As a gentle hint to the rest of the Oklahoma station owners—it is going to be a question of merit that will determine who our Oklahoma District Superintendent is to be. Therefore interested station owners are advised to get busy and handle traffic, and show what they can do.

Arizona is still without a District Superintendent for the same reason that Oklahoma is; i.e., there doesn't seem to be anyone located there who is capable of handling traffic.

It is regretted that Mr. Falconi's report has not been received but it is supposed that he has been so busy trying to get the East and West Coasts together that he hasn't had time for anything else. He has been doing excellent work out there. That however is one District we are all interested in, for it seems to be our only connecting link with the Pacific Coast. The last news received was via radio from 5ZA only a day or so ago and at that time he was not accepting any traffic for the West Coast as relay work was rather uncertain west of him. Conditions will become gradually less favorable for the long jumps as summer time and QRN approach and that is another reason why we should confine our work to short sure jumps. If the habit is once formed it will prove its worth for practical relay work.

Our able District Superintendent White, of the Northern Texas District sends in a lively report of his District.

Mr. Fate Sherril and Mr. George W. Fuller of Kerns, Texas, will be with us just as soon as their complete Thordarson transmitter arrives. White seems particularly interested in getting a station going at Trinity University at Waxahachie. Mr. W. E. Branch, of Ennis, has moved to San Antonio. That is where the Southern Texas District gains a good prospect. Branch has promised us a good station there as soon as possible. Asst. Dist. Supt. Butcher, of Greenville, is right on the job and is doing some good work, both in interesting amateurs in the League and in handling traffic. He has recently increased the power of 5AL and maintains communication with Topeka, Kans., St. Louis, Roswell, Shreveport, La., and numerous other points.

The Waco Texas Territory is coming to the front rapidly, and let us pause here a moment and give Asst. Dist Supt. Harris, of Waco, due credit, as he organized the Waco Radio Club and otherwise created interest in Waco again. The Waco Club will make formal application for affiliation with the League this week.

Dist. Supt. Autry of Houston reports that relay work in his District is being carried on successfully in practically all parts of importance with the exception of San Antonio which continues silent. Route "C" is working well to 5ZA, via 5AC at Houston, 5AS and 5BO at Austin. Both Houston and Austin report that it is almost impossible to work East to the East Gulf Division stations. Some good stations in Southern Louisiana near the Texas boundary line will help this condition. A route

to Eagle Pass is complete except for San Antonio. The route now goes via Houston, Austin and Eagle Pass. We are glad to have our old timer Ed. Nettelton, 5ZN, formerly of Beeville, Texas, now located at Eagle Pass, Texas, with us again. Carl E. Noll of El Paso has installed a ½ K.W. set there.

Just a word to you fellows right here that are located close to the Naval or Army stations; be sure of your wave length, and keep your decrement low and watch your step. Don't give the Naval or Army stations a chance to complain of interference. Just a few nights ago a Naval Gulf Coast station told a Fifth District station to get down on 200 meters or he would report him. Be sure that your station is on 200 meters and don't wait for some Naval or Army station to tell you about it.

**CENTRAL DIVISION,**  
R. H. G. Mathews, Manager,  
1316 Carmen Ave., Chicago, Ill.

Because of the failure of practically all the District Superintendents of the Central Division to make their reports covering the month of January, a long report for the Central Division is not practical. Attached hereto, however is an interesting report from Mr. Larson, 9KG, District Superintendent of South Dakota:

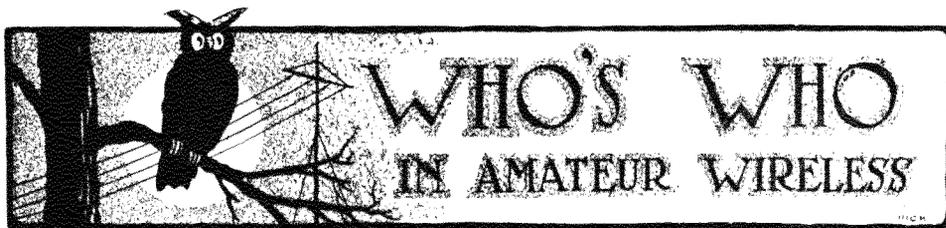
Mr. A. J. Ball, District Superintendent of Eastern Ohio reports that he has successfully organized a daylight route through his territory, connecting with 8AA at Defiance. Since we are able to work with 8AA and 8ER in daylight we therefore have a route which is workable at all times from Chicago to the Western boundary of Ohio.

Mr. Larson and Mr. Ball have done some excellent work in their respective territories and the former has had to work under the great disadvantage of a large territory with a comparatively small number of stations.

The Routes in the Central Division have reached such a state of organization that regular message work is possible to practically all points of the Division, although the contemplated short distance daylight routes are not yet formed.

Mr. Harold Larson, District Superintendent for South Dakota, writes that up to the present time there has been very little to report for the district of South Dakota. In fact the only stations or prospective stations within the district to inquire by letter regarding activities of the league or otherwise have been the following: Edward Isaac, Eureka, S. D.; Charles Norton, Sioux Falls, S. D.; and F. D. Steadman, Beresford, S. Dak.

(Concluded on page 52)



WHO'S WHO  
IN AMATEUR WIRELESS



**JOHN M. CLAYTON**

Here's a fellow whose call we all know, old 5BV of pre-war days, 5AF since we re-opened, and now 5ZL—John M. Clayton, of Little Rock, Arkansas, Assistant Manager of the East Gulf Division.

Mr. Clayton was born in Little Rock in May, 1899. One of the most persistent hams in the 5th District, he had reached the stage of a full big quarter kilowatt in late 1914, and started 5BV with a "1" in 1916, doing splendid relay work on old trunk line E during 1916-17. When the gang quit for the Navy, he tried three times but was "too blind" and finally wound up at Cornell late in 1917 where he worked what was left of 8XU—a buzzer table full of punks. Going back to Arkansas in March, 1918, he became radio instructor for the University of Arkansas, until the S. A. T. C. broke out in the said school. Had the bad taste to try the  
(Concluded on page 45)



**GUY R. ENTWISTLE**

Mr. Entwistle, Assistant Manager of the Atlantic Division and in charge of the New England Section, is a man of many titles, being also President of the New England Amateur Wireless Assn. and QST's business representative in Greater Boston.

He was born on Feb. 21, 1893 in Somerville, Mass., and got his electrical engineering education at Tufts College, where for two years he was president of the Tufts Wireless Society. His interest in radio dates from 1907, having started with a 15-foot aerial and the proverbial tuner back in the days of no books and no radio schools. Neighbor's hen-coops and nearby billboards were raided for lumber for his first shack, where with his first call of EH he achieved a quarter-mile range and claims to have sat up twenty-four hours chewing the rag with another fellow, when he first connected up over this famous distance,  
(Concluded on page 38)



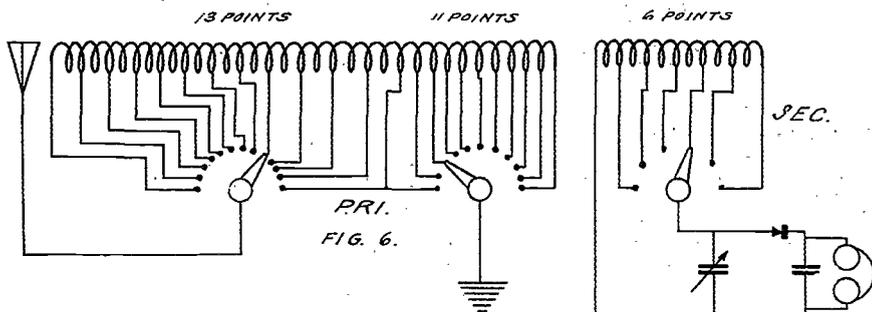
Conducted by Guy R. Entwistle

### THE LOOSE COUPLER

**A**FTER the beginner has used his double-slide tuner a while and picked up a multitude of stations, he begins to wonder whether there isn't some easy way to weed out the majority of them and obtain but one at a time. To some extent this is accomplished in modern practice. The problem is similar to trying to pick out the spoken words of one person in a crowded room in which everyone is talking. The voices of people differ in their characteristics, and so do signals coming in on our apparatus. By the proper design we can render our tuning apparatus much more selective.

In any wireless receiving set we have two main circuits. In the primary the energy, from the accepted wave, oscillates. This energy is passed over by electromagnetic induction into a secondary circuit where the detector converts it into a state whereby it can affect the telephones. In order to pass energy from one circuit to another like this, the two circuits must

important to understand a very important relation existing between the kind of coupling used and the character of the resulting wave on our instruments. At this early stage of the game we can not go too deeply into the reasons for things but will have to state certain facts helpful in the understanding of the various pieces of apparatus. Briefly, close coupling permits the transfer of energy from primary to secondary to occur very quickly and this has the very bad affect of producing "broad tuning"—the signals come in all over the tuner and one cannot be picked out from the others. This situation corresponds to conditions when using the double-slide tuner. On the other hand, if we have a means of loosening the coupling between the coils (that is, separating them from each other), we can vary the rate at which the energy is extracted from the primary by the secondary and will notice that the looser the coupling the "sharper" will be the tuning of any particular wave. This is because the energy is extracted more slowly. It is a little hard to understand but we may say that when the energy is



be COUPLED. That is, they must be placed near each other. In our double-slide tuner, being parts of the same coil, they are very close and we speak of them as being CLOSELY COUPLED.

There is another style of tuner, called the loose coupler which, as its name indicates, permits us to use "loose" coupling. This is done by providing a means of separating the coils which form part of the primary and secondary circuits.

Before describing such a tuner it is

extracted more slowly, the primary gets to oscillate more times and so is able to more exactly define its frequency of vibration, and the result is that we are able to pick out one station from a maze if it has slightly different characteristics. Connect up in your mind this relation between the rate at which the energy is withdrawn and the resulting wave characteristic in the detector circuit. The same idea holds for transmitting and shows us why we should use loose coupling for sharp tunes.

Boiled down to simple language, a loose coupler is a piece of apparatus having two coils whose number of turns can be varied but having no electrical connection with each other, and having a means of varying the distance between the coils by some convenient mechanical mounting. Each coil alone provides the necessary inductance for its own circuit, while the two together provide a means of transferring energy from one circuit to another.

So much for theory. Regarding actual construction, the questions from most amateurs are what tubes to get, size of wire, number of turns, taps etc. The dimensions of any tuner depend on the range of wave lengths desired. We will confine ourselves to those between 150 and 3000 meters (Arlington's wave is 2500 meters.) Assuming that the amateur has one 0.001 mfd. variable condenser for the secondary, in order to get a wave of 3000 meters we must have a total of 2,570,000 units of what is called Inductance. Our problem now is just what is the best way to wind our coils to obtain this. We will hold throat to the following dimensions:

- Primary tube diameter, 4 inches
- Secondary tube diameter, 3½ inches
- Wire for primary, No. 24 D.S.C.
- Wire for secondary, No. 28 S.C.C.

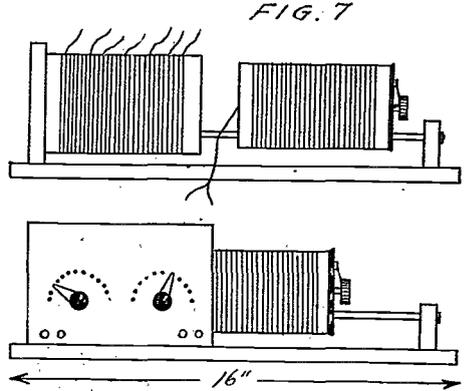
The only remaining item is the length of winding, or the number of turns. It is found that four inches of winding will be sufficient for the secondary. The tube will have to be slightly longer, allowing say ¼ inch space at each end. We will let the secondary dimensions govern the length of the primary, i.e., cut the two tubes the same length, 4½ inches, and wind the primary for four inches.

The following table gives the data for our secondary winding, of the dimensions given above, and with the variable condenser across it, the maximum wave length being obtained when all the capacity is used and the minimum when the capacity is reduced to 0.0001 mfd., which would be 20 degrees on an ordinary 43-plate variable.

Length of winding Inches	Turns	Inductance in Cms.	Maximum Wave Length	Minimum Wave Length
4	216	2,570,000	3000	950
2	108	1,005,000	1900	600
1	54	348,000	1100	350
¾	41	227,000	900	280
½	27	121,600	600	200

From this table we can pick out ranges of wave length and dimensions of winding to correspond, can make a tuner for short waves, for long waves, or for both. The taps on the secondary can be determined by the table. Punch holes in your tube before beginning the winding, starting a quarter-inch from the end, at ½", ¾", 1", 2", 3", and 4", giving six taps.

For the primary, altho a slider can be used we will describe one to be tapped in units and tens of turns, by which careful tuning of the primary circuit can be obtained. See Figure 6. Starting on that end of the winding which will be adjacent to the secondary, bring out a tap from every turn for the first ten turns, and then a tap every ten turns the rest of the winding. There will be about 140 turns, with 10 for single taps, leaving 130, or 12 "tens" taps. Thus we will need 11 points on the unit switch and 13 on the tens switch, as



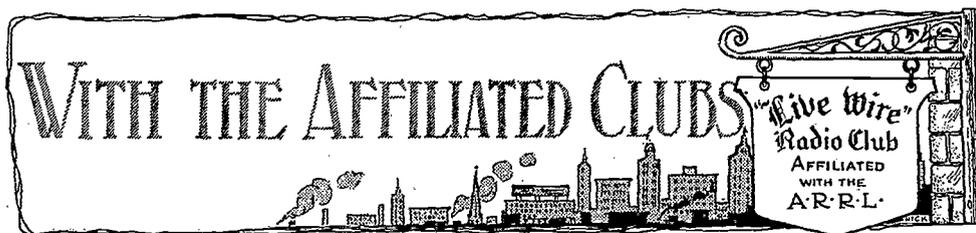
shown in the diagram, which will be understood with a little study. This makes it possible to get one-turn variation of the winding.

Note how the increases of primary and secondary turns progress each from the adjacent edges of the coils.

The ends and supports will be left to the taste of the constructor, but we show some ideas in Figure 7. The base may be about 16" long, with a square piece upright on one end, to which should be screwed a circular disc of wood about ¾" thick and just small enough to go inside the primary. With glue and brads the primary may then be mounted and will be supported satisfactorily by just this one

end. The secondary should have wood ends, on one of which the secondary switch is mounted. This coil should slide on two brass rods as shown. Do not attempt to make sliding contacts to the rods for the connections. Instead use a flexible double-lead of lamp-cord or phone-cord as shown. The primary may be housed in, but the

(Concluded on next page)



**T**HE A. R. R. L. takes pleasure in announcing the affiliation of the following additional societies:

- Blackstone Valley Radio Assn.,  
Pawtucket, R. I.
- San Antonio Radio Club,  
San Antonio, Texas.
- Duluth Radio Assn.,  
Duluth, Minn.
- Anderson Radio Assn.,  
Anderson, Ind.
- Indianapolis Radio Assn.,  
Indianapolis.
- Kokomo Radio Assn.,  
Kokomo, Ind.
- Philadelphia Amateur Radio Assn.,  
Philadelphia.

In this issue appears an article on club organization which is hoped will be helpful in the formation of clubs where they do not exist, and in the conduct of clubs already in operation. A. R. R. L. traffic officials everywhere are urged to give attention to this matter and invite the affiliation of active clubs, and to undertake the formation of new clubs where desirable.

The benefits of national affiliation are apparent to us all. We may have more legislation to oppose—in fact it looks like a certainty that we will—and we will need close co-operation. And in our daily affairs

we can not successfully work our stations without complication in any community where there is more than one station, without that same quality of co-operation. The Secretary will be glad to hear from the officers of clubs on this subject. Now that A.R.R.L. activities have spread to Canada, this invitation expressly includes the Canadian clubs.

The Ravenswood Radio Assn., 1917 Warner, Avenue, Chicago, an organization originally composed purely of commercially licensed operators, has created a Junior Membership with reduced admission fee and dues—a step which will no doubt materially strengthen their club. This society is one of the foremost and stables organizations in Chicago. Its Secretary, Mr. W. E. Wunderlick, will be pleased to hear from interested parties.

The Secretary invites items of interest from the affiliated clubs. Information which will be of assistance in strengthening organization, overcoming club problems, and resulting in more complete harmony in local operating conditions is particularly desired, rather than the heretofore customary notices of meetings, etc. Let us make the club news in QST something more vital than mere "gossip."

### THE JUNIOR OPERATOR

(Concluded from page 37)

drawing shows a simpler design where a panel of ¼-inch wood or fibre is mounted vertically alongside the primary and bears the two switches as well as binding-posts for both windings.

The amateur can depart from this data. For audion detectors he can and is advised to use finer wire on the secondary, as audions work better when the wave length is obtained by using more wire rather than by using so much condenser across a smaller winding. If the small antenna described in December is used with this coupler, it is suggested that a .001 mfd. condenser be connected across the primary when tuning to the longer waves, and in series (with added primary turns) for shorter waves.

Use as little capacity across the secondary as possible, especially when using an audion.  
C.W. reception next month.

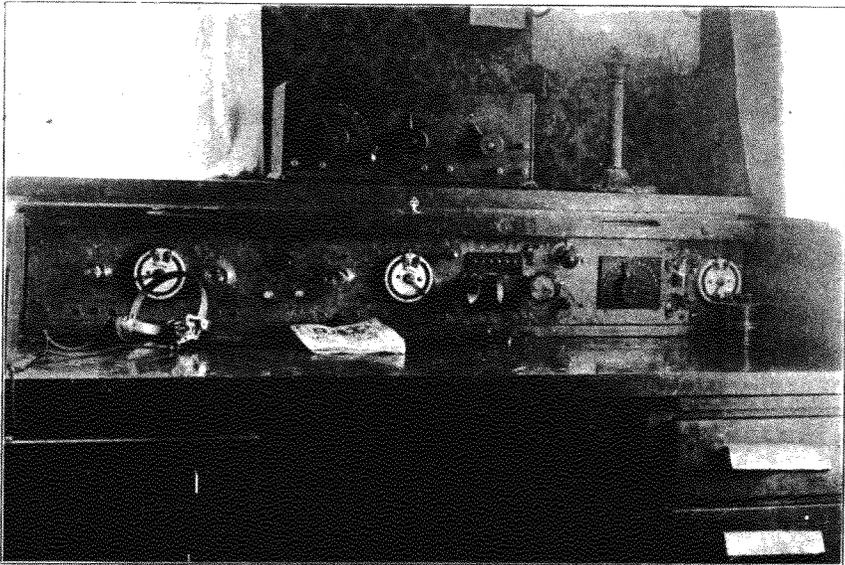
### GUY R. ENTWISTLE

(Concluded from page 35)

until his batteries ran down. In 1909 he took a course in radio at the Everett Evening School and taught there for six years following. He has operated on ship-board during summer vacations the last eight years and has covered 100,000 miles on everything from an ocean liner to a coal barge. His commercial experience also includes research work with the American Radio & Research Corp., where he was later in charge of the testing laboratory. His present station is 1AL, located in Brookline.



### 9AJ, PEORIA, ILL.



Our photograph illustrates the receiving set of Mr. Harry A. Mackley, Radio 9AJ, at Peoria, Ills., embodying a number of novel features, and from which we all can take suggestions.

Note the mounting in a desk. What could be more convenient? The key is there, and the white push-buttons operating the distant-control relay. The set can be locked up for protection from dust during the day, and the neatness of the installation and its total freedom from unsightly wiring enable it to pass the censorship of a critical housekeeper and secure room in the house.

