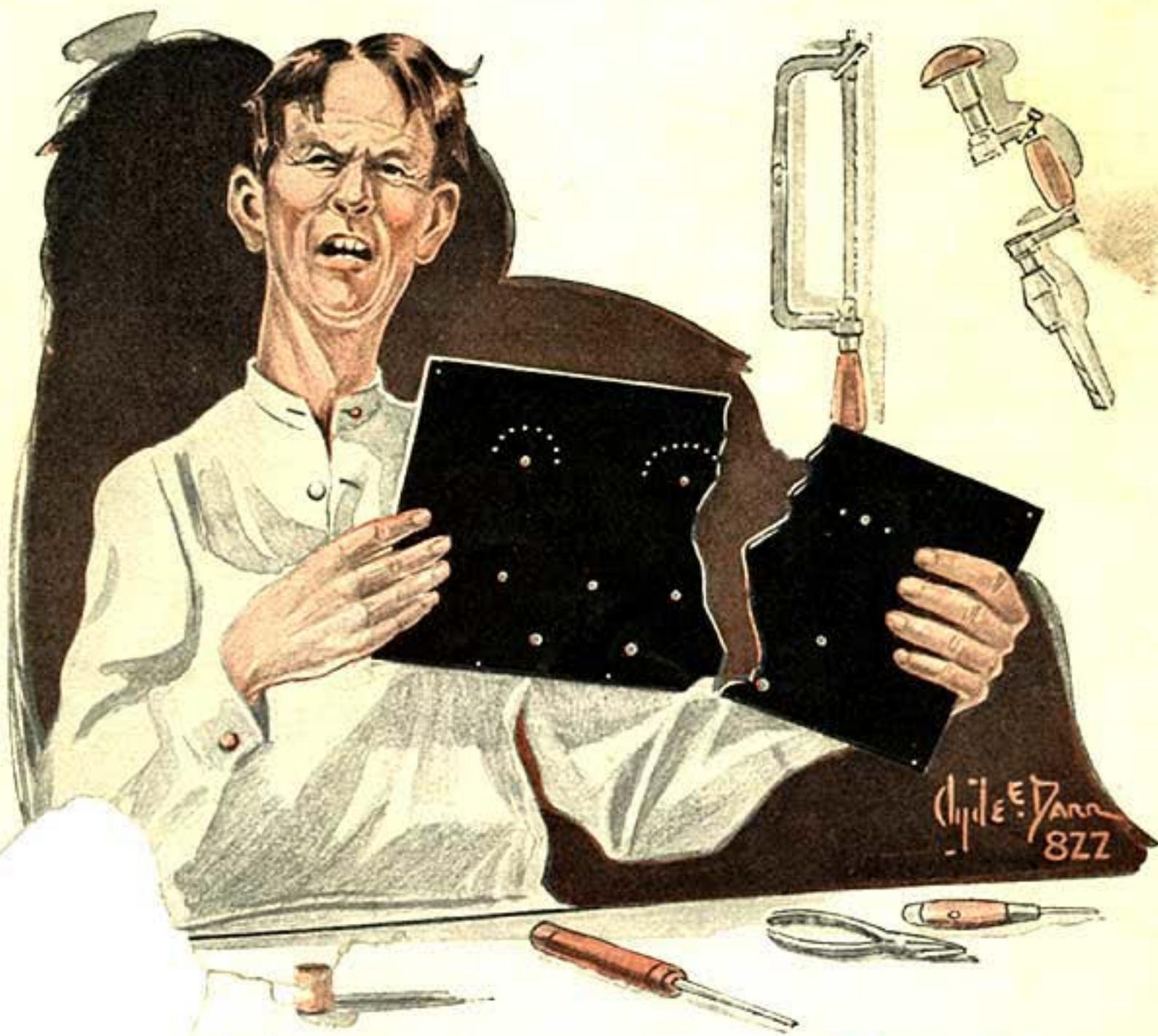


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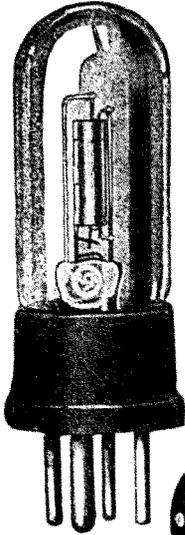
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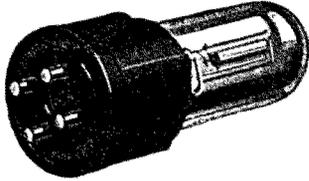
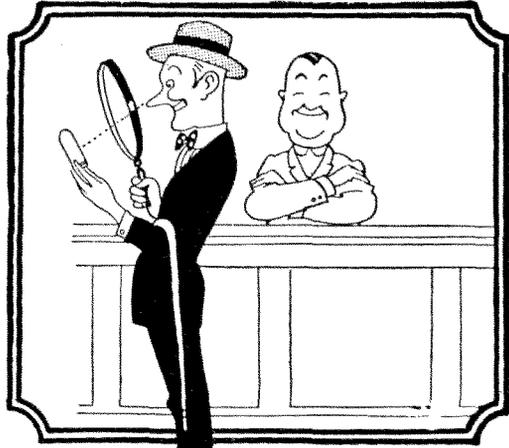
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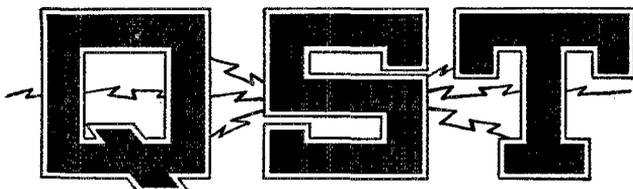
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EDITORIALS

de AMERICAN RADIO RELAY LEAGUE



The Hoover Bill

A GAIN we have a radio bill to report, this time one proposed by none other than Secretary of Commerce Hoover himself. In a letter to Congressman White, author of the "White Bills," and made public by the Department, Mr. Hoover discusses at length the changing conditions surrounding radio, particularly broadcasting. He thinks that radio will ultimately require extensive legislation but that further time is necessary to ascertain what the nature of this comprehensive legislation must be. He suspects that broadcasting may soon have to be considered as within the field of public service rather than that of private enterprise, and if this viewpoint becomes adopted a variety of legislation entirely different in its fundamental character from anything contemplated in the past will be necessary. The basis of regulation of broadcasting and the fundamental policies to be pursued must be determined by Congress. It is the Secretary's opinion that this must be thrashed out before exhaustive legislation is attempted and that another year's study will be required. In the meanwhile he proposes a short bill in the nature of emergency legislation, "to preserve the situation in the public interest until a final and complete legislative policy can be adopted." The text is as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it is hereby declared and re-affirmed that the other within the limits of the United States, its territories and possessions, is the inalienable possession of the people thereof, and that the authority to regulate its use in interstate and/or foreign commerce is conferred upon the Congress of the United States by the Federal Constitution.

"Sec. 2. That Section 1 of the act of Congress approved August 13, 1912, entitled 'An Act to Regulate Radio Communication' is hereby amended by adding at the end of said section the following: 'The

wavelength of every radio transmitting station for which a license is now required by law, its power, emitted wave, the character of its apparatus, and the time of transmission, shall be fixed by the Secretary of Commerce as in his judgment and discretion he shall deem expedient, and may be changed or modified from time to time in his discretion.'"

As a result of Mr. Hoover's action we can regard the pending White Bill as temporarily side-tracked, and legislative attention for the moment must be directed at the new short bill. In its essence the latter follows the basic idea of the White Bill, lodging all regulatory functions in the Secretary under a sweeping grant of discretionary power. It is therefore subject to the same critical arguments that were directed at Mr. White's bill—the danger to public interests that is unavoidably connected with the grant of discretionary powers from which there is no appeal. In fairness to Mr. Hoover it should be borne in mind that he proposes this only as temporary legislation, until the subject can be thoroly studied—but there is no time limit specified in his bill. We have stated it as our opinion many times in the past that such legislation probably would be an excellent thing under the administration of Mr. Hoover but might be a very terrible thing under another Secretary. The same comment is going the rounds now—for example, the National Association of Broadcasters states it would be willing to support the bill if Mr. Hoover could agree to live a hundred years and to serve as Secretary of Commerce all that while.

It seems to us that this bill needs amending, even tho it is but temporary legislation, in such a fashion as to limit its term of life, or to provide means for taking appeals from seemingly unfair decisions, or, better still, by reposing the discretionary power in some sort of a radio commission. At this writing the proposed bill has not yet made its appearance in Congress. Meanwhile our A.R.R.L. Legislative Committee is studying the situation.

The McCaa Anti-Static Devices

Part I

No greater contribution can be made to radio than to devise some method of combating the troublesome noises that we call "static" and "power leaks".

Therefore QST counts it as a privilege to present the McCaa devices which appear to be a long step ahead of anything that has been done in this direction.

The present installment will deal with the theory of one of the devices which is suited to both telephony and code work. The second installment will go into the constructional details and present another device of an entirely different nature.

THE Radio Laboratory at Parkesburg, Pa., has become known to us in various ways, by the broadcasting that was formerly carried on under the call of WQAA, by the power code signals of station 3ZO, and by the test work done with the portable field station 3OI. The members of the American Radio Relay League also know of 3ZO through the fact that its owner, Mr. Horace A. Beale, Jr., has served as a member of our Board of Direction.