Note the Audiotron as detector, and higher vacuum tubes for the three stages of amplification. The large separation between units should prevent audio squealing between tubes. DeForest coils are used

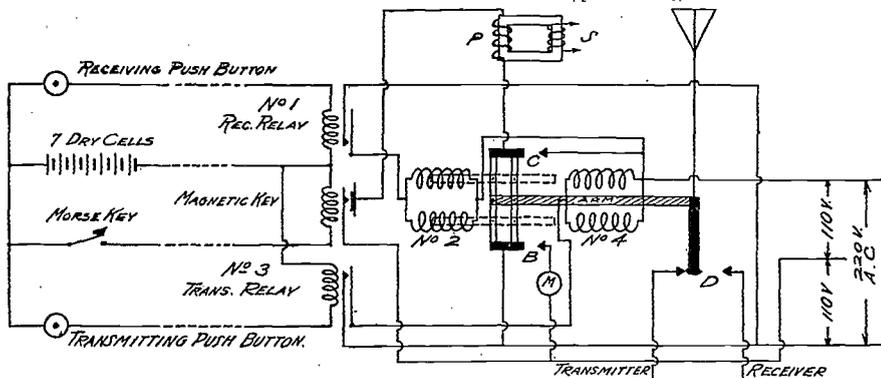
for receiving but a Paragon had just been received for installation when this picture was made.

The transmitter is a hundred feet away, in the garage. No noise, no building fires. Just slide into your slippers, light your pipe, and sit in. Unfortunately the transmitter is so located that a photograph was not obtainable, but our diagram illustrates the hookup of the control apparatus in even better style. Briefly, it is a magnetic switch consisting of double iron plungers, working in both directions in double solenoids, operating on 220 v. A. C., which is controlled by the local battery and push-buttons. A magnetic key is also used, and thus there is no induction in the receiving set. The control wires to the transmitter are in the form of a buried cable. The operation will be understood from

study of the diagram. Pushing the transmitting button causes current from Battery A to Energize Relay No. 3, closing the 220 v. circuit thru the solenoids on the transmitting side, No. 4, and thus drawing the iron plungers into position. These plungers carry a fibre frame with contacts which now connect the aerial to the transmitter

to the solenoids on the receiving side, No. 2, pulling the plungers to the opposite side and connecting the aerial to the receiver at D and opening contacts B and C.

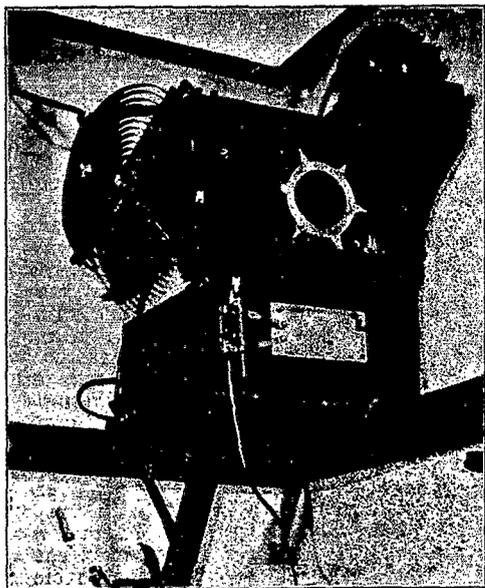
9AJ also has an experimental underground antenna running east and west, consisting of an extra wire in the buried cable for the distant control. Consider-



at D, start the gap motor M at B, and supply current to the transformer at C, subject to the control of the magnetic key, which by a common return is made to operate from Battery A also. The reverse operation takes place upon pushing the receiving button, Relay No. 1 being energized and admitting the 220 v. current

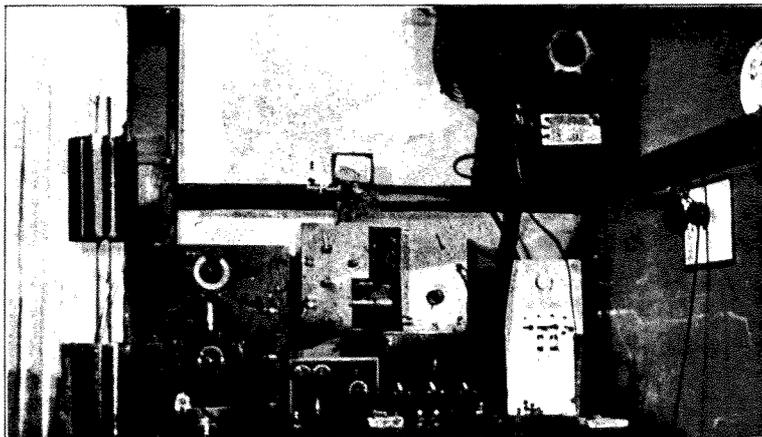
able amplification is necessary, of course, but Mr. Mackley says it is justified, for atmospherics are reduced and interference from stations to the north and south is nil. Amateurs as far east as 1AW have been read on this underground antenna. An aerial of conventional design is used for regular work, however.

## 5ZA



These views are of Mr. Louis Falconi's station at Roswell, N. M., now our most important link in transcontinental relaying. First acquiring fame under the call of LF, while awaiting his license, he has done very consistent work between Chicago, St. Louis, etc., and 6EA in Los Angeles and has been heard in many states. It is now operating under special license with the call 5ZA, and is one of those stations deserving a Z call.

The transmitter is mounted on a shelf in the corner above the receiving apparatus—an arrangement many amateurs find very convenient. Note especially the enclosed rotary with glass front, and the hinge-type oscillation transformer.



## 5AC

This is Mr. C. W. Vick, of 1918 Smith St., Houston, Texas, "CV" of pre-war days but now 5AC, at his station where he has recently done some remarkable and commendable work, both during the Gulf storm as recently mentioned in QST and with the NC-4 on her recent flight from New Orleans to Galveston. 5AC is heard regularly in Chicago, and the remarkable feature is that all this work has been done on a temporary single-wire aerial.

## CALLS HEARD

Such a volume of "Calls Heard" is reported that we are obliged to ask your help in the following respects:

- (1) List the calls on a separate sheet of paper—do not embody them in a letter.
- (2) Arrange by districts from 1 to 9, and alphabetically thru each district; and run them across the page, not down a column.
- (3) Put parentheses around calls of stations also worked.
- (4) Omit initial or other unauthorized calls.

### HEARD AT 9EQ, ST. LOUIS, MO.

1AW, 1AG, 1AJ, 1IR, 2DA, 3BZ, 3NN, 4AA, 4AE, 4AG, 4BC, 5AA, 5AF, 5AG, 5AH, 5AL, 5AS, 5BK, 5BO, 5AL, 5AQ, 5LA, 5DO, 5ZA, 5ZS, 5LO, 5ZL, 8AA, 8AD, 8ADX, 8AM, 8BA, 8CB, 8CN, 8DM, 8DR, 8DW, 8EG, 8ER, 8EX, 8EZ, 8ES, 8GA, 8GS, 8GB, 8GN, 8IK, 8JZ, 8JQ, 8JJ, 8FP, 8HG, 8NF,

8ALE, 8ASF, 8LF, 8WZ, 9AA, 9AJ, 9AH, 9AP, 9AU, 9AK, 9AW, 9AD, 9AG, 9BT, 9BP, 9ADM, 9CS, 9CE, 9CF, 9CH, 9EE, 9EF, 9EG, 9ET, 9EX, 9EY, 9EP, 9GA, 9HR, 9HC, 9IT, 9FI, 9JO, 9JT, 9JW, 9KF, 9LN, 9NE, 9VY, 9MK, 9ZN, 9WU, 9XR, 9GX, 9IG, 9YI.

### HEARD AT 5AA, NEW ORLEANS.

1AW, 2BZ, 2DA, 2IN, 2ZM, 2ZS, 3AN, 3BZ, 4AA, 4BC, 5AB, 5AC, 5AU, 5AF, 5AG, 5BB, 5BK, 5BO, 5BY, 8AA, 8AMN, 8BT, 8CC, 8CD, 8DA, 8EC, 8ER, 8EZ, 8EF, 8EX, 8FP, 8NF, 8RQ, 8JZ, 9AD, 9AH, 9AJ, 9AP, 9AU, 9AW, 9BR, 9BT, 9CS, 9JW, 9MK, 9PF, 9PO, 9VP, 9VY, 9WJ, 9WQ, 9WW, 9BY.

### HEARD AT 9AU, CHICAGO.

1AW, 2BM, 2ZL, 2ZS, 5AC, 5AF, 5AL, 5BO, 5ZL, 8AA, 8AE, 8AH, 8CB, 8CC, 8CF, 8ER, 8DA, 8JJ, 8JQ, 8NF, 9AJ, 9AK, 9AP, 9BR, 9BT, 9CA, 9CW, 9CS, 9EG, 9GS, 9HD, 9HG, 9HN, 9HS, 9HT, 9IP, 9IT, 9JT, 9NE, 9PF, 9PQ, 9VP, 9YA.

## HEARD AT 1AW, HARTFORD, CONN.

(Maxim and Warner), Jan. 6th to Feb. 5th.  
 (1AE), (1AG), (1AK), (1AY), (1ANW), (1AZ),  
 1BM, (1CM), 1CZ, (1DL), 1EN, 1EK, (1FQ), 1GJ,  
 1IA, 1IW, 1JO, (1JQ), (1KC), (1KT), 1MF, 1NO,  
 (1PW), (1QO), (1RU), (1RN), 1RV, (1SZ),  
 (1TG), (1TS), 1UI, 1VE, (1ZK), 2BK, 2BM, 2BT,  
 (2CB), (2CC), 2CG, 2CV, 2CY, (2DA), 2DV, 2FG,  
 2GO, 2GR, (2IR), (2JE), (2JU), 2JV, (2KN),  
 2LO, 2LW, 2NB, 2RW, (2SH), (2ZL), (2ZM),  
 (2ZS), 3AMO, (3BZ), (3CC), 3CV, 3EZ, 3GO,  
 (3LW), (3NB), 3NC, 3NN, 3WA, (3ZW), 4AE,  
 5DA, (8AA), 8AGM, 8AKY, 8AGO, 8AUX, 8BD,  
 (8CB), 8CC, (8DA), 8DY, 8DE, 8DG, 8DW, 8EC,  
 (8ER), (8EN), (8EF), 8EV, 8FF, 8FK, 8FH,  
 8GQ, 8GN, 8GB, 8HG, 8HI, 8HF, 8HM, (8IB),  
 8IN, (8IL), 8IR, 8IK, (8JQ), 8JJ, 8LH, 8LS, 8LJ,  
 8NI, 8KA, 8AJ, 8AK, 8BR, 9CC, (9CW), 9DQ,  
 9EC, 9EL, 9FO, 9FD, (9HD), 9HN, 9HR, 9HY,  
 9IX, (9IT), 9IJ, (9KF), 9KO, 9LQ, (9NL), 9VP,  
 9ZJ, (9ZN).

## HEARD AT 5ZC, DALLAS, TEX.

during December and January. 3GC, 4AE, 4BC,  
 5AA, 5AC, 5AG, 5AJ, 5AL, 5AO, 5AP, 5AO, 5AU,  
 5AS, 5AY, 5BC, 5BL, 5BM, 5BO, 5BG, 5BJ, 5BK,  
 5BR, 5BS, 5BY, 5DO, 5ZA, 5ZN, 5ZL, 6IZ calling  
 6FD, 8AA, 8DA, 8ER, 8EZ, 8FC, 8FY, 8FZ, 8GQ,  
 8K, 8NF, 8NT, 8AMT, 9AA, 9AJ, 9AK, 9AP,  
 9AU, 9AY, 9BG, 9BR, 9BT, 9CJ, 9CN, 9CS, 9CW,  
 9DC, 9DF, 9EG, 9EL, 9ER sending time, 9EQ, 9EX,  
 9FB, 9FD, 9FI, 9FN, 9FS, 9FU, 9GA, 9GE, 9GS,  
 9HA, 9HD, 9HI, 9HN, 9HS, 9HT, 9IB, 9IK, 9IT,  
 9IX, 9JE, 9JI, 9JN, 9KF, 9KN, 9KR, 9KT, 9KU,  
 9KV, 9KX, 9LC, 9LF, 9LA, 9LP, 9LQ, 9NE, 9NY,  
 9NX, 9OY, 9PF, 9PY, 9WH, 9WU, 9YJ, 9ZN, 9ZS,  
 9AK, 9AKA.

HEARD AT 8ER, ST. MARY'S, OHIO,  
UP TO JANUARY 31.

1AE, 1AN, (1AW), 1CM, 1DL, 1KT, (1RN), 2BM,  
 2CB, (2CS), (2DA), 2DS, 2EH, (2FG), (2IR),  
 2JU, 2KN, 2PL, 2SH, (2XG), 2YH, 2ZH, 2ZL,  
 (2ZM), (2ZS), (3BZ), 3CC, 3CH, (3CV), 3EZ,  
 3FG, 3GO, (3NB), 3XC, 3ZS, ex-3AMO, (4AE),  
 (4AG), (4AI), 4AN, 4BC, 4EJ, 5AC, 5AD, 5AE,  
 5AG, (5AL), 5AS, 5BC, 5BG, 5BO, (5BZ), 5DA,  
 (5DO), 5EX, 5XA, 5YA, 5ZA, (5ZC), (5ZL), 5ZS,  
 (8AB), 8AE, ex-8AGO, 8AH, 8AK, ex-8AKY, 8BD,  
 (8BO), 8BF, (8CB), (8CC), 8CE, 8CJ, 8CO, 8CP,  
 (8DA), 8DE, 8DF, 8DV, (8DW), (8EC), (8EF),  
 (8EN), (8FA), 8FD, 8FH, 8FI, 8FO, 8ER, 8FS,  
 (8GA), 8GE, 8GK, 8GN, 8GS, 8GW, 8HA, 8HF,  
 (8HG), (8IB), 8IE, (8IK), 8IN, (8JJ), 8JN,  
 (8JK), (8KV), 8LJ, 8MB, 8MF, (8XA), (ex-9ARD),  
 (9AD), (9AJ), (9AK), ex-9AOR, 9AF, (9AU),  
 9AV, 9AW, 9BC, 9BL, 9BF, (9BR), (9BT), 9BW,  
 (9CA), 9CC, 9CE, (9CI), (9CN), 9CR, 9CS, (9CW),  
 (9DF), (9DH), 9DV, (9EC), 9EE, 9EQ, 9ER, 9EV,  
 9EX, 9EY, (9FB), 9FE, 9FI, 9FP, 9FR, 9FU, 9FZ,  
 9GC, 9GK, (9GS), 9GV, 9GW, 9GX, 9HA, 9HI,  
 (9HN), 9HP, 9HR, 9HT, 9HW, 9IL, 9IL, (9IR),  
 (9IT), (9IX), 9JB, 9JT, 9KF, 9KI, 9KO, (9KV),  
 (9LC), 9LN, (9LQ), 9ME, (9MK), 9OB, 9PQ,  
 9PY, 9QH, (ex-9QR), (9QT), 9RO, (9ZC), (9ZJ),  
 9ZL, (9ZN).

## HEARD AT 1AR, BELMONT, MASS.

1CM, 2BB, 2CC, 2DA, 2DI, 2JU, 2ZS, 3BZ, 3CH,  
 3CV, 3NB, 3XC, 8AA, 8AB, 8AD, 8AE, 8CB, 8CC,  
 8DA (very QSA), 8DW, 8ER, 8HF, 8HG, 8IL,  
 8IN, 8JQ, 8AKY, 8ALB, 8ASF, 9EP, 9HD.

## HEARD AT 8FC, ROCHESTER, N. Y.

1AK, 1AS, 1AW, 1CC, 1DL, 1RN, 2BM, 2CB, 2CR,  
 2DA, 2IR, 2JE, 2JU, 2FM, 2WB, 2ZL, 2ZM, 2ZS,  
 2ZV, 3AK, 3AW, 3CC, 3GO, 3NB, 3NC, 3ZM, 4AE,  
 5AC, 5AF, 8AA, 8AD, 8AE, 8BV, 8CB, 8CD, 8CH,  
 8DA, 8DE, 8DG, 8DR, 8DV, 8EC, 8ED, 8EF, 8EG,  
 8ER, 8FA, 8FD, 8FI, 8FO, 8FR, 8GA, 8GE, 8GQ,  
 8HB, 8HC, 8IB, 8IK, 8IL, 8IO, 8IQ, 8IX, 8JJ,  
 8JK, 8JZ, 8LS, 8NF, 8NO, 8RS, 8XA, 8ADX,  
 8ALE, 8AGO, 8AKM, 9AH, 9AJ, 9AK, 9AP, 9AU,  
 9BG, 9BT, 9DC, 9DH, 9DL, 9EG, 9ER, 9EV, 9FD,  
 9FU, 9FZ, 9IAD, 9HN, 9HP, 9JE, 9JW, 9KF, 9KO,  
 9KV, 9MK, 9NZ, 9PF, 9VD, 9VP, 9VY, 9YA, 9ZL,  
 9ZN, 9ANO, 9ASP.

## HEARD BY 6BS, SAN FRANCISCO

5EM, 6AT, 6BR, 6BQ, 6CS, 6EB, 6EA, 6EJ, 6FF,  
 6TX, 7CH, 7ZB.

## HEARD AT 3NB, M. FRYE, VINELAND, N. J.

1AE, (1AW), 1CM, 1DL, (1KT), 1PG, (1PY),  
 (2BM), (2CS), (2DA), (2FG), (2GR), 2IR, 2JE,  
 (2JU), 2KM, 2RG, 2SH, 2ZL, 2TX, (2ZM), (2ZS),  
 3BZ, 3GO, 3ZS, 3ZW, 3XZ, 5AF, (8AA), (8AE),  
 (8AK), (8AKM), (8AKY), 8AOM, (8AY), (8BP),  
 8CB, (8CC), (8DA), (8DV), 8DW, (8ER), (8FD),  
 8GB, 8HG, 8IB, (8JQ), 8KP, 8LW, 8MZ, (8XA),  
 8XU, (ex-8ZW), 9AF, 9EG, (FH), (9HD), (9IT),  
 9KG, 9KV, 9LQ, 9YA, (9ZN).

## HEARD AT 3EN, NORFOLK, VA.

1AW, 2DA, 2JE, 2JU, 2LM, 2LO, 2ZM, 2ZS, 3BT,  
 3BZ, 3CC, 3NB, 3NC, 3NN, 3QM, 4BC, 5DA, 8DA,  
 8EF, 8ER, 8JQ, 9EN, 9HD, 9ZN.

## HEARD AT 5BC, NEW ORLEANS

1AW, 2IR, 2ZS, 3BZ, 4BC, 5AC, 5ZL, 8AA, 8BA,  
 8CB, 8DA, 8ER, 8EZ, 8HO, 9AF, 9AU, 9BR, 9BT,  
 9CR, 9DC, 9EZ, 9FO, 9HS, 9MK, 9XS.

## ADDITIONAL CALLS HEARD AT

## CANADIAN 3AB, TORONTO

2ZM, 5ZC, 8AV, 8CB, 8DR, 8EN, 8GB, 8HA, 8HG,  
 8JJ, 8JQ, 8MS, 8NF, 9ER, 9HA, 9HD, 9KF, 9KO,  
 9LQ, 9ZN.

## HEARD AT 8DA, SALEM, OHIO

(1AW), 1BG, 1KT, 1PM, 1RN, 2BM, (2CS), (2CC),  
 (2DA), 2FG, 2GO, (2IR), daylight, (2JZ), (2KX),  
 2LO, (2JU), (2PL), 2GR, (2XG, phone and cw  
 set), (2YM), (2ZM), (2ZL), (2ZS), (2ZV), 3AN,  
 (3BZ), (3CC), (3CH), 3DZ, 3EN, 3JM, 3NC,  
 (3NB), (3ZS), 4AE, (4AG), 5AF, 5AL, (5BV),  
 5EX, 5ZL, 8JJ, (8CB), (8CC), (8ER), 8ASE, 8FI,  
 (8NF), (8MC), 8XU, 8XA, 8BP, (9ADL), (9AU),  
 9AD, 9AP, 9AJ, 9AK, 9BM, (9BT), 9CA, 9CS, 9CN,  
 (9CW), 9DF, 9DC, 9DT, 9DX, 9EA, 9EG, 9EY,  
 9FP, 9FA, 9FC, 9HA, 9HD, 9HN, 9HR, 9HS, 9HT,  
 9IL, (8IX), (9IT), (9KV), 9KF, 9KO, (9NT),  
 (9LC), 9LF, 9OY, 9PF, 9FQ, 9RD, (9VP), (9ZN),  
 (9BR). Also work regularly U.M. Mr. Carter,  
 Cleveland on his CW set, one bulb using 20 watts.  
 Distance 60 miles.