However, very little has been said about the work of Dr. Galen McCaa, of the same organization, mainly because it was advisable to speak little of an anti-static device while it was growing—too many such devices had turned out to be "false alarms," and the radio world is skeptical. Consequently there has been a great deal of checking and testing, repeated trips to the Gulf of Mexico, "the home of real static," and constant observation of the McCaa circuits and devices under operating conditions before anyone felt that it had become possible to say—"We have an anti-static device that is dependable."

The problem is one that has long been worked on by Dr. McCaa, and in passing it is a pleasure to add that, as is usual with the men that produce something worth while, Dr. McCaa has been with the radio art for a considerable period of years. A few of our readers may remember his experiments with radiophones before tubes had been devised. This work was done at the old New York Herald station at Battery Park and used a 3-phase alternating current supply to drive three primary circuits, each with its own spark-gap. The excitation was thus made continuous enough to permit modulation in the antenna and successful speech was transmitted. Perhaps it will surprise many readers to know that this happened in the year 1914. The transmitter was put on the SS Tyler in August and worked 125 miles to the N. Y. Herald station, old WHB. This was the first sea-going radiophone. In January of the same winter McCaa phone transmitters were used at both WHB and on board the Tyler. Two-way communication was carried on for 500 miles.

Shortly after this the static problem took over Dr. McCaa's interest and has held it continuously since that time.

Principles

To understand the McCaa anti-static circuits that use a vacuum tube, one must begin by an understanding of the difference between signals and static. No better explanation can be given than that found in Dr. McCaa's notes on his work, and the following is simply an abstract of those notes, plus some side-lights obtained in conversation and at tests.

Let us assume that a receiving station is listening for a 300-meter continuous-wave telegraph signal, using the circuit of Fig. 1. Naturally the operator will tune the antenna circuit to 300 meters so as to obtain the best signal strength. Now the antenna is in condition to oscillate at 300 meters when a signal comes along—but it will also oscillate at 300 meters when "shocked" or "jolted" electrically in any way. This is easy enough to understand when one remembers that a tuning fork will not only respond to its own pitch on a nearby piano, but will also vibrate at that pitch when hit suddenly by anything whatever.

Now static discharges, and most "power leaks," act as "shock exciters" of receiving antennas within their range, these disturbances do not have any definite wavelength of their own.

This creates a difficult situation, because we must tune the antenna to the wavelength of our signal—or near it; but as soon as this is done we find the static effects in the antenna at that same wavelength.

It would be a very fine thing if we could tune the antenna to the wavelength of the signal, yet keep the static-tune somewhere else. That is what the first of the McCaa devices does.

The Method

In Fig. 2, suppose that the switch is closed and the antenna tuned to the incoming signal. Naturally the signal now reaches the secondary. However—so does the static, for it causes the antenna to vibrate at the signal-wavelength. Now let us open the switch, putting the primary P into

action. We can now change the coupling of the two primaries with the secondary until they balance each other out and the secondary receives *neither* signal nor static, excepting what gets through by static-coupling. The static-coupling can be made small by keeping the primaries an inch or more from the secondary and by putting the whole coupling-coil-system down near to a good ground connection or near the nodal point of an antenna-and-counterpoise system. Two things have happened, we have shifted the antenna tune by cutting in the additional primary and we have "bucked out" the static and signal *both*. Now then—how is it possible to regain the signal *without* the static?

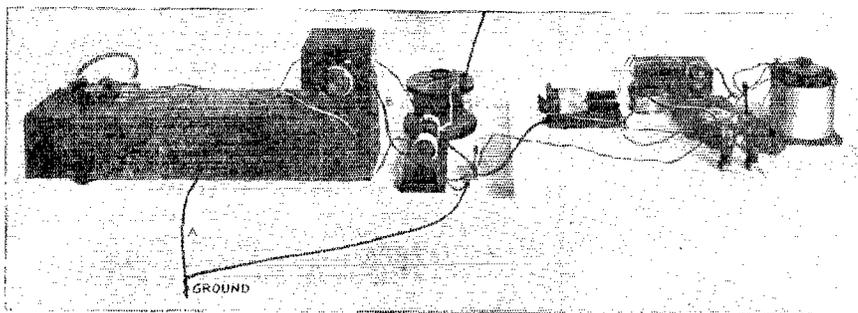
For the answer to this question we must go to Figure 3, where a large coil has been shunted around P_2 . This coil will not affect the system very much in any way because its inductance is made 5 or more times that of P_2 . This raises an interesting question, the answer to which leads to an explanation of the McCaa system. The question is "Why does this high-inductance coil take so little current?"

The answer seems to be plain alternating-current theory—and it is. The reason that

coil L has a magnetic field which goes around through itself and cuts through its own turns. If that field was not there the coil would have no inductance. It is therefore possible to change the inductance of this coil by opposing its field with still another field, manufactured in some fashion or other.

In Fig. 4 we have added to the system a "driver"; in other words a vacuum-tube oscillator. This is coupled to L and then tuned to the signal wavelength. We now have a complete McCaa receiver and it remains to explain its action so that we will understand the adjustment.

The field of the driver-coil alternately adds to and subtracts from the field of the coil L. The effect of this is to make the inductance of L change at an audio frequency. One can easily see that if the driver-coil field is strong enough, this will mean that once per cycle the inductance of L will go to nearly 0. When that happens L is no longer a choke-coil—it is merely a very low resistance. But when that happens we have just exactly the same condition that we had in Fig. 3, when the switch was closed. Thus it is possible for us to open and close the short-circuit around coil P_2



THE ANTI-STATIC AND ANTI-INDUCTION UNIT IN LABORATORY FORM

At the left, in the long box, are two stages of R. F. amplifier, detector and two stages of audio amplifier. The copper shield of this unit is grounded by the lead A. On top of the tube box is the tuning unit whose shield is grounded by the lead B.

At the back-center of the picture is the antenna tuning condenser with the antenna lead coming down to it. Just in front of that is the temporary mounting carrying the two primary coils and the secondary coil. This is the "balanced coupler". The coil nearest the reader is P_1 , the one farthest away is P_2 . The dark one in between is the secondary.

Next to the right is a small loose-coupler which is used to feed the repeater tube, the secondary being tuned by the small variable condenser next to the right. The B battery and the repeater tube follow. Farthest to the right is the condenser tuning the plate coil of the repeater tube. The plate coil itself is the right-hand one of the pair of honey-comb coils at the right-front of the picture. The left-hand one of the pair is in series with the loose-coupler primary and these two coils together constitute the primary-shunt of the coil "L" to which frequent reference is made in the text. The diagram of this setup is given in Fig. 6.

the high-inductance coil draws so little current is that its manufacturers within itself an alternating voltage which is at all times opposite to the received voltages from the antenna, and this "back e.m.f." is almost as large as the voltage the antenna feeds to the coil. Very well—it would do the same thing anywhere, all inductance coils do this thing—what of it?

This, the "back e.m.f.," exists because the

by purely electrical means with no moving parts at all.

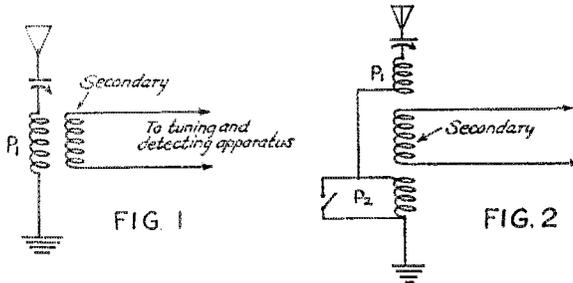
Interesting—but what of it? Wait!

Just Why?

We have seen that it is possible to make the oscillator-coil field oppose that of L and thereby short-circuit P_2 , allowing *both* signal and static to flow to the secondary in the usual fashion. We have also seen that

it is possible to make the field of the oscillator-coil add to that of L, making the inductance of L so high as to restore the balanced condition and thus prevent *both* signal and static from reaching the secondary.

There is a third possibility, one that is a bit hard to grasp, but which is perfectly reasonable and which works in practice. Suppose that we have the incoming signal flowing in the antenna, and of course the



static with it as usual. Suppose that the oscillator is shut off for a moment. Very well—the antenna is now tuned from the incoming signal (because P_2 is in circuit) and the static is kept out of the secondary by the balancing action and also because there is a difference in the tune of the antenna and secondary.

The incoming signal gets into the antenna *in spite of* the detuning and causes a voltage across P_2 and across L.

Now suppose we start the oscillator and tighten the coupling to L until we are putting into L an opposing field just equal to that created in L by the received signal. Now we have an intermediate condition; for voltages equal to those of the received signal (or less) L is out of the circuit and P_2 is shorted. These conditions permit these currents to produce effects on the secondary. Therefore the signal will appear in the secondary, and along with it will appear such small amounts of static as do not represent any voltage above the signal voltage. The tendency is toward a 1-1 ratio of signal and static. That does not sound very promising—but it is really very excellent indeed. In code work the operator receives the impression that the static has disappeared.

In the paragraph just finished the word “voltage” has been used repeatedly without a clear connection. The voltage across L and P_2 was meant in each case.

Radiophone Work

The system so far discussed used a “driver” or oscillator to produce the bucking field that operates on coil L. This is all right for telegraphic work if the beat frequency is made audible and can be used for telephony if the beat is made super-audible. However a little thought will show that the weak sounds of radio telephony will be

overridden by static and that the field used “to modulate” the field of L should vary exactly in the fashion of the received radiophone currents—that is, we must use a magnetic field that is modulated exactly as is the carrier wave of the station we are listening to.

Of course there is only one possible way of doing this, namely to make the received signal itself furnish the controlfield.