## REPORTED BY 3BZ, DANVILLE, VA.,

during January. (1AW), 1AE, (1CM), 1KT,  
 (1RN), 1ZM, 2AR, (2BB), 2BG, 2BZ, 2BM, 2CB,  
 2CH, 2CS, (2DA), (2IR), (2JE), 2JU, 2LK, 2LO,  
 2PL, (2SH), 2ZM, 2ZS, 2XG, (3AA), 3AMO,  
 (3CC), (3CE), (3FG), (3GO), (3GX), (3NB),  
 3LW, 3XC, 4AE, 4AN, 4AT, 4BC, 4GX, 5AL,  
 (5DA), 5EX, 5ZC, (8ALE), (8AA), 8AB, 8AF,  
 (8ASF), 8AE, 8AH, 8APU, 8AO, 8AUM, 8AL, 8BR,  
 8BP, 8CC, 8CB, (8DR), (8DW), (8DA), 8DD, 8DJ,  
 8DY, 8DE, (8EF), 8EN, (8ER), 8EG, 8EC, 8EZ,  
 8EQ, 8FD, 8FG, 8FP, 8FA, 8FO, 8FH, 8FI, 8FW,  
 8GA, 8GH, 8GR, 8GN, 8GH, 8HD, 8IX, 8IQ, (8IF),  
 (8IL), 8IB, (8JQ), 8JY, 8KG, 8LN, 8LL, 8LH,  
 8LQ, 8MB, 8NL, 8RS, (9AJ), 9AD, 9AU, 9BR,  
 9BA, 9CJ, 9CC, (9CS), 9EM, 9EG, 9ER, 9ET, 9EQ,  
 9EE, 9FD, 9FK, 9FM, 9FU, 9GS, 9GC, 9GX, 9GS,  
 (9HD), (HA), 9HP, 9HB, 9HR, 9HS, 9HN, (9HJ),  
 9HI, 9IT, 9IJ, 9IX, 9II, 9JT, 9KF, (9KV), 9LA,  
 9LQ, 9MC, 9ZN.

## HEARD AT 6EA, LOS ANGELES, CALIF.

(5ZA), (6AE), (6AK), 6AL, 6AM, (6AT), (6BJ),  
 (6BQ), 6BR, (6BZ), 6CL, 6GL, (6CO), 6CP, 6CQ,  
 (6CS), 6DK, (6EJ), 6FE, 6GQ, 6GL, (ex-6KL), (7DK),  
 (7ZB).

## HEARD AT 6EB, LOS ANGELES

(5ZA), (6AE), ex-6AL, 6AM, 6AT, 6BA, 6BB,  
 6BJ, (6BQ), 6BR, 6BZ, 6CE, 6CI, 6CL, 6CO, 6CQ,  
 6CS, 6DK, 6DY, (6EJ), 6FE, 6GQ, 6GL, ex-6RN,  
 (7ZB), 7CR, 7DK.

## HEARD AT 9PL, EUREKA, SO. DAKOTA

5AC, 5AF, 5AL, 5AY, 5CD, 5DO, 5EH, 5EX, 5MH,  
 5YA, (5ZA), 5ZC, 6AL, 8AA, 8AK, 8BO, 8BP, 8CB,  
 8DA, 8ER, 8EX, 8FA, 8FI, 8GQ, 8HG, 8JQ, 8NF,  
 8XA, 9ABD, 9AHW, 9AJ, 9AK, 9AO, 9AOR, 9ASP,  
 9AU, 9BF, 9BR, 9BT, 9BU, 9BY, 9CA, (9CN).

9GK, 9CL, 9CO, 9CR, 9CS, 9CW, 9DC, 9DE, (9DH), 9DR, 9DT, 9DU, 9DV, 9DX, 9EA, 9EB, (9EE), 120 miles, using Ford spark coil), 9EG, 9ER, 9ET, 9EK, (9EY), 9FA, 9FB, (9FI), 9FL, 9FM, 9FN, 9FP, 9FR, 9FT, 9FU, 9FW, 9FZ, 9GC, 9GK, 9GS, (9GT, 150 miles, using 2" spark coil), 9GV, 9HA, 9HD, 9HN, 9HS, 9HT, 9HU, (9IF), 9IJ, 9IT, 9IX, 9JB, 9JD, (9JE), 9JW, 9KF, (9KI), 9KT, 9KV, 9LC, 9LM, 9LP, 9LQ, 9MK, 9NT, 9OB, 9OG, (9OT), 9PF, 9PQ, 9VF, 9VT, 9WH, 9WU, 9XT, (9YA), (9YB), 9YI, 9YV, 9ZC, 9ZL, 9ZN, 9ZT.

**HEARD AT STATION 3A1, PHILADELPHIA, PA.**, during the month of January. 1AW, 1OW, 1RN, 2BM, 2CS, 2FG, 2IR, 2PB, 2RO, 2XG, 2YH, 2YM, 2ZH, 2ZS, 2ZS, 3BH, 3ZV, 4AE, 8AG, 9AR, 8BF, 8CB, 8DA, 8DW, 8DV, 8ER, 8ES, 8GC, 8JQ, 8XA, 8XE, 9AJ, 9FH, 9HJ, 9ZN.

**HEARD AT 7YS, LACEY, WASH.** 6AE, 6AT, 6BA, 6BR, 6CL, 6CO, 6CP, 6CS, 6DK, 6EA, 6EJ, 6FE, ex-6RK, ex-6RN, 7AR, 7BK, 7BF, 7BC, 7CK, 7CR, 7CW, and 7DE. Worked 6BQ, 7AD, 7AK, 7AN, 7BA, 7CE, 7CB, 7CB, and 7ZE.

**HEARD AT 7ZB, PORTLAND, OREG.** 6AA, 6ACC, 6AE, 6AG, 6AJ, 6AN, 6AT, 6BA, 6BB, 6BQ, 6BR, 6CO, 6EA, 6EB, 6EJ, 6FE, 6KL, 6RN, 6TX, 6DY, (JN), 6UD, 6CI, 6BX, 6AM, 6VS, 6DK, 6CS, 7AD, 7AK, 7CC, 7CE, 7CW, 7CH, 7BF, 7DJ, 7ZH, (JBM), 7YS. Worked 6AE, 6AT, 6BQ, 6EA, 6EJ, 6TK, 7AD, 7AK, 7YS, 7CW, 7CH, and (JN).

**HEARD AT 7CH, BOISE, IDAHO** 6BA, 6BP, 6AT, 6AR, 6CQ, 6AZ, 6XW, 6WR, 6AC, 6EA, 6AG, 6AX, 6AJ, 6SX, 6AU, 6AN, 6CE, 6CC, 6TX, 6CO, 6DR, 6AM, 6EJ, 6BO, 6IZ, 6AE, (PNB), 6CQ, 5ZA, 7GR, 7YS, 7RB, 7AD, 7ZB, 9WH, (LY), (CA), 6FH, 6EB, 6AL, 6FE, (JN), 7DK, 6UD, 7BQ, 6BT, 7CC.

**HEARD AT 6DH, FRESNO, CALIF.** 6EJ, 6AB, 6YA, 6FE, 6BS, 6HH, 6IH, 6BH, 6BR, 6ER, 6ED, 6AC, 6AD, 6VC, 6EB, 6EA, 7ZB, 7CH, 5ZA, 6BQ, and 6AE.

**HEARD AT 6AE, STANFORD UNIVERSITY, CALIF.** 6AY, 6EL, 6ER, and (OA). Worked 6BQ, 6EA, 6EB, 6FE, 6MG, 6TX, 6UD, (PZ), 7DK, and 7ZB.

**HEARD AT 6CS, FRESNO, CALIF.** 6ER, and worked 6BQ, 6EA, 5ZA, 7ZB, also exchanged signals with 7YS.

**HEARD AT 6DK, FRESNO, CALIF.** 6EA, 6EB, 6EJ, 6TX, and 7ZB.

**HEARD AT 9CS, CLINTON, IOWA** 2ZS, 4AE, 5ZC, 5BO, 5ZA, 5DO, 5BK, 5AC, 5AL, 8DO, 8IK, 9JQ, 8AB, 8HG, ex-8XA, 8DA, 8FH, 8AA, 9EX, 9KV, 9HJ, 9LH, 9EZ, 9AV, 9HW, 9CW, 9ST, 9LM, 9HT, 9IT, 9EE, 9GK, 9AT, 9DH, 9GX, ex-9AOB, 9NV, 9LC, 9AU, 9NO, 9AK, 9HI, 9GS, 9DU, 9CI.

**HEARD AT 2FG, ALBANY, N. Y.** 1AL, 1HN, 1SZ, 2AR, 2AS, 2BB, (2BM), 2CC, (2DA), (2EH), (2IR), (2JU), 2KM, 2LE, 2LN, 2LP, 2PH, 2XG, (2ZS), 3BC, 3BP, 3CV, 3ZS, 3ZW, 4CH, 8AA, 8AD, 8ADX, 8AH, 8AK, 8ALE, 8ARJ, 8BV, 8CB, (8CH), (8CC), 8DA, 8DE, (8ER), 8FY, 8GK, 8HD, 8HG, 8JT, (8JQ), 9RS, 9AJ, 9AU, 9BG, 9EG, 9EN, 9KF, 9RT, 9ZN.

**HEARD ABOARD S. S. COSKATO, ANCHORED NEW YORK HARBOR**, by E. Frey ex-8JQ. 2JZ, 2WB, 2AV, 3CV, 1AW, 1KJ.

**HEARD AT 9EY, OELWEIN, IOWA** 1AW, 2ZS, 4AE, 5AL, 5AM, 5AS, 5DO, 5ZA, 8AK, (8CB), 8CC, 8DA, 8ER, 8FI, 8FP, 8HP, 8IB, 8IK, 8IX, 8JQ, (8JZ), (8NF), 8XA, (9AOB), 9BT, 9CA, 9CH, (9CW), (9DR), 9DV, 9DX, 9EE, 9EG, 9ER, (9EX), 9FC, (9FU), 9GK, 9GV, 9GX, 9HA, 9HN, 9HP, 9HD, 9HR, 9HW, 9IP, 9IT, 9JE, 9JQ, 9JT, 9KO, 9KV, (9LC), 9LO, 9LQ, 9LR, 9ST.

**HEARD AT 4AL, ATLANTA, GA.** 2ZS, 3AMG, 3GO, 4AN, 4AT, 5AC, 5AF, 5AL, 8AE, 8AL, 8AS, 8CC, 8DA, 8DO, 8ER, 8FA, 8FD, 8FN, 8FP, 8FS, 8JQ, 8NF, 8ZM, 9AR, 9AJ, 9AU, 9AW, 9ABD, 9BA, 9BR, 9CW, 9DF, 9DO, 9DR, 9EG, 9EJ, 9EY, 9FD, 9FU, 9GS, 9HN, 9JQ, 9VY.

**HEARD BY JOHN L. GATES, CINCINNATI** 2CB, 2XG, 5ZA, 5ZC, 8JQ, 8EN, 8HU, 8IA, 8IE, 8NR, 8HU, 9DG, 9LJ, 9KO, 9HU, 9GQ, 9IR, 9HN.

**HEARD AT CANADIAN 3Z, FARNHAM, QUE.**, (Eric W. Farmer, Box 403). 1AW, 1SZ, 2AW, 2DA, 2SH, 2ZM, 2ZS, 8CD, 8CF, 8ER, 8MP.

**HEARD AT 9KV, ST. LOUIS, MO.** 1AW, 2CS, 2NB, (2ZS), 3BZ, (4AG), 5AA, 5AB, 5AC, (5AF), (5AG), (5AL), 5AQ, (5AU), 5ZC, 6EA, (8AA), (8AB), (8DW), (8ER), (8FI), (8HG), (8IK), (8JJ), (8JK), (8VP), 8XA, 9AD, 9AH, 9AR, (9AU), 9BG, (9BT), (9CA), (9EE), (9HQ), (9IT), 9IF, (9JT), (9KX), (9ZN).

**HEARD AT 9EE (ex-LXA), VALLEY CITY, NO. DAK.** 2ZM, 6AA, 5AL, 5BG, 5DO, (5ZA), 5ZC, 5ZL, 8AA, 8AB, 8BP, 8CB, 8DA, 8ER, 8FM, 8FL, (8GQ), 8GV, 8HG, 8HR, 8IK, 8JZ, 8RS, 8SM, 8XA, 9ARD, 9AD, 9AJ, 9AK, 9AM, 9AQB, 9AOR, 9AP, 9ASF, 9AU, 9AV, (9BR), 9BT, 9BW, 9CA, 9CE, 9CG, 9CK, (9CS), 9CW, 9DA, (9DE), 9DR, 9DT, 9DU, (9DV), 9DX, 9EA, 9EO, 9ER, 9EX, 9EY, 9FA, 9FC, 9FL, 9FL, 9FM, 9FQ, 9FR, 9FS, 9FT, 9FZ, 9GC, 9GN, 9GQ, 9GR, 9GS, 9GV, 9HA, 9HD, 9HG, 9HJ, 9HK, 9HN, 9HT, 9HU, 9IF, 9IL, 9IK, 9IT, (9IX), 9JA, 9JB, (9JE), 9KF, (9KI), 9KU, 9KV, 9LC, 9PQ, 9SK, 9TA, 9WH, 9WJ, 9YA, 9YN, 9YV, (9ZN).

**HEARD AT 9KG, VIBORG, S. D.** 5BG, 5DO, 5HN, 5LA, 5ZA, 5ZN, 8ER, 9AJ, 9AK, 9CH, 9EE, 9EK, 9FR, 9GK, 9HJ, 9HN, 9IF, 9IX, 9JE, 9KI, 9KU, 9KV.

**HEARD AT 3ZS, ST. DAVID'S, PA.** 1AW (regularly), 1AZ, 1CM, 1KT, 2BM, 2BK, 2CT, 2DA, 2IR, 2JU, 2LO, 2ZM, 2ZS, 3BZ, 3KE, 3NB, 8AA, 8AKY, 8ASD, 8CB, 8CC, 8CH, 8DA, 8DW, 8EF, 8ER, 8GA, 8IB, 8IK, 8JQ, 8NO, 9AJ, 9CW, 9EG, 9HA, 9HN, 9IT, 9K, 9QH, 9VY, 9ZJ, 9ZN.

**HEARD BY SAS, TILLEY, AUSTIN, TEX.** 5AA, (5AL), (5AC), (5CD), (5ZA), 5EZ, (5ZC), (5BG), 5DO, (5ZL), (5ZN), 5BT, (5AG), (5YA), 8GQ, 8ER, 8HB, 8AA, 6IZ, (9HT), 9AJ, 9BR, 9FA, 9GR, 9GO, 9HB, 9JA, 9FL, (9AOB), 9ZN, (9BT), (9JE), 9IT, 9KV, 9GL, 9AHI, 9EX, 9HR, 9HN, 9AP, (9HS), 9FU, 9IN, 9AK, 9CA, 9IX, 9GY, 9LC, 9DF, 9BG, (9EL). Can hear 9ZN and FH in the middle of the day loud enuf to copy without trouble.

**HEARD BY L. P. WOOD** Brantford, Ont., Canada, 100 miles northwest of Buffalo. 1AE, 1AK, 1AW, 2BB, 2JU, 2ZS, 8CB, 8DA, 8ER, 8IL, 8XA, 8gu, 9AJ, 9CW, 9LQ, 9ZN.

**REPORT FROM 4AG, ATHENS, GA.** 2AW, 2JU, 2ZM, 2DA, 2CS, 2BM, 3NB, 3BZ, 3CH, 3AMO, 8GO, (4AN), 4ET, (4AB), 4AT, (5AF), 5AC, 5BG, 5DO, 5ZL, 5DO, 5BB, (5EX), 5BZ, 8JQ, 8ADX, (8JQ), 8FT, 8AA, 8JZ, 8ER, 8FR, 8AUM, 8EX, 8FP, 8AH, 8DA, 8EX, 8FS, 8EN, 8AAR, 8IQ, 8EC, 8IX, 8JJ, 8ASF, 8CB, 8IB, 8FI, 9CW, 9HJ, 9CS, (9KV), 9AG, 9FO, 9HN, 9AP, 9AJ, 9AU, (9BR), 9CB, 9ZN, (9BT), 9VP, (9GS), 9FU, 9ER, 9HH, 9GY, 9KF, 9IT, 9HD, 9GX, 9FD, 9KO.

**HEARD AT 9FM, COLLEGEVILLE, MINN.** 5BT, 5DO, 7KN, 8DA, 8JJ, 9AJ, 9AP, 9CN, 9CS, 9DK, 9DS, 9DU, 9EL, 9EO, 9FA, 9FU, 9FZ, 9GK, 9GS, 9HI, 9HW, 9KI, 9KV, 9LN, 9LO, 9PI, 9ZC, 9ZA, 9ZJ, 9ZL, 9ZN.

**HEARD AT 9EL, COUNCIL GROVE, KANSAS** 5AC, 5AG, 5AL, 5AS, 5BT, 5DO, 8ER, 9AK, 9AL, 9BR, 9NE, 9NO, 9HI, 9HT, 9JE, 9LC, 9ZN. (Concluded on page 46)



The standard A.R.R.L. letter-head will be placed on sale soon, at a price everyone can afford. Patience until then, you chaps—our printer's first duty is to get out QST. We hope to announce it next month.

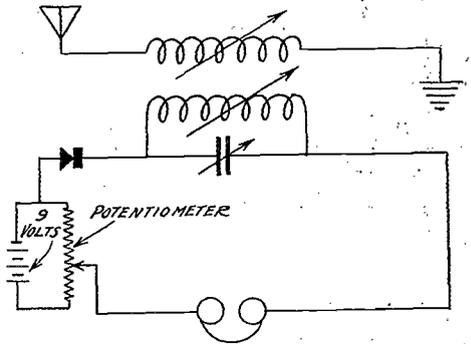
Heard KO? KO is an ex-amateur, now a ship operator, and his identity must remain unknown. He's had a lot of fun hamming up and down the coast, and some remarkable distances have been covered with various inland amateur stations. While 50 miles off the south-east end of Cuba, communication was had over the following distances:

3BZ .....	1275 miles
2IR .....	1550 "
8ER, 9EG, 1AW .....	1600 "
9ZN .....	1775 "

The stations covering these distances can well be proud of their work. The remarkable part is that KO says his input during this work was but 200 watts.

Here's an idea for a home-made adapter for the tubular bulbs, contributed by Mr.

Did you ever hear of an oscillating crystal? Mr. G. W. Pickard, of the Wireless Specialty Apparatus Co., has done it, and here's the hookup. The secret is the

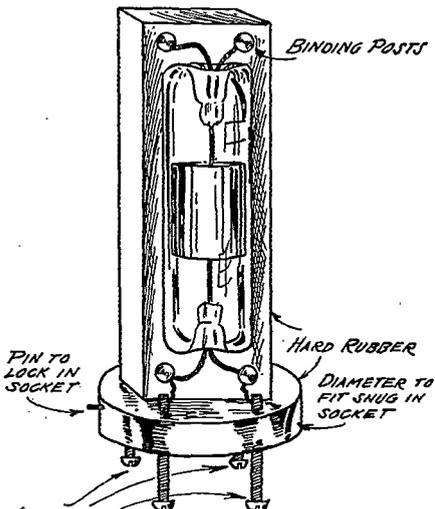


nine volts at the potentiometer. CW is received by heterodyne beats in the usual manner. The Editor would like to know what results are had with this hookup.

Some operators have the bad habit of "coming back" at a station calling them and shooting a message without finding out whether their own signals are loud enough to copy. This makes untold confusion. Messages should not be transmitted without a GA from the listening station, and it would be well to inquire first QRK?

Repeating words when the other fellow tells you your signals swing is worse than useless. If he says you are too fast, slow down; if he says QRM, QTA for him; if he says QRN, then to QSZ is very desirable; but if the trouble is fading and nothing more, try it again the same as the first transmission. Nothing is so exasperating as to tell a fader to QTA and have him consume priceless time while his sigs are "in" in calling and repeating each word, only to fade out again when he did before, when if only he'd gone ahead in proper style you'd have had it.