The method of doing this is illustrated by Fig. 5. Here the antenna system and the secondary system are both exactly as before but the control-coil is in the plate circuit of a vacuum tube which is a repeater instead of an oscillator. The grid circuit of this same tube is connected to the upper portion of the antenna (that is to say above P_1) by the couplings condenser C and the tuned input circuit.

The action is somewhat the same. After the switch S is opened and the signal (and static) is balanced out by adjusting P_1 and P_2 , we start the repeater tube into action, by lighting its filament. Now the incoming signal controls the grid of the tube, thereby causing the field of the plate coil to vary. This in turn works on the coil L as described before and allows signal to enter the secondary in accordance with the received voltage. Of course static enters too—but at no instant does the static voltage in the secondary exceed the signal voltage. If you want to look at it in that way—the static also is modulated.

Results

Before we describe more systems and go into greater details it is interesting to consider what these effects are worth.

We must admit that we have not “eliminated” static as yet, having merely reduced it to the signal level. This does not sound very promising, but there are several reasons why it is much better than one would think. In the first place we have made sure that there will be no loud rackets that deafen the receiving operator—his ears will remain normally sensitive. In the second place we will find that the operator is utterly unable to believe that the static is *not very much weaker* than the signal. The feeling is so strong that even measurements are not convincing. In code reception one feels as if the static had quite disappeared—probably because one is used to receiving through static that is 5 times as strong as the signal. What is much more surprising is that broadcast radiophone reception is satisfactory under these conditions. This sounds quite incredible, but the fact remains. One is driven to the con-

clusion that there is a ratio of signal to static which is really much better than 1-1.

Other Circuits

We have spoken as if there were only two systems—the Oscillator System for code work and the Repeater System for both code and telephony. This is not correct—there are almost endless variations, and these fall into three general classes as follows:

- A—Changes in the tuning system with no change in principal.
- B—Changes in the proportion of the primary system which involve a minor change of principle.
- C—More elaborate systems that take care of various residual couplings.

Class A

The primary tuning system can be changed almost at will. Instead of the antenna-series tuning condenser we may use a condenser shunted around the two primaries. Again we may cause the oscillator (or repeater) to operate on a tuned system that is coupled to L instead of working on L directly. We can combine these different coils in a variety of ways, making the mechanical construction somewhat easier, and sometimes making the operation of the set easier. Any number of such changes will occur to the reader.

Class B

Instead of making L big and then destroying its inductance by means of the field of the coil in the tube circuit we can make L quite small, so that it will ordinarily short P₂. Then we can reverse the coupling to the repeater (or oscillator) and periodically raise the inductance of L. The operation is approximately the same. When working with a small value of L still more

that do not appear on the diagram, in addition to the ones that can easily be seen on the diagram. Thus there are static couplings between various coils, static couplings through the repeater tube, and some troublesome magnetic and static couplings that are due to unforeseen phase differences.

To get rid of these effects the systems here shown must be somewhat elaborated.

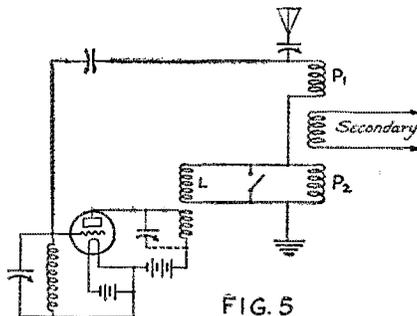


FIG. 5

However, it is fair to say that even the simple systems that have been shown do their work very well indeed and permit satisfactory reception under conditions which do not even permit one to hear the signal with an unprotected receiver.

The more complex systems will be discussed in the next installment.

Shielding

Of course there is not the slightest use in keeping static out of the antenna coupler and then allowing the receiving set itself to pick up large amounts of the same directly. If anyone is inclined to think that a receiving set will not do this he is invited to take down the antenna during the summer and then notice what a lot of static is collected by the receiver wiring itself.

To prevent this sort of thing the receiving set itself must be very thoroughly shielded. There is nothing especially difficult about this, but it must be done well—else it might better be left alone entirely.

The methods are the usual ones—a copper-lined box with the coils kept away from the shielding and with as few and as small openings as possible. The lid should have a flange and the entire shield will be much more effective if thoroughly grounded.

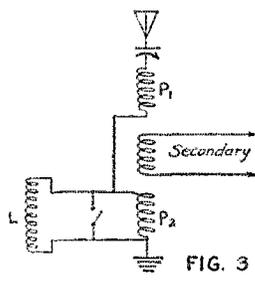


FIG. 3

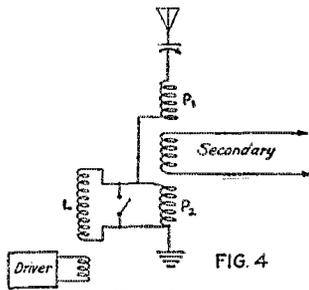


FIG. 4

circuit-changes suggest themselves, one can even put L into the antenna circuit itself in series with the rest of the equipment.