It's no crime to ask for QRS. If a man comes at you too fast, tell him that rather than trying to guess at the message. We have some "Lake Erie swings" in our midst, too, who can't be read until they drop



L. A. Walker, of St. Joseph Mo. The drawing is self-explanatory.

down to so low a cadence that it just naturally can't be jazzed. So ask 'em.

George Howsare, of 8EZ, old 8ASG, Dayton, Ohio, died on December 30th at the home of his parents, Rev. and Mrs. McD. Howsare, after a week's illness of bronchial pneumonia. He had been attending college at Defiance where he was the operator at Defiance College Station, DC, late 8GQ, and was home for the holidays at the time of his death. As 8ASG he acquired many friends among the A.R.R.L. fraternity, with whom he was an active worker, and we will all miss his spark. Our sincere sympathies are extended his parents in the loss which is ours as much as theirs.

A number of new publications have appeared in the radio field. The "Radio Review," published in London by the Wireless Press under the editorship of Prof. G. W. O. Howe, is a highly technical monthly dealing mostly with the work of leading British physicists but containing reviews and abstracts of all advanced radio work, covering in general about the same ground as our own Proceedings of Institute of Radio Engineers. The advanced student will find it of considerable interest.

Rupert Stanley's book known as the "Text Book on Wireless Telegraphy," published in England, has been revised and republished in two volumes. Volume II, entitled "Valves and Valve Apparatus," is a splendid exposition of modern practice in the use of vacuum tubes, theoretically and practically, as detectors, amplifiers and oscillators. It deals largely with the work of Round, Ferrie, and other British and French experts in their wartime developments, and presents many features new to American readers.

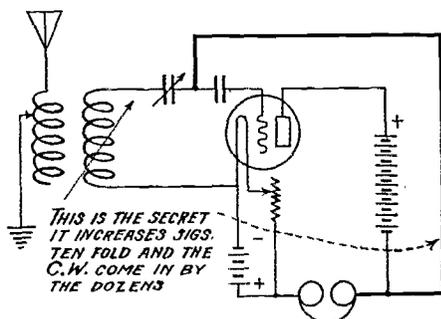
The best theoretical radio text we have seen for a long time in "Radio Engineering Principles," by Lauer and Brown, formerly Signal Corps officers, and published by McGraw-Hill. This book completely covers the American developments in radio communication made during the war, and in a lucid manner. QST readers will find it of much value in gaining an understanding of the electrical design of modern apparatus. QST Book Dept. has it, at \$3.50, p.p.



See this tiny tuner? It is only five inches in diameter, yet it tunes to 20,000 meters with a couple of shunt variables. This is the big Tresco tuner, one of which we have been using thru the kindness of Mr. Kirwan. It has two involute-wound coils, with five taps on each, and the circuit

is the ordinary straight audion with an additional variable from plate to antenna connection to produce the local oscillations. LCM, POZ, GB, IDO, OUI, MUU, NBA, NPL, XDA, and the eastern U.S. arcs have been heard, and tho perhaps not as loud as on more complicated sets, the Tresco tuner certainly has the advantages of compactness, ease of manipulation, and low cost.

Erratum: Mr. Brown reports an error in the hookup shown on page 30 of the December QST, wherein the A battery is



shorted thru the phones and secondary. It should be as in the drawing herewith.

**JOHN M. CLAYTON**  
(Concluded from page 35)

S. A. T. C. and got in, and then sat around until December praying to be transferred to a radio outfit. Favorite pastime: blowing condensers; next favorite, fixing them. When he dies he hopes to have engrossed on his tombstone "Here lies a ham—he did and died."

**CALLS HEARD**  
(Concluded from page 43)

**HEARD AT 8AA, DEFIANCE, O.**

- 1AE, (1AW), 1RN, 1SZ, (2BM), 2BZ, 2GB, 2GS, (2DA), 2FG, 2IR, 2JE, (2JU), 2LO, 2PL, 2SH, 2SZ, 2WB (2ZS), (3BZ), 3CC, (3GH), 3GO, 3ZS, 3ZW, 4AI, 4AN, 5AA, 5AG, 5AL, 5BC, 5BE (5BO), 5BR, 5BZ, 5DO, 5EX, 5OU, 5ZA, 5ZL, 5ZC, 5XA, 8AVD, 8AKY, 8AB, 8AD, 8AE, 8AN, 8AL, 8BO, 8CB, (8CC), 8CJ, 8DA, 8DB, 8DE, 8DR, 8DV, (8EC), 8EF, (8EN), 8EV, 8EZ, 8FA, (8FI), 8FT, 8FH, 8FD, 8GZ, 8GI, 8HB, 8HG, 8HR, 8GJ, (8IB), 8IF, 8IK, 8JB, (8JJ), 8JQ, 8JV, 8KK, 8KW, (8NF), 8NG, 8NL, 8RS, 8US, 9AQB, 9AOR, 9AD, 9AF, (9AJ), 9AS, (9AU), 9EM, 9BP, 9BR, (9BT), 9BW, 9CA, 9CH, 9CS, 9CW, (9DU), 9EG, 9EL, 9EX, 9EV, 9EY, 9FE, 9FG, 9FM, 9FR, (9FU), (9GC), 9GS, 9GV, 9HI, 9HN, 9HR, 9HY, 9IF, (9IT), 9IX, (9JT), 9KI, (9KF), (9KM), 9KO, (9KV), (9LC), (9LQ), 9LR, 9MK, 9NE, (9NQ), 9OG, 9OV, 9OY, 9PQ, (9ZN).

**HEARD AT 8EU, TOLEDO OHIO**

- 2PL, 3NB, 4AE, 5AF, 5ZL, 8AO, 8BR, 8BS, 8DA, 8DC, 8DO, 8EF, 8FB, 8GJ, 8GK, 8GH, 8GR, 8GX, 8HI, 8IN, 9AD, 9AF, 9AJ, 9AO, 9BR, 9BT, 9BU, 9CS, 9DU, 9EG, 9ER, 9FD, 9FC, 9FU, 9GH, 9HA, 9KF, 9LC, 9LQ, 9LR, 9LN, 9PQ, 9ZN.

# Radio Communications by the Amateurs



THE PUBLISHERS OF QST ASSUME NO RESPONSIBILITY FOR THE STATEMENTS MADE HEREIN BY CORRESPONDENTS

## AN INTERESTING ACCOUNT OF THE STATUS IN QUEBEC

243 Mackay St.,  
Montreal, Que.,  
Jan. 15, 1920.

Dear Mr. Warner:

Have been somewhat handicapped for time, therefore made no definite attempt to answer yours of Nov. 13th before.

From the start I wish to extend my personal thanks and the thanks of many Canadian amateurs for the truly splendid way in which you and the A.R.R.L. have offered us "that helping hand." Judging from your Editorials on the subject, you are following the right course. There already seems to be a little competition between the Ontario Division and this Division for "the place in the limelight." It is not amiss and will serve to overcome obstacles in the way of closer co-operation.

Personally I consider the A.R.R.L. an International Amateur Brotherhood, much the same as the many other joint brotherhoods on this continent.

This Division is progressing remarkably well in the grand rush to make up for five years delay in amateur radio development. We have a few star stations already, Mr. Milette of this city (2AI), being the most prominent. His sigs reported QSA 60 miles east, and has worked with another amateur in Three Rivers, a distance of 85 miles (daylight.) I might add here that I find most all our amateurs are and have been using 200 meters provided no interference caused. However, the Government has now granted permit for use of the 200 meter wave until April 15th.

We hear many of the leading U. S. amateurs up here, even on crystal receiver, 2ZS being about the most prominent, tho we often hear 1AW, 2ZM, 2JU.

The Jesuit College here is using 600 meters for transmitting (call XAA) and are obtaining a special license. XAA was calling 1AW the other night but doubt very much if he would be picked up, especially with the QRM experienced on that wave in the Coast District. His sigs have been reported QSA at Quebec, 172 miles (daylight.)

Somehow it appears to me that very good work can be done on 200 meters in this country. Our ranges are nothing extra-

ordinary but there seems to be nothing freakish about the ranges covered in daylight. We have several  $\frac{1}{2}$ " spark coil stations in Farnham, Que. 2AS, (Corvansville, Que.) 16 miles east, picks up these stations every time they open up, using one valve for reception. 2AS's sigs reported at XAA last Sunday afternoon, 60 miles with  $\frac{1}{4}$  KW.

The Marconi Co. in this country have thrown a few legends to the winds and are now in the amateur game making apparatus. The Radio Elec. & Supply Co. have been taken over by them and now the Scientific Experimenter Co., shares reported as 100,000. The Marconi stations now send out press daily for the amateurs. You readily understand that we Canadians are "up against it" when purchasing from the U. S. manufacturers now. After paying 35 to 50% duty, there is an additional 10% on money. I have had a  $\frac{1}{2}$  KW transformer on order since Nov. 15th, not received to date. There seems to be no rush to filling orders from Canada.

Must QRT now, OM. More later.

Sincerely,  
Albert J. Lorimer.

## EXIT QRM IN ST. LOUIE

3424 Olive St.,  
St. Louis, Mo.,  
Jan. 21, 1920.

Dear Eddy:

Want to congratulate you on January QST as it certainly is a pippin. Was just reading the letter of John Clayton wherein he states that so much QRM prevails here in St. Louis that it's NG when it comes to getting a MSG thru. Well, let me tell you something, Eddy; 5AF was right, as this was exactly the case here six weeks ago, but not now. Bill Woods and I took it upon ourselves to go around and see every ham in the city with a one inch spark coil up to a ten KW. Well, after putting in a lot of the good ole amateur pep we succeeded in getting 'em together one fine evening at what is now known as the St. Louis Radio Assn., and let me tell you, Eddy, they were there from ten years old up to fifty.

Well, as Bill Woods had the best line

(apologies!) it was decided that he start the thing off—and he did as follows:

“Well, fellows, glad to see yer all here. I see a lot of old faces but the majority are new. Now the first thing we’re going to do is to find out who some of these lids are who cause all the QRM. . . . All right, Mr. Jones, step to the board and put down the calls which are reported. . . . LR. . HF . . . 9— (Etc., ad inf.) Now then, is this Mr. LR in the crowd? (LR rises.) Well! So this is Mr. LR, fellows! (Just about this time LR sits down but is called upon to stand up again.) Now Mr. LR, you have a spark coil, have you not?”

LR: “Yes”.

Bill: “And you have it connected across the aerial and ground, have you not?”

LR: “Yes”.

Bill: “Well, this is against the law and you’ll have to get an oscillation transformer, condenser, etc.”

LR: “What is an oscillation transformer?”

Bill: “Can any kind gentleman tell the man what an oscillation transformer is?”

Bright lad in the rear rises: “Yes, an oscillation transformer is a hunkus you put in the aerial circuit to keep yer wave on 200 meters.”

Bill: “Fine! Now Mr. LR, you’ll have to insert one of these hunkuses in yer aerial circuit or we’ll have to ask you to pipe down.”

Just at this stage LR gets sore, and with a great outburst says: “Why do you all pick me out? I hear a guy whose call is CQ that’s always causing QRM. Why don’t you get him? (Laughter from crowd.)

Bill: “Come to order, fellows. Now who is this next bird on the QRM list? Ah! Mr. 9— . . . . .”

So they were all given the third degree and some awfully rash promises were made that it wouldn’t happen again. Rules were laid out to call a distant station three times, sign three times, repeat and then pipe down. To send a Morse “C”, meaning “clear?”, and if no one is QRW two dots are given meaning GA. And I want to tell you we got every lid in town down to those rules and our QRM-knock session takes place every two weeks, when all offenders are given the third degree.

However, we still have a few outlaws, as they paid Bill Woods a visit one night last week and cut down his aerial, also stamping out in the snow a skull and cross-bones. But we’re laying for ’em with 45’s now. Hi!

Well, Eddy, guess I’ve taken up a lot of yer valuable time but want to let you know what’s going on in this neck of the woods, so will QEX till we find out who cut Bill’s aerial down.

Bennie (9KV, ex-9VP)

IT’S A GREAT LIFE

Del Mar, Calif.,  
Dec. 8, 1919.

Editor, QST:

The following actually happened, and I repeat it just as it took place:

Time: 10:30 p. m. Scene: 600 meters. The audion lights up slowly (we also use it for a desk light) and discloses our trusty pencil writing the following:

“ . . . to my uncles for Christmas how do you get me now?”

“BU and FA de NPL QRT”

“FA de NPL QRA”

“NPL de FA San Pedro I live here”

“FA de NPL are you amateur?”

(Silence)

“NPL de BU don’t send so fast”

“Are you amator” (NPL)

“NPL de BU QRS”

“Are you amateur?” (NPL)

“FA de BU ? ? QRM”

“BU de FA what did NPL say?”

“FA de BU don’t know he sent to fast”

“NPL de FA QRS”

(Silence. NPL may have fainted.)

“BU de FA QRM will call again some time GN GN” (1000 times)

“FA de BU a trolley car just past and made QRM”

(More silence.)

Have you any hams in the East who can beat it?

Yours truly,

John F. Gray.

(J. F. G.: Yea, Bo, beat it easy. Howzis?: “1— de 1— my mamma says tell your mamma Mrs. Murphy says Mrs. Jones husband has lost his job and what does she know about that and if I come over can she loan her a cup of flour until to-morrow morning?”—Ed.)

FROM A QST ADVERTISER

Davenport, Iowa.,  
1-20-20.

Editor, QST:

I was in the Navy in 1897. When Marconi started his wireless tricks we boys were on the job. I have been on the job since, but I have never seen such blamed headlong strides, in this or any game, that can come up to QST. Since advertising in QST, have had the opportunity to check up our answers and sales from eight widely circulating wireless and electrical magazines and can say truthfully that in our opinion QST is the leader, at least for our class of mail-order business. Have sold tuners from answers to your ads in China, Mexico, Canada, Alaska, Honolulu, Santo Domingo, Porto Rico, and today we received a letter from ICELAND which we

are enclosing herewith. With the temperature here about ten below zero, we thought well of our Iceland Radio Worker and have written him for his picture. Am anxious to see what kind of a bird can live in that place and keep his mind on his wireless work. We are going to send him a present of a tuner so he can hear at least something from this country and perhaps check up on some of your long distance stations.

With kindest personal regards and reserving again a full page for your next issue, I remain

Cordially,  
TRESKO

By W. H. Kirwan, Sales Manager.

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### QSY 200 METERS!

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107 McDaniel St.,  
Dayton, Ohio.,  
Jan. 20, 1920.

Editor, QST:

I feel that the amateurs, readers of QST, would be interested in knowing of their range and also something of the wave length that they are transmitting on.

I listened in on a regulation Army short wave receiver at McCooks Aviation Field for about an hour last evening, January 19th, and copied the following stations. I used a Kohlster Decremeter in connection, and recorded wave lengths at the same time.

9KV—260; 9HN—330; FH—410; 8AHT—455; CH—200; 4AE—220; HE—465; 9LQ—250; 8CB—255; 3CZ—235; 9FR—295; 9IK—285; 2CC—320; 2ZM—340 meters.

I hope this work will be taken as a favor rather than a knock. Far be it from me to knock, as I am an amateur myself—ex-8LT, now operating 8IX and 8EZ. I hope this will open the eyes of some of the amateurs, who probably think they were on a legal wave length, and keep them from tangling with the inspector—please explain in QST.

An amateur friend,  
Roy Stanley Copp  
(Radio Div., Civil Service.)

(The Editor is sure that we are all highly appreciative of this valuable information. It is truly an eye-opener, and the stations mentioned who are outside the pale should take due notice thereof and govern themselves accordingly.)

### DX RECEPTION

1918 Smith St.,  
Houston, Tex.,  
Jan. 9, 1920.

Editor, QST:

Here's "one better" on short wave DX receiving, asked for by Mr. Gisburne in December issue.

On Nov. 25, 1919, at 11:50 p. m. I heard a faint station on 300 meters calling NAU. Realizing that NAU is over 2000 miles from here, I listened closely and got call letters KKT signed in. He was giving his TR and this is what I copied: "Arrive Barbados Thursday arrange 500 tons coal 19 r 21 north 52 degrees west 8 pm sig S - Morris QSL on 600 pse K".

Referring to your map and measuring the position given, you will find it to be approximately 2800 miles. 300 meters can't carry? I have written the naval station operators at NAU telling them of the record.

Very truly yours,  
C. W. Vick (5AC)

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### PAGE DIOGENES!

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Kernersville, N. C.  
Jan. 23, 1920.

Editor, QST:

There's no use of going any further—I have the record for wireless transmission. This thing of "one hundred and fifty miles with a Ford spark coil in daylight on a summer day" can't touch me. 'Tis said I did seven or eight hundred miles via radio when I haven't even had a set in operation. Anyway, that's what 5AF and half a dozen others said in the last QST.

Yes, I 'spose it is about time for this super-prevarication to come to a halt, so I'll explain. 4AA is reported as having been heard by a number of stations. That is my call, but honestly I haven't done any transmitting this season. I guess our good friend Pope, of Atlanta, was using that before he was assigned his new call-4AG. The idea is this: I don't want any credit that is due someone else, presumably new 4AG. I haven't swam in yet, due to the fact that I have been away from home practically all the time. I hope soon to be able to remedy this sad state of affairs. (No kidding, it makes a fellow feel like "a man without a country" to read about the great things others are doing, and not be able to help). But just wait, I'll be "there" some of these days—even tho it's with the characteristic slowness a Southerner is said to possess. Well, OM, this is my last until I am stripped and in action. CJL 73.

W. M. Nelson.

## NEWS FROM NORTH CAROLINA

Coast Guard Cutter "Seminole",  
Wilmington, N. C.,  
January 30, 1920.

Editor, QST:

Since sending in our last list of calls heard, sigs have just been pounding in here on board this vessel. We are very anxious to have the fellows know just how far their sigs are going. After making the rounds of the local amateur stations we find they are "undamped" enthusiasts without the proper apparatus for receiving long distance sigs. We claim to be the only operators who are receiving long distance fellows in this vicinity and since no reports come from here it is well that we advise you of the calls heard. The following were heard within the past two nights: 2ZM, 2ZS, 3NC, 3KH, 3XC, 4AE, 5ZC, 8BD, 8HG, 8IK, 8XK, 9AJ, 9HJ, 9ZN.

The field is wide open for an American Radio Relay station in this town and when old 3AOW is released he anticipates taking full charge of all relaying in this locality.

Many times long distance sigs are heard but the operator fails to sign off, thereby losing his call. Even if it is only sent once at the end there is a chance it may be picked up in some part of the country.

Would like to hear from some of the fellows who have had success with the Amrad quenched gap. Let us all hear what it can do.

The above calls are in addition to those already sent in and hope to see them in an early issue of QST.

Coils designed by Mr. Bates were used throughout the entire receiving and believe me they "SURE DO WORK".

Success to all amateurs and QST,

Sincerely yours,

James F. Rau,

C. A. Roethlinger.

P. S. Why do all sailors know the moon is NOT made of green cheese; well they all went to C!

## INTERESTING RADIO JOBS OPEN

NVH, 19 January, 1920.

Dear KB—

Here's a little dope that may interest some of the more adventurous among the League members. I know there was a time when I'd liked to have had a line on something like this.

About April, there will be a demand for operators around Seattle, to come to Alaska for the summer season, from about April to September, to take the wireless job at various canneries.

These require in most cases, first commercial licenses, although in some instances, men with second grade commercials, can get in. Now a little about the

jobs themselves.

In almost every instance they are what in known as 'combinations', that is, wireless and storekeeper, or some similar combination. The wireless job amounts to half or three quarters of an hour a day, generally, consisting in clearing with the nearest Naval station. The salmon canneries are so located, that they get mail only about once a week, and wireless therefore handles considerable business to and from each cannery.

An op takes the job, acting as, say storekeeper, for six or seven hours a day, and clears perhaps twice a day on a regular schedule with his nearest naval station. His day's work is completed then, but as the radio quarters are in most cases right with the instruments, there's all kinds of opportunity for experimenting in the evenings, particularly as the operator reigns supreme, in so far as the apparatus is concerned. The majority of installations are of half kilowatt 500 cycle capacity, although some run up to one KW, depending on distance from naval station.