Class C

So far we have spoken as if the schemes shown would keep static completely out of the secondary. This is not correct in practice because there are many stray couplings

Which System

Because it is so simple, the Oscillator System will appeal to the radio telegrapher. However, the system is decidedly not as

good as the modulator or Repeater System. This can be seen by considering that the Oscillator system lets a steady stream of energy into the secondary—when there is no dot or dash it admits static. True—the static is no stronger than the signals, but there is some loss of sensitivity on account of the noise between dots and dashes.

The repeater system, on the other hand, lets virtually nothing through between dots and dashes, therefore they "stand out from the background" much better, the only effect being that they may be accompanied by faint static noises. There is no harm in that however, the only effect being on the tone, which is of no importance.

Therefore, the Repeater System is best for both telegraphy and telephony.

A Simpler Repeater System

In our photograph there is shown a Repeater System that has been still further simplified, the connections being those shown in Fig. 6. Here L_1 has been split into two parts. L_1 is small and feeds the tuned input circuit of the repeater. L_2 is large and receives the output of the plate coil of the repeater. While it is true of all the repeater systems, this circuit makes it much plainer that the repeater can be made to oscillate, for its two tuned coils can be regarded as being coupled together via the antenna. In fact the repeater will oscillate whenever the input and the output are tuned closely together and the plate coupling made too close. This is no great difficulty though.

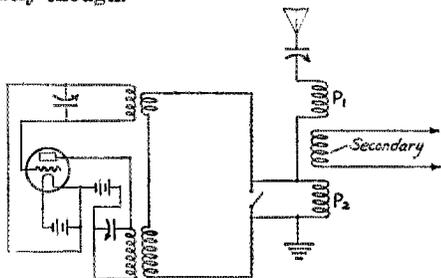


FIG. 6

The repeater system here shown was used at Lancaster, Pa., in the presence of various witnesses. Lancaster is cursed with an ancient arc-lighting system using the old fashioned high-voltage series-arc generators which have only a few commutator segments and operate at voltages ranging from 2000 to 10,000. The radio uproar sent out by a few miles of circuits of such outrageous stuff can be imagined. One of the circuits passes near the house in which the repeater system was set up. The row was simply terrific with an unprotected receiver but with the McCaa device in action it was possible to ignore the interference and to

copy with ease many amateur, ship, shore and broadcast stations. It can be seen that this set had no elaborate circuit—nor was there anything mysterious about it—simply a hurried table-top set. However, it did the work—excellently, with no particular advantage except that the apparatus was in a cellar where a good ground was available near the set.

At 3ZO no such favorable condition exists, but there also the performance was amazing.

Of just what the tests consisted, the details of the apparatus and the McCaa "band device" will furnish the material for the next installment of this series.

Governors'-President Relay

Every four years a President of the United States is inaugurated, and then he receives a great many wires and letters of congratulation. Four years ago, we secured a message from nearly every governor and we relayed those messages to the late President Harding, by amateur radio. Except for one or two messages that didn't get started, all but a very few were delivered.

This year, we want to do the same thing, the only difference being that most of the messages will be handled on the short waves. However, it makes no difference what wave is used. Here's the plan:

Each division manager is appointing some amateur in each state to secure a message from each governor. (We want all of them this time). On March 4th all of the messages are to be started to President Coolidge at Washington, D. C. On March 5th, all messages received will be delivered to the President. Then President Coolidge probably will become aware that there are radio amateurs who can do these things, unless Mr. Hoover has already told him.

No, we DO NOT want complete copies of your log! We want only complete copies of the messages showing time received, station from which each message was received, time sent and to what station each message was sent. (See the example in the Washington Birthday Daylight Transcon, on page 16.)

That's about all we can say. Yes, you can count on the Washington Radio Club to have stations organized to handle everything that comes in. Just keep an ear out for them—Washington Radio Club did it four years ago, and we are not worrying about their falling down this year.—F. H. S.

The Month's International DX

New Records All Around. 1KC Works Asia and Africa
Six New Countries Added to Our List

HOLIDAY greetings flying all around the world by amateur radio; amateur communication opened up between North America and Belgium, Brazil, Morocco, Mesopotamia, Spain and Sweden; the O's in South Africa reporting us; Australasia and England working around the world in both directions; a Frenchman copied in the U. S. A. at noon—these are some of the high spots in the month's DX notes. It is all very wonderful.