The combination jobs pay from \$125 to \$175 a month, with board and quarters and in a season a fellow can lay up \$500 anyway to come out with in the fall. He gets a good vacation too, and has some good experience. An opportunity is offered also to make considerable overtime money, when ships arrive to load cased salmon.

Stick this in some corner of QST, and if any of the boys are interested, let 'em write me direct, and I'll give 'em dope on where to file their applications etc. It will be necessary for them to pay their own fare to Seattle, but from Seattle to Alaska, first class transportation and expenses are furnished, fare also being paid back to Seattle at close of season.

Sincerely yours,

H. S. Pyle.

CE(ro)USN

Address me: Navy Radio, Ketchikan, Alaska.

## —GOOD WORK—

1625 Locust St.,  
Philadelphia, Pa.,  
Feb. 4, 1920.

To Editor of QST:

I would like to report to you what I think is a new record for long distance spark coil transmission, and possibly a new record for miles per watt input.

During January, I have been heard several times by 9AJ, H. A. Mackley, Peoria, Illinois; in the neighborhood of nine hundred fifty miles from here. Mr. Mackley reports that my signals are so strong at times that he cannot work local stations. Here is a brief description of my transmitter.

"Ford" spark coil which gives a high

pitched note very similar to a five hundred cycle set. Condenser .0017 mfd. capacity. An original design of oscillation transformer, and a straight semi-quenched spark gap. Aerial one hundred feet high, forty feet off roof, eighty feet long, six wires spaced two and a half feet. Input in primary of spark coil, forty five watts. Radiation in antenna circuit, two amperes.

This is certainly a remarkable distance for the above set. These statements will be willingly corroborated by Mr. Mackley if so desired. You will also see my call listed in the February QST as being heard at 2NS, Peekskill, N. Y. I would like to hear from anyone who has a better record than this, or who wants more information regarding this matter. Does anyone hear 3AI?

Well, 73 for now.

Bayard P. Fonda.

### THE WORD "AMATEUR"

Box 33, Tallman, N. Y.,  
Jan. 15, 1920.

Editor, QST:

Enclosed herein is an application and dues for membership in the A. R. R. L. While not yet a member, I have been an enthusiastic QST reader since before we entered the War and I am taking this opportunity to express some of my views.

I think that your idea of an emblem by which A. R. R. L. members can recognize each other is an excellent one. I have thought for some time that one was needed. I am in favor of a small lapel button not over one half inch in diameter. The smaller and more inconspicuous, the better, for A. R. R. L. members would easily recognize the general design at a distance and outsiders would not be interested anyhow. The latter consideration is not important, as I don't think that an advertisement of the League is intended in this manner. It would have a thin, threaded shank or stem in the center of the back, which would go thru the cloth of the lapel and be secured by a nut on the other side. I have found this method of fastening to be the most satisfactory. It would be gold plated, with a gold center on a blue enamel background. This background contains "ARRL" in white letters. The gold center is reserved for the wearer's call letters which would preferably be engraved at extra cost and to order, when purchased from the League. The cost of a neat button alone, heavily gold plated, ought not to cost more than 50c, I should think.

This idea calls to mind two of the devices that a friend of mine used to use for "spotting" fellow amateurs in a crowd in pre-war days. They may be useful to some of us who are collecting subscriptions. I first made his acquaintance on a train, when a tall young fellow sauntered slowly

up the aisle, regarded my youthful appearance with a speculative eye, and dropped into the empty seat beside me, withdrawing a QST from his pocket as he did so. I had heard of QST and I immediately rose to the bait and introduced myself as a fellow amateur. After a few minutes of conversation, he invited me to inspect his issue, remarking as he did so, that he would be pleased to accept my subscription—which he later did; also that of a friend of mine thru me. Thus also, was I first introduced to QST, which, I am glad to say, I have never regretted. This, my friend later told me, was his favorite method. He would also whistle the code when in a crowd, which occasionally brought results.

I should like very much to reply thru you, to Mr. W. L. Matteson, who in the December QST, voices his disapproval of the designation "Amateur", as applied to us. To begin with, Mr. Matteson is under a very great misapprehension as to the meaning of the term. The name "Amateur" is no indication of, or reflection upon, the ability of a person in his chosen line of endeavor; it merely means one who is a non-professional. Any dictionary will verify the above statement. The fact that the average professional operator is as far above the average "Ham", as the advanced amateur is above the average professional, does not alter the case. I, for one, am very proud of my status as an amateur, for it means that in the Radio Art, instead of being employed for money and under the authority of my employer, I am a free agent, pursuing the game for the love of it.

In closing, Mr. Editor, I should like to express my appreciation of the obviously genuine Amateur Spirit of the League and of your magazine.

Very truly yours,

Dundas P. Tucker.

### SPARK COIL TRANSMISSION

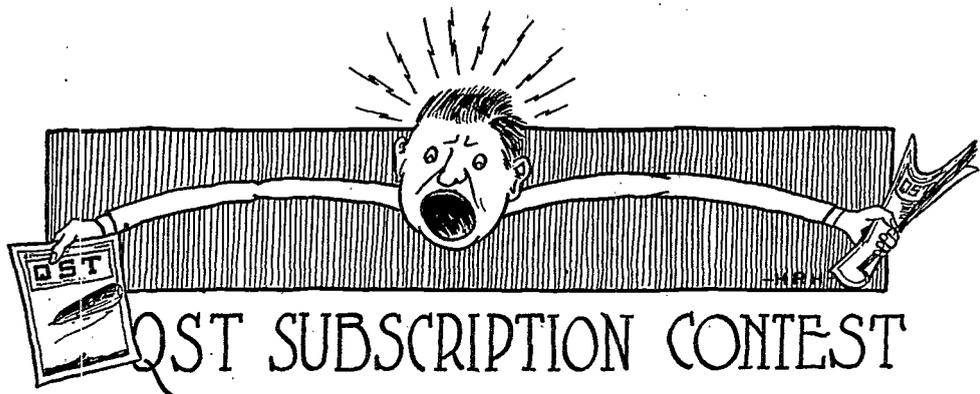
593 Cass St.,  
Milwaukee, Wis.,  
1/12/20.

Editor, QST:

It might be interesting to a few spark coil enthusiasts to know that I have been heard by 9BT at Topeka, Kans., approximately 400 miles, on a 2 inch spark coil, operated on 110 v. D. C. with an interrupter, and a 4-lug rotary gap going at 8000 r. p. m. The tone produced is exactly like a 240 cycle synchronous set, such as VBB, VBA, etc. 8AH at Youngstown, O., and 8DA at Salem, also report QSA, so for the love uv Mike, fellows, if you hear 9HW please write and tell me about it, because I don't believe there are very many fellows getting results like that with a spark coil. 73.

Yours truly,

Clarence F. Bates.



February 11, 1920.

Well, she's over, and I've been figuring up scores all morning. Yes, there was a whirlwindy finish all right, and one chap

pulled me out of bed at 11:59 last night to register the fruits of his labor at a nearby radio club meeting.

The prize winners are as follows:

1st Prize,	W. S. Taylor, Minonk, Ill.....	576 Points
2d Prize,	Jno. L. Reinartz, South Manchester, Ct.....	480 Points
3d Prize,	Robt. H. K. Foster, Columbus, O.....	420 Points
4th Prize,	E. C. Wiendieck, Hartford, Conn.....	402 Points
5th Prize,	Herbert Richter, Collegeville, Minn.....	382 Points
6th Prize,	K. E. Hiorns, Librarian, Attleboro, Mass.....	336 Points
7th Prize,	W. H. A. Paulus, Atlantic City, N. J.....	270 Points
8th Prize,	R. D. McCommon, East Palestine, O.....	252 Points
9th Prize,	H. J. Burhop, Manitowoc, Wisc.....	216 Points
10th Prize,	Walter Kolb, Pelham, N. Y.....	201 Points
11th Prize,	J. D. Hertz, Portland, Ore.....	180 Points
12th Prize,	Thos. F. Hunter, Elizabeth, N. J.....	134 Points
13th Prize,	{ E. E. Anderson, Ridgewood, N. J.....	120 Points
	{ Samuel Place, Norristown, Pa.....	120 Points
	{ Thos. G. Waldie, Beverly, Mass.....	120 Points

The last three contestants tying, the value of the 13th prize is allotted to each. No one qualified for the last five prizes.

To the winners, our hearty congratulations. We have written you to send in your orders for apparatus from the catalogs of the firms listed in the December QST, and we hope you'll soon be happy with your new equipment.

We're going to have another contest soon and then we hope that those who were not winners in this contest will qualify for a prize.

To all you we give our hearty thanks for your work.

The Contest Manager.

**EK-9GY SAYS IT'S AWFUL**

1503 Cambridge St.,  
Ann Arbor, Mich.,  
February 4, 1920.

Dear Ken:

Man alive, do you know it's fairly hell on earth not to be able to get your paw in every night on your own little, finiky, uncertain, pesky, pile of junk and to pound and pound at your own free will to some guy equally as bugs as yourself some hundreds of miles away? Hang it all, I never realized how a set could be missed till now. The other night two or three of us dropped in to the Engineering Building just as old 8XA was working 8ER. I got

in on the key as soon as he was thru and had a ham fest with Mrs. C. and ever since then I've been mentally hopeless. And then yesterday that blamed little tempter of a QST showed up and----- But why talk about it? Suffice it to say that today I was sitting in the library trying to assimilate a lot of bull having to do with the government, Congress and a lot of other unnecessary evils of this country but the whole time I was wishing I had three hundred bones or thereabouts, lots of space and the permission of my landlady to do my worst. Aw h--ell!

Hastily,  
Kern.

# CLASSIFIED ADVERTISEMENTS

Five cents per word per insertion, in advance. Name and address must be counted. Copy must be received by the 10th of month for succeeding month's issue.

**FOR SALE**—Murdock Aerial switch, oscillation transformer and four moulded condensers. Clapp-Eastham hot wire meter, Brandes Navy phones—good condition. **WANTED**—Magnetic Aerial switch. Dr. Cyriax, 219 East 71 St., New York City.

**FOR SALE**: 1/2 K.W. Thordarson, 4 sections. Moulded condenser, Oscillation Transformer, Heavy duty Key. A1 condition, \$25. J. K. Brooker, Cass City, Mich.

**FOR SALE**: Half K.W. Packard transformer, Mounted, \$16. A1 condition. Maxwell Hutchinson, Middlebury, Indiana.

**FOR SALE**: The following Radio Apparatus from the well-known Amateur Radio Station of 9LR. This material is of the highest grade stuff, in first-class condition, having had very little use. 1 Clapp-Eastham 1 KW Hytone Transmitter, 220 volts, complete with panel and instruments, like new, \$400.00; One 1/2 KW Clapp-Eastham Hytone Transmitter, 110 volts, complete, with Boston Key, new, \$150.00; 2 Clapp-Eastham Blitzen Tuners, variometer type, 1500 meters, \$7.00 each; 1 Blitzen Variable Condenser in glass case, new, \$3.00; 1 Blitzen Variable Condenser, without glass case, \$2.00; 3 Blitzen Variable Condensers, assembled, unmounted, \$1.50 each; 1 Clapp-Eastham Ferron Detector on Italian Marble base, \$3.00; 2 Murdock Silicon Detectors, \$3.00 each; 1 Murdock Variable Condenser, \$2.50; 1 Pair Holtzer Cabot Phones, 3000 ohms, \$5.00; 1 Two-Step Multi Audiphone Amplifier, with loud speaking horn, \$25.00; 1 Multi Audifone loose coupler, pancake type, 15000 meters, \$10.00; 1 Telephone Transmitter for wireless telephone work, \$2.00; 1 Mesco Primary Condenser No. 439, plug type, \$2.00; 1 No. 496, 4 in. Mesco Spark Coil, \$6.00; Two 5 ohm telegraph sounders, \$1.25 each; 1 Crystaloi Detector, 85 cents; 2 High Frequency Buzzers, \$1.00 each; 2 Low Frequency Buzzers, 30 cents each; 1 Nickel Plated Telegraph Key, for 1/2 KW, \$1.20; One 1/2 KW Spark Gap, \$1.50; 1 Geisler Tube, \$1.50; 1 Battery Motor, Knapp 4 volt type OK, \$2.50; 1 Double Slide Tuner, 1500 meters, \$1.75; 2 Audion Sockets with short brackets, \$0.50 each; 4 small DPDT nickel plated switches, unmounted \$0.30 each; 1 SPDT 100 amp. 500 volt ground switch, \$3.00; 1 Antenna Switch on wood base, \$1.25. Terms cash with order. Particulars given on request. Chas. Coultas, Operator of Station 9LR, 950 Beach Ave., St. Louis, Mo. We pay postage.

**FOR SALE**—1 K.W. Transmitter, 2 step Multi-Audifone. H. S. Hughes, 7390 Maple Ave., St. Louis Mo.

**FOR SALE**: First money order for \$55.00 takes brand new Grebe CR-4 receiver. W. A. Parks, 1220 Jackson, N. E., Washington, D. C.

**FOR SALE**: Murdock Antenna Switch, \$3.00; DeForest Unit Set with 12 units and V.T. Tube, \$60.00. Robert E. Edson, Harmon, Ills.

**FOR SALE OR TRADE**: Short wave regenerative receiver; Triple silver cornet in case. WANT one or two stage VI amplifier complete. All letters answered. P. A. Stover, Marengo, Iowa.

**FOR SALE**: 6" spark coil, mercury interrupter; two 36-gauge shot guns; 1 galvanometer; 1 Wheatstone Bridge; and other apparatus. A. H. Osborne, R. R. No. 7, Box 200, Elkhart, Ind.

**FOR SALE**: 2 brand new audiotrons, \$4.50 each. Motor generator set for undamped work, 1/4 h. p. 1750 RPM Induction Motor, direct connected to 500 volt generator, 1/2 amp. capacity. First \$75.00 takes it. Write for list other apparatus. W. E. Woods, 1106 Pine, St. Louis.

**FOR SALE**: Undamped wave coupler, 20,000 Meters, Navy-Type, \$15.00. Murdock Coupler No. 344, \$6.00. Holtzer Cabot—3000 ohm phones, new \$10.00. Elmer G. Baier, 253 Ninth St., Brooklyn, N. Y.

**FOR SALE**—Omnigraph, Blitzen Tuner, Three Murdock Variables and loading coil, loose coupler. B. Weed, 224 Saint Ronan Street, New Haven, Conn.

**CASH**: 1 K.W. Thordarson Transformer, \$19.50; 1/2 K.W. Packard Transformer, oil immersed, \$8.00; Pair Light Brandes Phones, \$11.00. B. Wendeln, St. Marys, Ohio.

**FOR SALE**: One No. 2 Jr. Omnigraph, with six sets of records, \$12.00. Maurice E. Kimmel, DuQuoin, Illinois.

**FOR SALE**: DeForest Honeycomb mounting, seven assorted coils, all NEW. Cost \$23.10. First MO for \$18.00 takes them. E. C. Jones, Jr., Fairmont, W. Va.

**WANTED**: Several General Electric VT-11 tubes, if cheap. Editor, QST.

**THE AUDION**. Its early history and development, Electron Theory and Trigger Action, compiled by a Chief Electrician Radio who was stationed at the Naval Radio School as Instructor for two years, written by an old amateur for the amateurs in words that they can understand. Also blue print diagrams for hook ups for receiving damped signals, using both air exhausted and gas bulbs. Receiving undamped signals and regenerative circuits. Two-step amplifier, using same (A) and (B) batteries for both steps. Wireless telephony with power bulb. Working blue prints on how to build a "One to One" transformer for use with Audion Amplifier. All for \$2.00. Address T. O. McKenzie, 104 Warburton Ave., Yonkers, N. Y.

## THE OPERATING DEPARTMENT

(Concluded from page 34)

The station of Mr. Isaac is going again. It is a very elaborate station and is quite prominent in relay work. It works 9EE Valley City, N. D., regularly, as well as a number of more distant points. Mr. Isaac reports some excellent pre-war records and ought to make a good relay station for the district.

A communication was recently received from the North Dakota District Superintendent, 9EE, Russell Pray, Valley City, N. D. He reports very few stations going in his district, and wishes to get in touch with some good stations outside of his district. He is well able to hold down his end of the line as will be noticed by his list of stations heard and worked. His relay operations may be heard any where in the S. D. district nearly every night.

The district of South Dakota may be a little slower in getting started than some eastern districts which are more populated and which have all their supplies at their door. This, however, does not alter the fact that we have some station owners who are good operators and once they get started will add considerable strength to the League's traffic routes.

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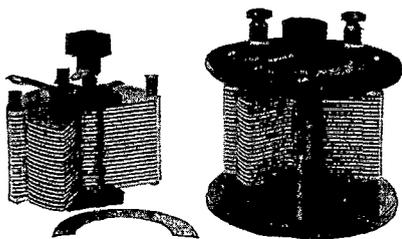
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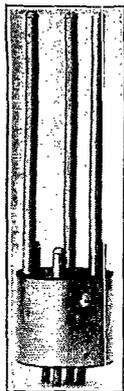
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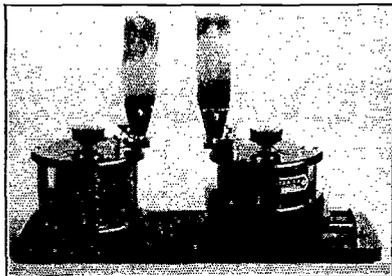
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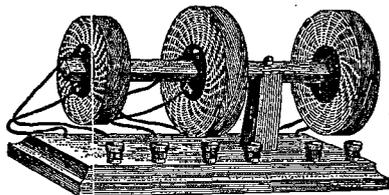
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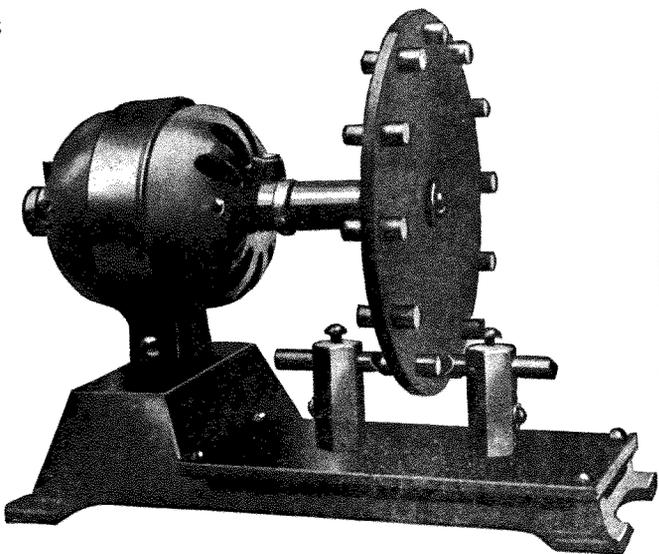
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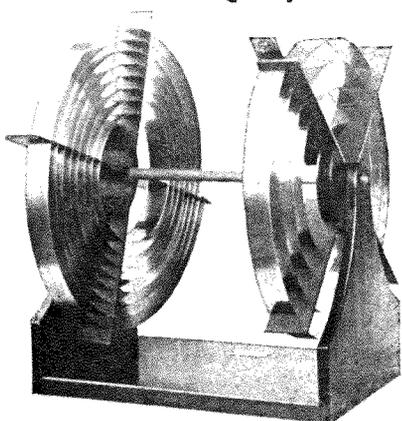
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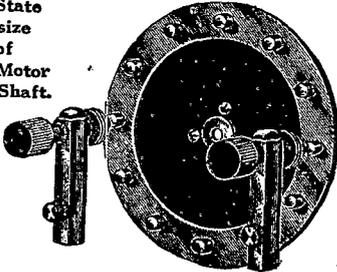
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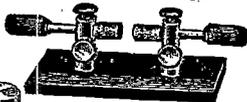
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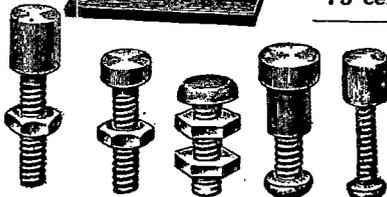
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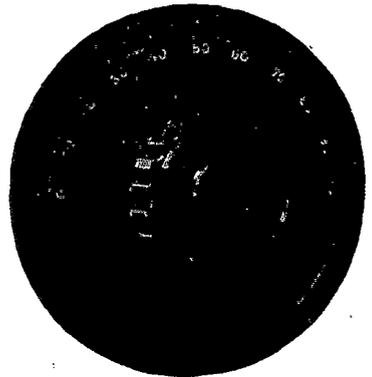
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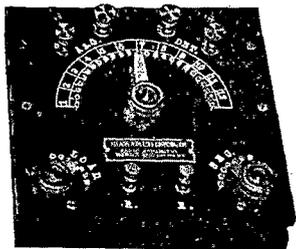
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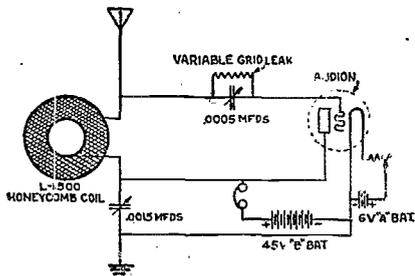
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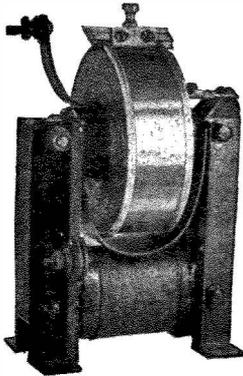
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Order a bunch today—orders filled according to rotation.

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672 Broadway, Brooklyn, New York

### A Wireless Message from Detroit

Licensed Radio Operators are in constant demand by the Commercial Land Radio Service, Telegraph Companies, Merchant Marine, Lake and Ocean Steamship Lines, etc.,

#### Minimum Salary of \$125 per Month, Plus Board and Room

is now being paid. Many operators are receiving much more than that.

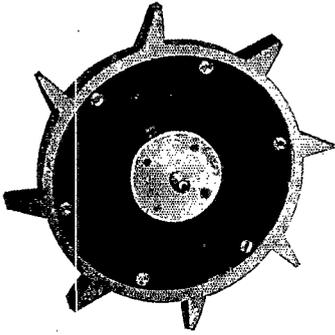
Our course in Radio Telegraphy, under the direction of S. W. Edwards, U. S. Radio Inspector, offers the highest class instruction available. New, complete equipment. Day or evening classes. Opportunity to earn expenses while here.

Our day class prepares for First-Class Radio Operator's examination in three months, night class in 18 weeks.

Before deciding where to get your Radio training, write for our Free Illustrated Booklet.

Detroit  
Institute of Technology  
303 Y.M.C.A. Bldg., Detroit

# Get That Clean-Cut Musical Note !



Our Hy-Rad rotary gap will give it to you. Used by 9ZN, 9EE, 9EY, 8IK, 9ZL, and many other prominent long distance stations

Immediate shipment can be made of discs to fit 1/4", 5/16", and 3/8" shafts. Other sizes furnished at no increase in price, but with ten days shipping delay.

Discs are 9" in diameter, and 1" thick, of special long-wearing aluminum alloy, with Bakelite center. Teeth are our famous "saw-wheel" type, giving excellent mechanical quenching as well as constructional strength.

Every disc carefully balanced on knife edges before shipment, thus eliminating all rattling and vibration.

Hy-Rad disc, 8 point, as illustrated. . . . . \$10.50

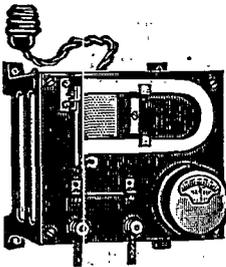
## CHICAGO RADIO LABORATORY

1316 CARMEN AVENUE  
5525 SHERIDAN ROAD

CHICAGO,

ILLINOIS

## THE BENWOOD BATTERY CHARGER



Keeps your "A" battery always ready. As essential as the battery itself. Especially so if you use an amplifier. Charges battery over night. Pays for itself in one season. Brings your station up-to-date. Connects to any 60 cycle 110 volt current supply. Designed for 4 to 6 volt battery. No external controls necessary. Already used by many leading amateurs.

Price \$20.00

BENWOOD SPECIALTY CO.,

3424 Olive Street,

St. Louis, Mo.

## "P.W." HAS THE LATEST RADIO APPARATUS IN PHILA.

We have the "Radisco" agency for Philadelphia and vicinity; also distributors for

Clapp-Eastham, Murdock, DeForest, Acme Apparatus, International Radio, Kilbourne and Clark, Benwood Rotary Quenched, Perfection Variables and Tuners, Universal Wound. Inductances, and Better "B" Batteries.

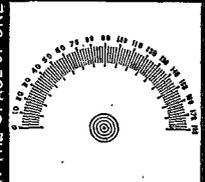
Est. 1911. Radio Call "3PW"

## PHILA. SCHOOL OF WIRELESS TELEGRAPHY

Parkway Bldg., Broad Street near Arch



SOMETHING NEW  
310 OHM RESISTANCES  
IN THE SPACE OF ONE

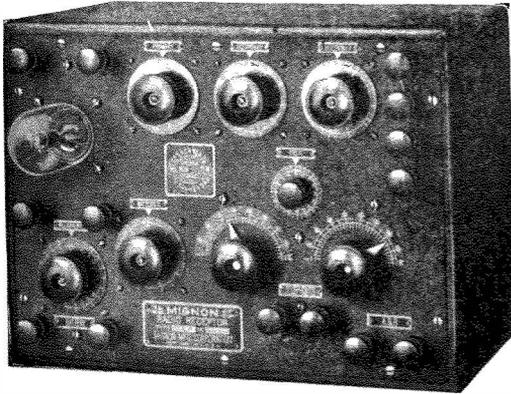


TRIPLE RHEOSTAT  
CONTROL 3 AUDIONS  
FROM ONE BASE  
GENUINE BAKELITE  
POSTPAID \$ 2.50

180° CONDENSER  
SCALE ON 4° CIRCLE  
PRINTED FROM COPPER  
PLATE ON BRISTOL BOARD  
POSTPAID .25¢

SEND FOR CIRCULARS

WORCESTER RADIO LABORATORIES  
16 WAYNE ST., WORCESTER, MASS.



RW 4"—SIZE 12" x 9" x 6½"

# Mignon "RW4"

## Undamped Wave Receptors

**NO** LOOSE COUPLERS  
LOADING COILS  
VARIOMETERS  
AMPLIFIERS

**Strongest, most distinct signals**

— IMPORTANT NOTICE —

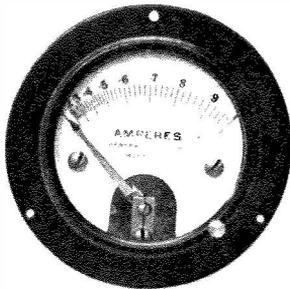
Ernest C. Mignon, Inventor of the famous disc-core Undamped Wave Receptor, is no longer connected with the Mignon Wireless Corporation of Elmira, N. Y. or their successors, The Universal Radio Manufacturing Corporation.

Address all communications for Mignon Apparatus to  
MIGNON MFG. CORP., NEWARK, N. J.

Damped and undamped wave apparatus for all purposes  
Endorsed by Radio Dept. of D. L. & W. Ry. Co.

WRITE FOR LITERATURE (DEPT. Q)

**MIGNON MANUFACTURING CORPORATION, Newark, N. J.**



## Unusual Opportunity

to secure a

**General Radio Co. Type 127A**

**HOT WIRE AMMETER**

**Special Price \$5.00—Regularly \$10.00**

A portion of these meters are 0-1 ampere and a portion 0-2.5 amperes. They are mounted in flush cases, new, in good condition, and were left on our hands by termination of the war. Exactly like a large number supplied by us to the U. S. Government.

Dealers send for proposition.

Have you received our new Bulletin 901?

**General Radio Co.**

WINDSOR STREET

**Cambridge 39 Massachusetts**

"ASK ANYONE WHO HAS USED IT"

**WHAT OUR PATRONS SAY**

"I can hear the signals three times as loud and clear as I could with my old receivers." (Name on Request)

**BRANDES  
WIRELESS  
HEADSET**



'Superior' 2000 ohms \$7

**TRIAL OFFER** Test out Brandes Wireless Receivers against any other make. Test them for sensitiveness, clearness and distance. If within ten days you're not only satisfied but enthusiastic over them—back comes your money without a question.

Prove for yourself the fine quality, the "matched tone." The two diaphragms, toned exactly alike, strengthen the signals and prevent blurring. Used by many U. S. Government experts, and experts abroad; by colleges and technical schools; and by professionals and amateurs everywhere.

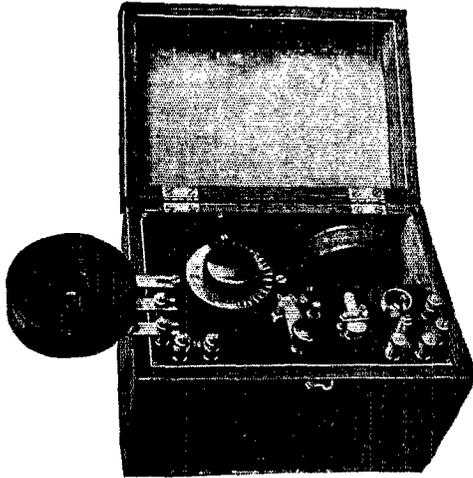
SEND 4c. FOR CATALOGUE F

**C. BRANDES, Inc.**

Room 821, 32 Union Square, New York  
WIRELESS RECEIVER SPECIALISTS

# A Good Wavemeter

## AT A MODERATE PRICE



is accurate simple and rugged. Comprises a portable oak case  $5\frac{3}{4}'' \times 8\frac{1}{4}'' \times 6\frac{1}{2}''$  with hinged cover, bakelite panel, balanced condenser, buzzer, detector, switch, binding posts, and two 2 unit inductance windings, range 200 to 2000 meters.

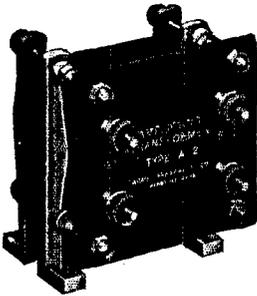
Price \$27.50

These meters are in stock for immediate delivery and are carried in stock by most good dealers.

### TYPE B. Q. WAVEMETER

Bulletins Z and F sent for 4c Stamps list our complete line of high grade, moderately priced apparatus for the radio laboratory. Bulletin R lists the Cambridge Rectifier for Storage Battery Charging.

**CLAPP-EASTHAM CO., 114 Main St., Cambridge, Mass.**



## MADE GOOD

The Acme Audio Frequency Amplifying Transformers have certainly made good. They are being used by at least three of the foremost manufacturers of high grade Amplifying Units.

These manufacturers choose the Acme Transformer after thorough tests have shown it to be the proper design for the Marconi V.T.

Thousands of amateurs throughout the country are enthusiastic over its performance. Many of whom use it with other tubes.

Take no chances—get Acme Transformers for that new two step Amplifier you are building.

Most dealers have them, but if yours does not just write us and send his name.

BULLETIN ON REQUEST

**ACME APPARATUS CO., No. 26 Windsor St., Cambridge 39, Mass.**

## RADISCO COILS

Cat. No. and turns.	Apx. Inductance in Millihenries	Wavelength Range with .001 Variable	Price
LRD 40	.082	225 575	\$0.60
LRD 100	.61	460 1480	0.85
LRD 175	1.6	750 2400	1.00
LRD 325	5.6	1375 4500	1.20
LRD 550	16.0	2250 7700	1.44
LRD 750	35.0	3000 11200	1.80
LRD 1200	114.0	6000 20000	2.40

Radisco Coils may be obtained with taps, which allow them to be used for a larger wavelength range.

Cat. No. and turns	Taps taken off at	Price
LRD 325-3	40 - 100 - 175	\$1.50
LRD 750-3	175 - 325 - 550	2.10
LRD 1200-3	325 - 550 - 750	2.70

Inside Diameter of all coils, 1 1/8 inches; Width, 3/4 inch.

Wooden centers for mounting coils per pair \$0.25

Murdock Variable .001 for use with above coils \$4.75

Radisco B Battery No. 1, \$1.40. No. 5, \$2.40. Postage extra.

21 Magnolia Terrace

E. L. LONG

Albany, N. Y.

## Another New Wilcox Switch

TYPE 103

Two double blades on one knob, yet carefully insulated from each other. May be used for changing variable condenser from series to parallel with primary, for changing from crystal to audion detector and many similar purposes. 1½" Radius. Polished Brass Finish, 75c; Nickel Finish, 85c, Postpaid.

**BUILD YOUR OWN APPARATUS**

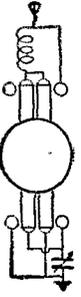
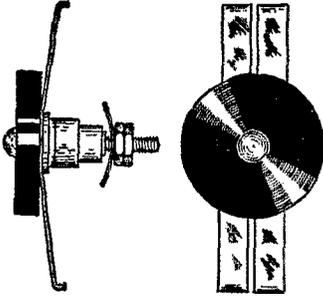
It will not be difficult and your work will have a uniform and beautiful appearance if you use WILCOX STANDARDIZED PARTS.

Our switches have highly polished genuine hard rubber knobs, large brass bearings, shafts and adjustable tension springs.

**OUR NEW LOOSE LEAF CATALOG**

describes our complete line of switches, panels, knobs, binding posts, various parts, etc. Sent for 5c in stamps.

**RELIABLE DEALERS WANTED**



### OTHER WILCOX SWITCHES

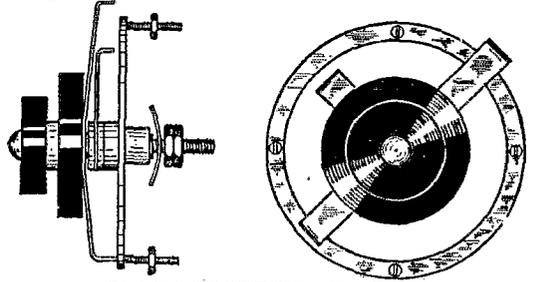
TYPE 101 (Not Illustrated)

A beautiful and efficient standardized switch for general use. Furnished in two sizes.

1" Radius, Brass finish, 40c Nickel finish, 50c  
1½" Radius, Brass finish, 50c Nickel finish, 60c

TYPE 102 (Illustrated)

A compound switch especially suitable for the primary of loose couplers. 1½" outside radius. Brass finish....\$1.10 Nickel finish....\$1.25 All Postpaid



### VARIOMETER PARTS

Turned from hardwood. Set as shown consisting of stator (two part), rotor and form for winding coils.

Postpaid \$2.50

Size of stator 5½" square. Other sizes made to order. SET NO. TWO contains all parts for the variometer including the above and knob, scale, pointer, shaft, binding posts, wire and instructions for assembly.

Postpaid \$5.00

**THE WILCOX LABORATORIES**  
LANSING, DEPT. H, MICHIGAN

# MULTI-FLEX RADIO

Our newest product, Multi-flex Radio Ribbon, is an absolute necessity for the efficiency and safety of your radio station. It is woven of pure Lake Superior Copper Wire No. 17 B. & S. gauge without sharp turns; each wire makes a very slight bend every eight inches. It is woven of continuous wires, not made of scrap or coil ends.

It is woven of wires heavy enough to withstand the weather when used as aerial, lead-in or ground. It is substantial enough to hold its shape when formed into edgewise wound coils for your oscillation transformers.

Multi-flex Radio Ribbon No. 31 is only 7-8 inch wide but has the skin carrying capacity of 4.4 inches. We also carry special connectors for this ribbon. Samples will be mailed on receipt of ten cents.

Multi-flex Radio Ribbon is sold only for use in the art of radio communication.

## JENSEN ELECTRIC CO.

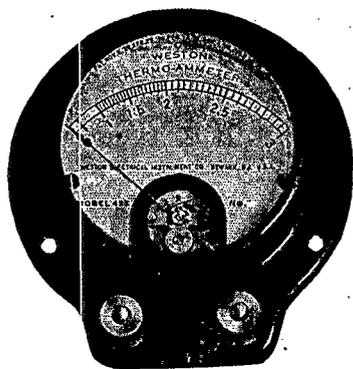
1949 HURON STREET, CHICAGO, ILL.

CAN WE SHIP YOU C.O.D. A GENUINE TWO FILAMENT AUDIO TRON VACUUM TUBE, POSTPAID, \$6.00? SATISFACTION GUARANTEED.

Licensed under DeForest Pats. Nos. 841387 and 87953 for use in Amateur Radio amplifying audio-frequency circuits.

# Thermo-Ammeters, Milliammeters and Current-Squared Meters

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## Weston

Model 425

### Miniature Size Instruments for Radio Service

are the ideal instrument for the amateur.

They are provided as back-connected or front-connected instruments, and can be mounted on small panels or be used as portable instruments.

Their characteristics of accuracy, large overload capacity, small current consumption and small size make them particularly desirable for use on amateur and other low-power outfits.

Complete information will be furnished upon request.

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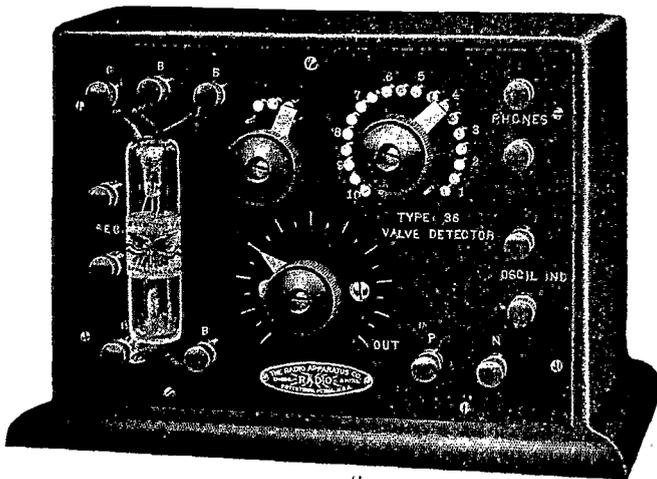
## Weston Electrical Instrument Company

158 Weston Avenue, Newark, N. J.

Branches in all Principal Cities.

# IT TALKS FOR ITSELF

Do You Need a Good Detector ?



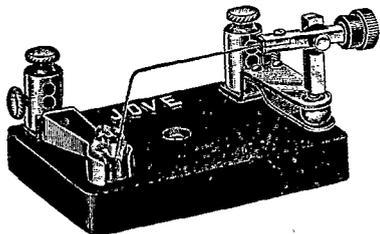
Here is Your Ideal. Use it in Your Regenerative Circuits. Get Thunderbolt Radio Telegraph and Telephone Sigs.

Tracolite Insulation Panel. Beautiful Mahogany Finished Cabinet. Including a High Grade Traco "B" Battery.

Send Stamps for Bulletins

## THE RADIO APPARATUS COMPANY

POTTSTOWN, PENNA., U. S. A.



(Ghegan Patent)

Bunnell Keys, Transformers, Condensers, Spark-Gaps, Receivers, etc. are High Grade but Inexpensive.

Send Stamp for New Edition, 42 Q Catalog.

J. H. BUNNELL & CO.

32 Park Place, New York

## BUNNELL

Instruments

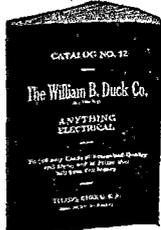
Always Reliable

### THE JOVE DETECTOR

HANDIEST, HANDSOMEST AND BEST

Sample by Mail, \$1.80

Tested Galena Crystal 25c.