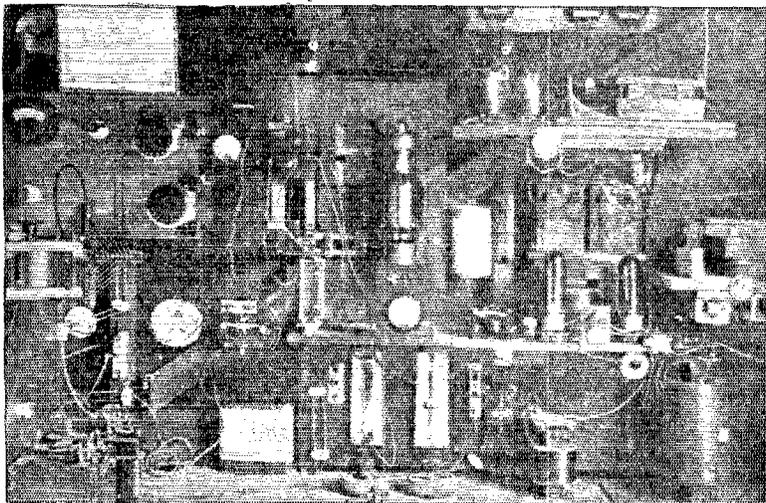
This chronicle is compiled from many dozens of reports and logs. It is a big job

We were in error in reporting the call of CB8 as changed to DA8. Mr. Braggio signs CB8 for all international work, using DA8 only for local phone.

5ZAV and others report LOR, the station of the Radio Soc. Argentina, in Buenos Aires, working short-wave telegraphy with Brazilian amateurs. 3HS reports rIAZ.

Australia

Two more Australians got over to this country when a2YG in Sydney worked 5DW on Dec. 11th and a2DS (Jack Davis of



THE TRANSMITTER AT AUSTRALIAN 2CM, Mr. Chas. D. MacIurcan, Sydney, which has worked England and this country. The set uses a single UV-204 Radiotron supplied with R. A. C., input 200 watts, putting 2 amperes in a 90-ft. vertical cage at 90 meters.

but we like to do it. We lack many reports. It is surprising, but our first knowledge of many of the history-making events reported below came from a casual report from somebody who had intercepted them. We want more reports—drop us a card, gang, when you do something unusual.

Now let's see where we are. We'd better take them alphabetically:

Argentina

40I, Atlanta, worked rA8, Mr. Ignacio Gomez, technical editor of *Radio Revista*, of Buenos Aires, on Nov. 23d, which is earlier than the work of 6GG (Nov. 30th) reported in our last issue. A8 has also worked f8AB and z2AC.

2CDM fame, also of Sydney) tied up with 6AWT on Dec. 16th. 6AWT also worked 2YG, giving him a total of 9 Australasians! 5DW has done beautiful work regularly. a6AC was heard calling CQ on the morning of Dec. 18th by 8XAY, Cincinnati—the first a6 heard. Additional stations working Australia recently are 1CMP, 2UD, 6BQL, 9CLQ, 9EKY, 9CJC and 9DQU. Who was first to work Australia? 6AHP worked a3BQ at 2:07 a. m. P. S. T., Nov. 2nd. Can anybody improve on that?

Belgium

Belgium became QSO the North American continent for the first time when cIAR, "Old Joe" Fassett, at Halifax, N. S., clicked with b4YZ on Dec. 11th, the latter station

using but 9 watts input. 4YZ sent greetings to A.R.R.L. members. 1QV, Westerly, R. I., worked P2, Brussels, for a half hour on Dec. 20th, and on the 23d W2, also in Brussels, worked u1KC, sending a message for Headquarters. 1ANA worked W2, and 2BY worked W2 and P2. 1KC tied up with b4RS on Dec. 24th, making the fourth Belgian to work this country. 4QS is well heard but not yet worked.

Bermuda

Bermuda, B.W.I., is QRV, ex-1AJW being on the air now at Hamilton and signing BER. Parliament is expected to provide for regular licensing of amateur stations soon. BER of course has worked all over the U. S. and has logged OAA, OLL, and OQR, all in Holland.

Bolivia

We had not previously heard of amateur activity in Bolivia, but ch9TC advises us there are several stations on the air there, using *de* for an intermediate pending an initial assignment. No particulars.

Brazil

The Dr. Hamilton Rice Expedition, with headquarters at Boa Vista, Rio Branco, Brazil, is now on the Amazon River at lat. 3° 20' N., long. 61° W. They have a C.W. transmitter on 86.5 meters, signing WJS, operated by Mr. Thos. S. McCalib. WJS is very anxious to work U. S. amateurs and asks that an ear be kept out for him. He seems first to have clicked with 6OI, Stanford University. On Dec. 9th 2CVS worked him at 2315 G.M.T. and took messages and arranged a schedule. 6AWT, g2KW and 2CIL also report WJS. WJS reports extremely heavy QRN and often has to receive on loop only. Important messages have been handled, one being an order for replacement tubes, which are now enroute.