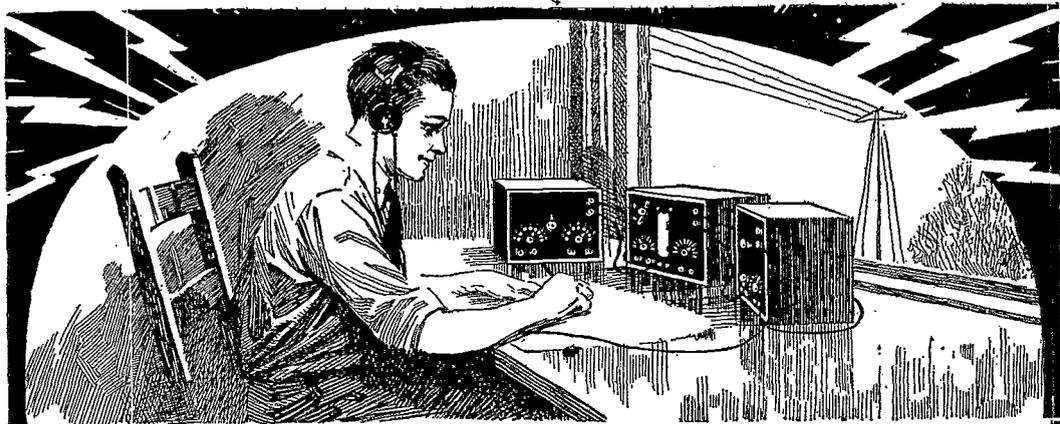


# DUCK'S BIG 300 PP. Wireless and Electrical Catalog

Is now as it always has been, the largest and most complete and dependable Wireless Catalog published. Mailed for 12c. in stamps or coin which may be deducted on first order of one dollar. It is the Beacon Light to guide you right in the selection of your wireless apparatus. No bigger or better values are obtainable elsewhere. Send for revised price list. It is yours for the asking. This catalog costs us twice the price of other catalogs.

Everything in wireless worth while is listed in this catalog. The experienced amateur will tell you to see our catalogue before buying. You are thereby insured against an unwise purchase. It is the Beacon Light to guide you right in the selection of your wireless apparatus. No bigger or better values are obtainable elsewhere. Send for revised price list. It is yours for the asking.

THE WILLIAM B. DUCK CO. 243-245 Superior St., Toledo, Ohio



## Have You Kept Pace With The Times?

Are you still operating the old style non-sensitive, poorly designed receiving apparatus? Or are you equipped with one of the new complete Gilbert Radio Outfits designed by an expert who was a Radio Officer in the U. S. Army during the war and who has incorporated all of the latest Army improvements in these new outfits.

Gilbert Radio Outfits are complete in every respect for transmitting, receiving or both. They are without doubt the latest and most scientific outfits. Each piece of apparatus is designed to operate in close harmony with every other part of the set.

The Loose Coupler used in the receiving sets is not the old Obsolete type that pulls out of the box but the new enclosed panel type. A highly sensitive instrument designed particularly to minimize distributed capacity and to eliminate dead-end losses. It is a very compact instrument in a quartered oak cabinet and is included in all Gilbert Radio Receiving Outfits.



These outfits can be purchased complete or each part separately. Our new Radio catalog No. 50 describes each one in detail. Write for it today.

# THE A. C. GILBERT COMPANY

317 Blatchley Ave.,

New Haven, Conn.

IN CANADA

THE A. C. GILBERT-MENZIES CO., Limited

Toronto

# MURDOCK

NO. 55



2000 OHM DOUBLE SET

**\$4.50**

3000 OHM DOUBLE SET

**\$5.50**

**M**ade for long and  
**U**seful service in  
**R**adio stations where their  
**D**ependable and sensitive  
**O**peration makes them the  
**C**hoice of those who  
**K**now GOOD 'phones.

**ORDER YOUR SET NOW—**

Try it out thoroughly.

**IF IT DOESN'T SUIT, SEND  
IT BACK AND GET YOUR  
MONEY**

Bulletin 19 shows a splendid line of the type of apparatus you want. Send for a copy.

**WM. J. MURDOCK CO.**

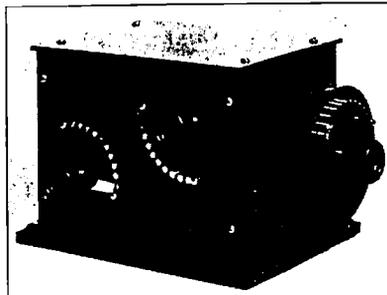
65 Carter St.

**CHELSEA MASS.**

221 SECOND ST., SAN FRANCISCO, CALIF.

## SPECIAL BARGAIN

Genuine GENERAL RADIO hot-wire radiation meters. Ranges 0-2 and 0-2½ amps. Regular list price \$10.00—our price \$5.00 each.



Our Latest type loose-coupler with self-supporting bank wound secondary range 180-3000 meters without condensers. The same high quality material and workmanship at the same old price of \$18.00

2nd edition Consolidated Radio Call Books \$1.00 ea.

TeCo AudioTron Adapter \$1.75

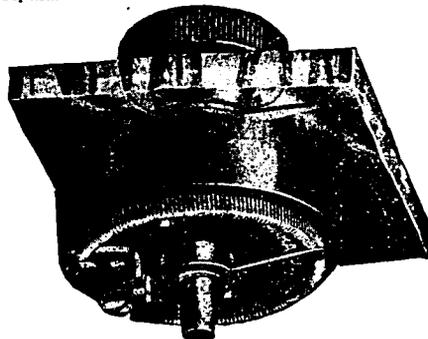
Our \$25.00 2 step amplifier to go up soon. Get yours now.

We have a new socket with positive contacts.  
\$1.00 Postpaid

## A NEW FILAMENT RHEOSTAT

RUGGED—COMPACT—GOOD LOOKING

6 OHM Resistance—2½" dia. Made of heat-proof condensite, for back or front mounting, \$1.75 postpaid.



**RADIO EQUIPMENT CO.**  
630 WASHINGTON STREET  
BOSTON, MASS.

# SERVICE

**PROMPT SHIPMENTS**

ORDER from any of the following catalogues—DeForest, Murdock, Acme, General Radio, Bunnell, Thordarson, Clapp-Eastham, Weston Elec. Inst. Co., Wireless Press.

**JAMES W. POOLE, Inc.**

64 Kingston St., Boston, Mass.

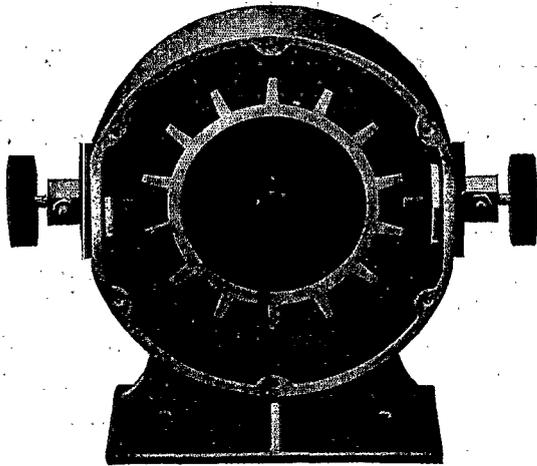
Established 1887

# Eliminate That Noise

## Get That Long Distance Kick

With the

# BENWOOD SILENT ROTARY



BENWOOD GAP-OPEN

Combines all the advantages of large sparking surface wonderful quenching qualities straight edge electrodes and a beautiful clear tone,

USED BY

8ER, 9CA, 9HW, 9BR, 9KV, 9LC, 9ZJ and many others that are heard every night.

**Absolutely Airtight**  
**Practically Noiseless**

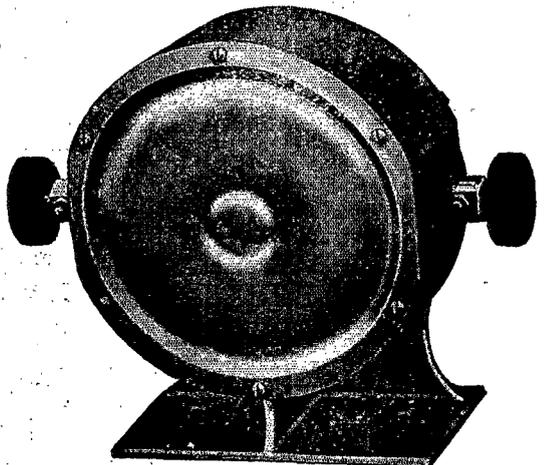
Cannot be heard outside of the room it is operated in.

**Bakelite**  
**Insulated**

Pulley driven or direct coupled to any motor.

Price with 8-10 or 14 point disc - \$27.50

Discs Separate . . . . . \$7.50

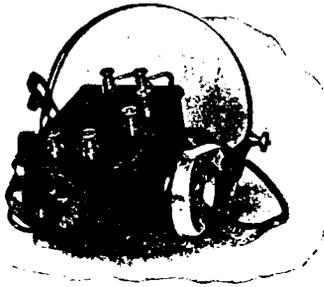


BENWOOD GAP-CLOSED

**BENWOOD SPECIALTY CO., 3424 Olive St., St. Louis, Mo.**

# "MODERN" AMPLIFIERS

(IMPROVED MULTI-AUDI-FONE)



**One-Step Amplifier.**

The ideal amplifier for all. Case is of moulded bakelite and all metal parts are specially designed and plated. The interior construction is of the best. All insulated parts are of moulded bakelite.

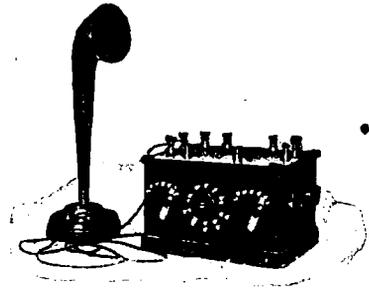
Only one dry cell is used with the one-step amplifier at a cost of about 5c a month and only 3 dry cells with the Two-Step at a cost of about 12c a month. Batteries last from 7 to 12 months.

The Two-Step amplifier is equipped with a loud speaking horn which shouts the signals out into the room. Horns can be had for the one-step amplifiers also.

"Modern" amplifiers can be had at all "Modern" agencies at—

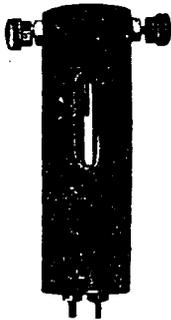
ONE-STEP AMPLIFIER less headset . . . . .	\$18.00
Loud Speaking Horn for one-step . . . . .	12.50
TWO-STEP AMPLIFIER WITH LOUD SPEAKING HORN . . . . .	75.00

Bulletin A1 describes fully our amplifiers etc.



**Two-Step Amplifier and Horn.**

**MODERN RADIO EQUIPMENT COMPANY**  
27 So. Broad St., Elizabeth, N. J.



## Get One Immediately

This is the most convenient device on the market for using a tubular bulb in a standard socket. Dealers write for price schedule.

PRICE \$1.50 POSTPAID.

**THE RADIO ELECTRIC COMPANY**  
4614 HENRY STREET PITTSBURGH, PA.

"We make or sell everything Radio"

## THE STANDARD—WHEREVER "B" BATTERIES ARE USED.

**EFFICIENT**

Their extensive use by leading radio manufacturers, dealers and amateurs constitutes their endorsement.

And then there is the "VARIABLE STANDARD VT BATTERY" which will interest you. Obviates the use of the potentiometer. Single cell variation is accomplished by mere-

**Pacent Electric Co., Sole Eastern Agents**  
150 Nassau Street, New York City, N. Y.



**MAXIMUM OPERATING LIFE**

ly inserting a resilient brass plug into receptacles on the top of the battery. It is truly a convenient and efficient variable voltage battery.

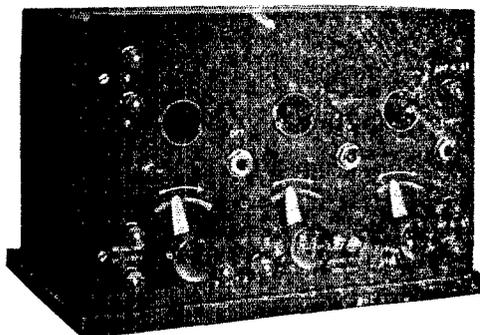
Send for descriptive literature, and give us your dealer's name if he doesn't handle STANDARD VT BATTERIES.

**RICHTER & BYRNE, New York**  
Manufacturers

# RADIO APPARATUS

*Distributors of reliable experimental and Laboratory  
Radio apparatus for High Schools,  
Colleges and individuals*

**Grebe Vacuum-tube detector and two-stage audio-frequency amplifier**



- Type RORF Grebe Detector and two-stage amplifier..\$65.00**  
Shipping weight 14 lbs.
- Type RORB Grebe Two-stage amplifier with  
cam-switch control .....\$45.00**  
Shipping weight 11 lbs.
- Type RORE Grebe Single stage amplifier.....\$23.00**  
Shipping weight 6 lbs.
- Type RORH Grebe Vacuum-tube unit (Audion control  
panel) with 40 volt "B" Battery.....\$17.00**  
Shipping weight 15 lbs.
- Type RORA Grebe Vacuum-tube unit (Audion control  
panel) without "B" Battery.....\$11.00**  
Shipping weight 9 lbs.
- Type CR-3 Latest Grebe Receiver.....\$60.00**  
Wiring diagrams and instructions accompany each unit.

## SPECIFICATIONS

**Panel:** Bakelite Dilecto, hand rubbed finish. **Cabinet:** Quartered Oak, weathered oak finish, with hinged top. **Vacuum tube sockets:** Standard, four prong type. **Amplifying Transformers:** Closed core type designed for highest efficiency. **Filament and circuit control:** Grebe telephone jack and plug system. **Wiring:** Grebe standard bus wiring. **Binding Posts:** Grebe standard with bevelled gripping edges. **Nomenclature:** Finest pantograph engraving.

Immediate delivery! Send us your orders at once. Exclusive distributors in New England for A. H. Grebe & Co. Dealers will find it profitable to stock this reliable high-grade apparatus. Send 6 cents for new catalog.

## F. D. PITTS CO., INC.

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Dept. A,

BOSTON, MASS.

# “SHRAMCO”

MAKE YOUR SET UP-TO-DATE AND EFFICIENT. OUR PARTS AND INSTRUMENTS ARE STANDARD. NEW CATALOG H CONTAINS COMPLETE LINE, INCLUDING MATERIAL LISTED BELOW, NECESSARY FOR A MODERN WIRELESS STATION.

4 Styles Switch Points,  
Brass and Nickel

15 Types Composition Knobs  
Panel Binding Posts and Switches

Copper Terminals  
Dial Indicators

Plain and Threaded Brass Rod

Plugs and Jacks  
KD Variable Condensers

“B” Batteries  
“Radisco” Coils

Switches  
Meters

VT Tubes and Sockets

Send 5c in stamps today for your copy and we will place your name on mailing list for future bulletins without charge.

**SHOTTON RADIO MFG. CO., P.O. Box 3, Scranton, Pa.**

BRANCH: 8 Kingsbury St., JAMESTOWN, N. Y.

**FOR CLEAR RECEIVING  
THE SATISFACTORY**

**B BATT**  
+ ⊙    ⊙ -

**BURGESS “B” BATTERIES**

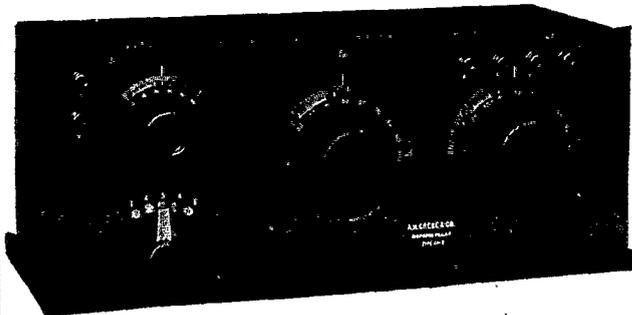
SEVERAL                      SIZES



Write for Catalogue

BURGESS BATTERY COMPANY

HARRIS TRUST BLDG. CHICAGO



CR 2 Receiver \$46.00. Shipping Weight 21 lbs.

## AMATEURS!

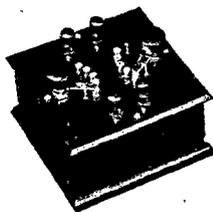
Here is a Regenerative Receiver that can't be beat. Price is very reasonable for the results obtained. All of the long distance amateurs come in very QSA. Shipment can be made in two weeks.

**Williams Radio Supply Co.,**

Successors to Gerkey-Williams Co,  
905 Monroe St., N. W., Washington, D. C.



# Hook 'er to yer bulb



any single wire aerial 25x40 feet will do anywhere. A C/W-20000 meter tuner for only **\$8.00**. Wound with the celebrated INVOLUTE coils. The

only tuner in the world for amateur use, licensed under the Marconi Patent No. 763772, that gets all the European stations with one bulb and one wire aerial anywhere, using no tickler coil. No movable coils, no loose connections, no trouble. Condensers help the tuning but are not needed to get the arc stations. Only one tuner of each kind sold at this price in each city. Act quick and if you are the second or third we will give the names of those ahead of you.

## WE SELL THE COILS SEPARATELY FOR PANELS.

Coils for any of our tuners boxed in small container, waxed, tapped, marked and with wiring diagram, for only **\$6.00**.

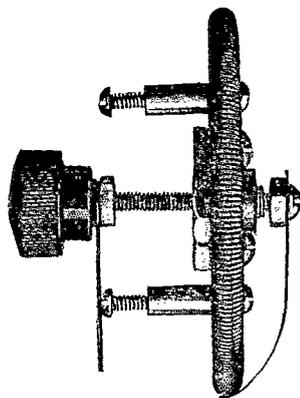
## THIS OFFER HOLDS GOOD FOR MARCH ONLY.

Now throw all your troublesome basket full of funny-wound coils in the heap and close your panel up after installing our water, dust, and fool-proof coils. Our tuners are in use in Alaska, Honolulu, Porto Rico, Cuba, Mexico, Canada, and REKJAVIK, ICELAND.

**NAA tuner and 200M regenerative tuners** at the same low price. One to each city. The second order will cost **\$10.00**, third **\$12.50**, and the rest **\$15.00**, our regular selling price. Our Arlington tuner is the only one made that gets and holds NAA all year round. Static is nearly all absorbed by the wax we use. Our 200M tuner has helped us to work a ship at sea 1300 miles from here and the air sounds like a nest of bees when using it—but you can get very selective tuning.

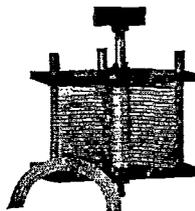
## PANEL MOUNTING RHEOSTAT only \$1.50.

A high grade combination switch and rheostat with formica disc, having an automatic stop that absolutely prevents burning out the filament accidentally. **ALL PRODUCTS LICENSED BY THE RADIO CORP. of AMERICA.**



## PERFECTION BINDING POSTS.

Use them on your panels, nickel plated 6 for **\$0.75—\$1.25 doz.** Every dealer in the country of any importance handles our goods.



## KNOCKED DOWN CONDENSERS.

Assemble and save money. 41 plate—**\$2.75**; 21—**\$2.25**; 11—**\$1.75**. Made by Perfection Radio Laboratory, Clinton. Sold only by

# TRESCO, Davenport, Iowa

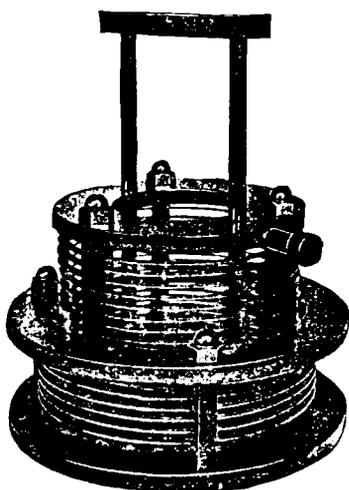
OR THEIR DEALERS.

# RADIO INTERNATIONAL RADIO

## TRANSFORMER

Type TXL-101 A

Price \$16.75 f. o. b. Factory



A standard Transformer modified and redesigned for amateur use. Coils are 1/16" copper, edgewise wound on bakelite supports. Assembly secured to end plate by bakelite nuts. Secondary slides on bakelite rods. This elimination of metal through-out results in maximum efficiency.

PRIMARY INDUCTANCE 8 micro henrys  
SECONDARY INDUCTANCE 44 micro henrys

The Transformer illustrated above is only one of many newly designed radio specialties which we have ready for you. Write us for descriptive bulletins which are being issued covering all International Radio Products. Address Department No. 23.

International Radio Telegraph Co., 326 BROADWAY  
NEW YORK CITY

## VACUUM TUBES REPAIRED

We repair the filaments and other elements in all types of vacuum tubes and guarantee them to operate equally as well as a new tube. In most cases they operate better. We produce wonderful oscillators, detectors and amplifiers.

MARCONI VT  
DE FOREST VT  
MOORHEAD TUBES  
WESTERN ELECTRIC  
REPAIRED AT FOUR DOLLARS AND FIFTY CENTS EACH.  
ELECTRON RELAYS  
OSCILLAUDIONS  
AND ALL OTHER TUBULAR TYPES  
REPAIRED AT FOUR DOLLARS EACH.

All foreign made receiving tubes repaired at SIX FIFTY and power tubes depending upon size.

WE HAVE PURCHASED A LARGE QUANTITY OF BURNED OUT  
MARCONI VTs AND ELECTRON RELAYS WHICH  
WE OFFER FOR SALE AT FIVE DOLLARS.

REMEMBER THESE TUBES ARE GUARANTEED GOOD AS NEW.

DEALERS WRITE US

### THE VACUUM TUBE REPAIR COMPANY

511 Perry Building

OAKLAND, CALIFORNIA.



TEL.  
BANK BAY  
5964

**EASTERN  
RADIO**

899 BOYLSTON ST.  
BOSTON, MASS.

**INSTITUTE  
RADIO**



# Learn Wireless !!!

Under former U. S. Government and Marconi Experts; men who have spent years in the SUCCESSFUL training of THOUSANDS of Wireless operators. OUR GRADUATES now in all parts of the world as **Instructors, Radio Inspectors, Engineers, Operators, etc., etc.**

Interesting and fascinating work!

Splendid opportunities now in the Merchant Marine!

For years the EASTERN RADIO INSTITUTE has trained Wireless operators, placing them in good positions on land and sea. In that time they have placed every graduate and have kept them employed. Moreover, every graduate is NOW guaranteed a good position operating on ships sailing to all parts of the world.

When you realize that our Day or Evening school prepares you quickly and efficiently for position paying from \$100 to \$150 per month, food and quarters included, and that the entire expense of the course can be more than returned to you in one month's salary, does not this appeal to you?

**REMEMBER:** We are the **OLDEST, LARGEST, and BEST EQUIPPED** school of its kind and already have **THOUSANDS** of satisfied graduates to our credit. **LAST YEAR ALONE WE GAVE INSTRUCTION TO MORE STUDENTS THAN ALL OTHER SCHOOLS IN NEW ENGLAND COMBINED!! THIS SPEAKS FOR ITSELF.** OUR YEARS OF EXPERIENCE AND RESULTS ARE AT YOUR DISPOSAL. Send in your enrollment today.

**DAY AND EVENING CLASSES.**

**ADVANCED CLASSES IN RADIO THEORY OR CODE.**

**SPECIAL AMATEUR CLASSES.**

**Start any Monday.**

**Our prospectus for the asking.**

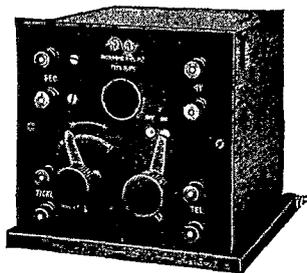
# The Latest Audion Control Cabinet

Here is a compact and highly efficient unit that may be used with any and all receiving circuits.

The



**Audion Control Cabinet  
Type RORH**



**Price,  
\$17.00  
Without Tube**

contains the grid condenser, grid leak, filament rheostat and two 20-volt dry batteries. Socket accommodates the standard 4-prong tube. There are binding posts for secondary, tickler, phones and filament battery.

Direct and simple connections may be made to all types of receivers.

Free bulletin R-117 describes this unit. Complete catalogue 10 cents.

**A. H. GREBE & CO., Inc., 74 Van Wyck Blvd., Richmond Hill, N. Y.**

**YOU CAN BECOME A**

## **WIRELESS OPERATOR IN FOUR MONTHS**

We are turning out qualified men every week in this time, who earn from \$100 to \$150 per month, besides food and quarters. When you stop to consider that every additional month spent in preparation is an equivalent loss of \$200 to you, economy should suggest your taking a course at this School. The cost of tuition will be more than returned to you in your first month's salary as an operator.

We have a complete 500 cycle Marconi ship installation. Theory under direct supervision of former U. S. Radio Inspector, Dept. of Commerce. Daily practice on Omnigraph. Positions guaranteed. Tuition and terms reasonable. No entrance fee. Write, phone or call for literature.

We also teach Telegraphy.

### **MASSACHUSETTS RADIO & TELEGRAPH SCHOOL.**

18 Boylston Street,  
ARTHUR BACHELLER

Telephone Beach 7168,  
(Lt.) R. F. TROP

Boston, 11, Mass.  
G. R. ENTWISTLE

## The Largest Radio Supply Stock In The South

**COMMERCIAL AND AMATEUR WIRELESS  
APPARATUS OF ALL KINDS**

**Holt Electric Utilities Co. Jacksonville, Fla.**

**IMMEDIATE DELIVERY**  
**Western Electric VT-2**  
**POWER TUBES**  
*PRICE \$18.00*

For measurements in a laboratory these tubes are unequalled by any others. They are the only tubes having oxide-coated filaments, insuring greatest emission of electrons and longest filament life. They are sold only for uses other than the transmission or reception of messages.

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**Rawson Electrical Instrument Co.**  
**CAMBRIDGE, 39, MASS.**

**“JUPITER” STRANDED AERIAL WIRE**

One year of experimenting has produced a stranded copper wire, ideal for aeriels, drawn for the particular requirements of the Aerial Radiator... Composed of seven strands of full size No. 22 solid copper. Very strong and 100% Radiation. Large surface and low high-frequency skin resistance.

**Special Price 1 Cent PER FOOT \$9.00 PER THOUSAND**

Shipping weight, 15 lbs. per 1000 ft. Send postage.

No C.O.D.'s. Immediate delivery anywhere.

**LEE A. BATES, <sup>SOLE AGT.</sup> 8 Moen St., Worcester, Mass.**

**GALENA**

**Unmounted**  
**25c Each**

**Navy Regulation Size**  
**Postpaid**

**Guaranteed**  
**5 for \$1.00**

My vast practice in all detector minerals enables the Amateur to come in direct contact with Real Galena. This material is personally selected at the mines, every piece cut and tested out on Arlington Signals. Former mineral cutter and selector for the Wireless Specialty Apparatus Co.

**Fusible Metal**

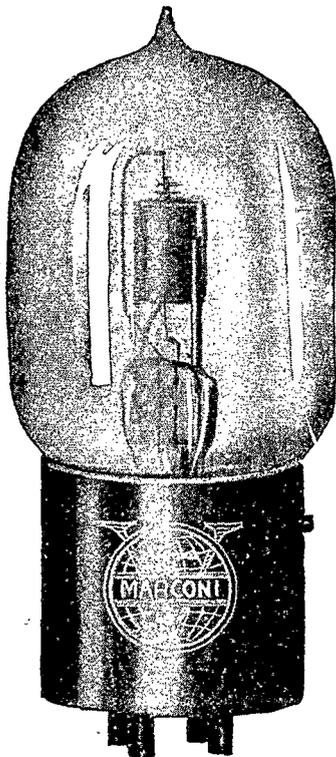
**Sufficient Quantity for Mounting**

**25c**

**27 Oakland Ave.,**

**R. BROWNLIE**

**Everett, Mass.**



# A WARNING

to Manufacturers  
Importers  
Dealers  
Jobbers

Agents  
Amateurs  
Purchasers  
Users of

VACUUM TUBES

## The Marconi V.T. Patent is Basic

United States Letters Patent to Fleming, No. 803,684, November 7, 1905, has been held to be valid by Judge Mayer of the United States District Court for the Southern District of New York, and by the United States Circuit Court of Appeals for the Second Circuit. It is a basic patent and controls broadly all vacuum tubes used as detectors, amplifiers or oscillators in radio work.

Fleming Pat. No. 803,684  
De Forest Pat. Nos. 841,387-379,532

No one is authorized to make, sell, import or use such tubes for radio purposes, other than the owners of the patent and licensees thereunder. Any others making, selling, importing or using them alone or in combination with other devices, infringe upon the Fleming patent and are liable to a suit for injunction, damages and profits. And they will be prosecuted.

### THE AUDIOTRON AND THE LIBERTY VALVE ARE NOT LICENSED UNDER THE FLEMING PATENT

The price of the genuine Marconi V. T. delivered is \$7.00 each. The standardized socket is \$1.50 additional. The standard resistance, complete, costs \$1.00 and is made in the following sizes:  $\frac{1}{2}$  megohm, 1 megohm, 2 megohms, 4 megohms, 6 megohms.

Do not take chances by making, importing, selling, purchasing or using vacuum tubes for radio purposes not licensed under the Fleming patent. By selling, purchasing or using licensed tubes for radio purposes you secure protection under the Fleming patent and avoid the risk of litigation for infringement thereof.

This warning is given so that the trade and public may know the facts and be governed accordingly.

Send all remittances with order to COMMERCIAL DEPARTMENT

**RADIO CORPORATION OF AMERICA**  
**MARCONI WIRELESS TELEGRAPH CO. OF AMERICA**

227 Broadway

New York

Sole Distributors for De Forest Radio Telephone & Telegraph Co.

Retail Office and Exhibition Rooms, 25 Elm St., New York  
Schofield Bldg., Cleveland, Ohio  
American Bldg., Baltimore, Md.  
Insurance Exch. Bldg., San Francisco, Cal.

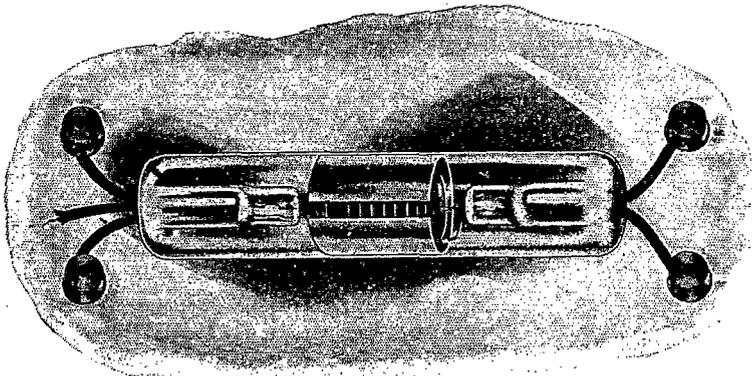
136 Federal St., Boston, Mass.  
301 Commercial Bank Annex, New Orleans, La.  
109 South 2nd St., Philadelphia, Pa.

# Licensed by De Forest AUDIOTRON

## The Original Tubular Vacuum Amplifier

The AudioTron vacuum tube is now manufactured and sold as a genuine audion licensed under DeForest Patents Nos. 841387 and 879532 to be used only for amplification in radio communication and only for experimental and amateur purposes and only in audio frequency circuits.

The Audiotron has a double filament of special thorium tungsten and the operating life is over 2000 hours. No special socket is required. The electrical and mechanical dimensions result in a heavy plate current and corresponding signal strength. Plate voltage under 40. Our guaranty insures satisfaction.



**PRICE \$6.00 EACH**

If your local dealer cannot supply you we will ship **postpaid** when cash accompanies order.

**The AudioTron Exclusive Guaranty:** Each and every Audiotron is guaranteed to arrive in good condition and to prove fully satisfactory. Replacement of unsatisfactory tubes will be made free of charge.

**AUDIOTRON AUDIO-FREQUENCY TRANSFORMER.....\$7.00**

Laminated closed core, two coil type.

**DEALERS:—Write for our attractive trade Proposition.**

# AUDIOTRON SALES CO.

Lick Bldg.,

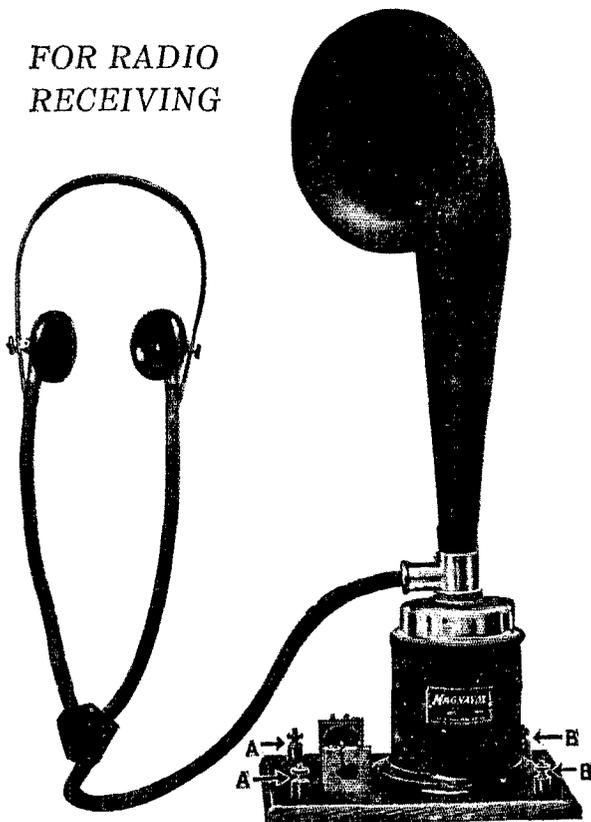
San Francisco, Calif.

# MAGNAVOX

## Telemegafone

*Most Efficient Telephone Receiver and Loud Speaker*

**FOR RADIO  
RECEIVING**



The most rugged, simple and reliable instrument yet produced for the reproduction of radio signals and sound.

It is not only a most sensitive receiver when used with the head-set, but is also the most powerful loud speaker.

The Magnavox Telemegafone fills the long felt need of both commercial and amateur radio stations.

By using this instrument in connection with your vacuum tube amplifier, signals will be reproduced with great volume. For weak and ordinary signals use the head-set. Strong signals can be heard a great distance from the horn.

**PRICE \$75.00**

Connect AA to your receiving set where your present head-set is connected

Connect BB to a 6-volt storage battery

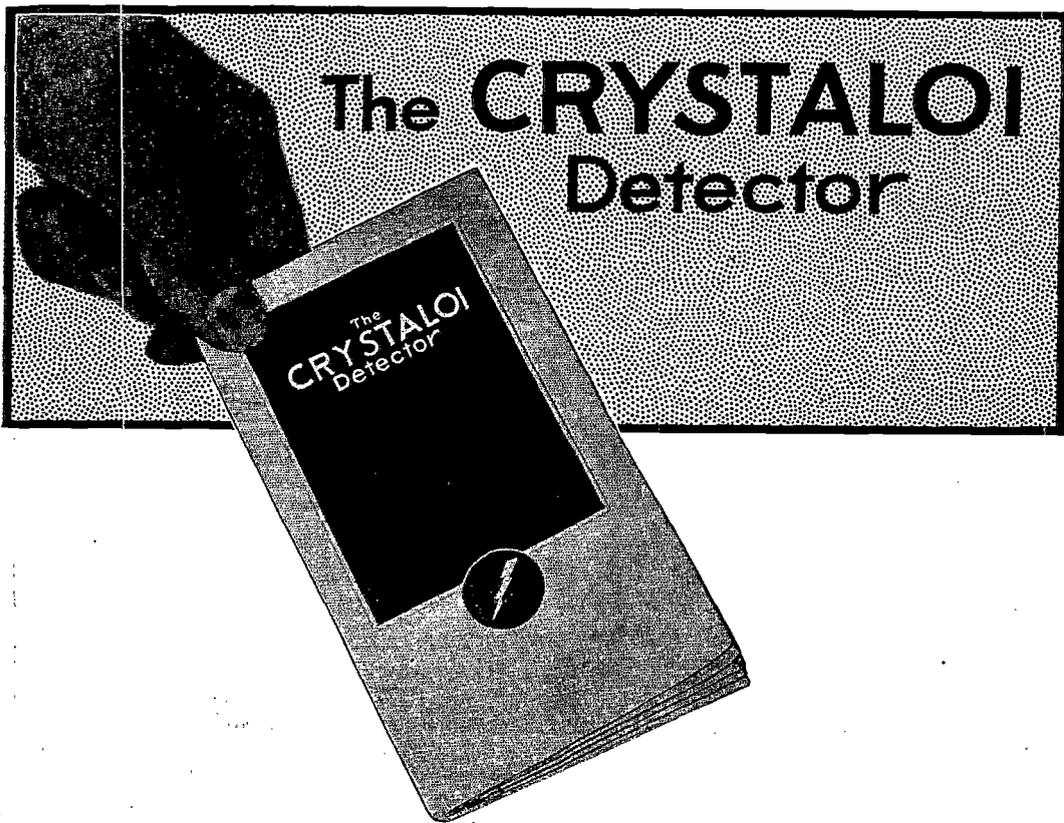
*Immediate Delivery—Order Early*



PATENTED IN U.S.A. AND FOREIGN COUNTRIES

*2701-2759 East Fourteenth Street, Oakland, California*

# The CRYSTALOI Detector



This booklet is yours for the asking. ¶ It explains the principle of CrystalOI design. ¶ Tells how to hook it up. ¶ Gives full particulars as to how it operates. ¶ And describes the advantage of working with it. ¶ Complete with illustrations, wiring, diagrams, etc. ¶ Send for it

#### PRICES

Type O. CrystalOI Detector \$3.50    Type A.A. CrystalOI Detector \$6.00  
By parcel post prepaid 3.60    By parcel post prepaid 6.20

MANUFACTURED ONLY BY

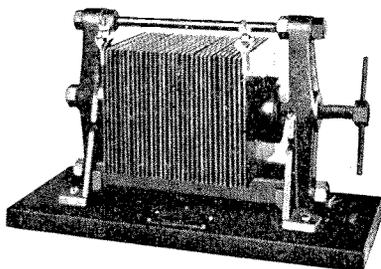
## CONNECTICUT TELEPHONE & ELECTRIC COMPANY

INCORPORATED

MERIDEN, CONNECTICUT

All rights and patent under which the CrystalOI is made were purchased from the inventor, Eugene A. Turney

Write for folder giving complete specifications and operating instructions.



**\$17.50**  
Shipping Weight  
12 lbs.

## More Working Energy in Your Antenna!

You must have proper quenching in your primary circuit if your antenna is to radiate all its energy and not transfer current back to the primary condenser circuit, where it is lost. With the

### “AMRAD” QUENCHED GAP

you have perfect quenching—with no rotating parts to give trouble, and no motor to eat up current—and you get

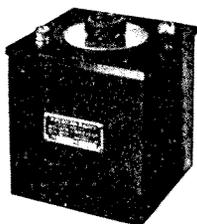
### A 240-SPARK NOTE ON 60 CYCLES

with a low decrement entirely inside Government regulations. This instrument gives as satisfactory service as the more expensive silver-surfaced quenched gaps, because the plates are of electrolytically refined copper having practically the same thermal conductivity and gas content as silver.

Ample radiation capacity is afforded by the liberal area of the plates, and the airtightness of the sparking chambers is assured by the special method of assembly. All parts are interchangeable.

If your dealer cannot supply you, order direct of us, but send us his name.

### TUNE YOUR STATION FOR HIGHEST EFFICIENCY.

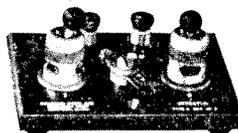


Shipping Weight 2 lbs. By means of a flash-light bulb and a direct-reading dial, this simple, reliable little device gives instantaneous, accurate measurement of your transmitting wavelength. Mounted in ebonized wood case, with Bakelite top plate—metal parts nickeled. Descriptive folder on request. Ask your dealer—if he cannot supply you, we will ship direct to you.

and keep safely inside Government regulations. You will have no tables or curves to bother with if you use the

“AMRAD”  
WAVE METER  
\$6.50

### “AMRAD” DETECTOR STANDS



Duplex stand, on Bakelite base, with two selecting switches and two binding posts—\$4.50—shipping weight 1 lb.

Single stand, on Bakelite base, with two binding posts—\$2.50—shipping weight ¾ lb. Your dealer should be able to supply “Amrad” Detector Stands—if not, send us his name and order direct.

Folders describing any pieces of “Amrad” apparatus will be sent on request—write for them.

## AMERICAN RADIO AND RESEARCH CORPORATION

25 PARK ROW

Factory at Medford Hillside, Mass.

NEW YORK