There are native Brazilian amateurs on the air too. 2SP at San Paulo was working ch9TC as early as November. He and 1AC in Rio are reported at rCB8. Some of the Brazilians are incorrectly using *b* as an intermediate; *b* is assigned to Belgium. The matter of an assignment for Brazil is now in process.

British South Africa

At last authentic reports from South Africa, the first as far as we know. Mr. S. C. Pleass, Box 1077, Johannesburg, reports the following stations logged on detector and one audio, almost all between the hours of 0300 and 0415 G.M.T. Nov. 1, NKF on 54m., without aerial or ground; 1SF. Nov. 2, 6CSS, without aerial or ground; 6AGK. Nov. 3, 1PL. Nov. 9, 4SA, 6APW, 8BAU, 8PL, 8GZ, 9BHX. Nov. 10, 6BCA. Nov. 12, 5AME. San Francisco to Johannesburg is about 10,400 miles, so this is still real DX. Amateur transmis-

sion in South Africa is coming very slowly, but after this demonstration it ought to show some pep. O's, get on the air, we want to talk with you.

Chile

Major R. Raven-Hart, of ch9TC-rMA4, kindly offers a pair of miniature Chilean stirrups, of carved wood, as a souvenir to the first amateur to work Chile from Canada, Cuba, and from *each district* in the United States. Several of these have already been won. Keep a watch for Chile.

chFAL, reported in our last issue, is Mr. Eugene L. Falkenburg, of Santiago, Chile. On 72 m. with one UV-202 he has worked z4AG and a snag of South Americans.

Denmark

The second Dane to get over was 7ZM, who worked by u1KC on Dec. 24, good QRK during a long ragchew. Last month we erroneously reported 1MY as first to work Denmark, connecting with d7EC on Nov. 28th. 1BDT beat him to it, having worked 7EC on Nov. 26th and quite regularly thereafter. c1AR has worked 7EC also.

England

2OD, Mr. E. J. Simmonds, is the outstanding British station of the month. To him goes the credit for being the first Englishman to work Australia, tying up with a3BQ on Nov. 13th. He also was the first to work z2AC, who was found impossible to work for a long while after he was being heard regularly. g2KF has worked a3BQ too. On Oct. 16th g2OD worked z2AC at 5 a. m. New Zealand time, and on Nov. 24th he worked a2DS at 6:15 p. m. British time and a2CM at 7:05 p. m. It will be remembered that all other reported work between these countries has been at dawn in England and dusk in Australasia, with signals traveling west from England, but in the above-reported work the signal path thru the night belt was east from England. Around the world in both directions! In working a2CM a message was received from Mr. Maclurcan as president of the Wireless Institute of Australia, sending greetings from Australian amateur experimenters to His Majesty the King.

u5UK worked g2OD on Nov. 23d, the first U. S. 5 reported QSO England. g5NN has been heard at 6BUR, Whittier, Cal., on detector only, the first west-coast reception of European amateurs of which we have record.

On Dec. 24th u1BDT and g2KZ worked *voice* from 7:00 to 8:15 p. m. E.S.T., the first reported two-way amateur transatlantic radiophone operation.

France

f8AB and u1ANA have been trying some daylight tests. f8AB was QSA at 1ANA on 37 meters at 1 P. M., E.S.T., Dec. 7th,

a cloudy day. They have worked two-way as early as 3 p. m., E.S.T., 8AB on 50 m. and 1ANA on 75 m.

Holland

When we wrote last month's article no Holland amateurs had been reported and we wondered where they were. They have shown up in December with a vengeance, most of them using O (zero, five dashes) as the numeral in their calls. 1ANA and 3AJD have worked ONL, Amsterdam, QSA. 2BRB and 1KC worked OBQ, 1KC and 1BEP worked PC1 in Rotterdam, 1ARY worked OLL and CP1 (PC1?), and 1KC also hooked OBA and ODB. 8ADQ worked OLL; 2BY worked OBA, OBQ, OLL, PC1. We understand PCII of last year now signs 3CM but he hasn't been reported from this side. The Dutch stations all use *n* as an intermediate.

India

1AAC in Framingham, Mass. while working z4AA, was logged by Mr. G. W. G. Benzie, at Cachar, India, at 11:40 G. M. T., Nov. 17th. 1AAC used one UV-202 ("5-watt") with an input of 35 watts, wavelength 75 meters. The DX is around 7,800 miles. z4AA's confirmation card checks the work.

Luxemburg

3HS reports hearing Lux. 8AO, first blood.

Mesopotamia

Now get a good grip on yourself. We've worked Asia again, this time the other way! Have you noticed that 1KC, Mr. Frank Lyman, Jr., of Northampton, Mass., has been pretty prominent in this chronicle? Add this to his record: On Dec. 21st at 11 p. m. E. S. T., 1KC worked GHH1 for a half-hour. GHH1 is at Mosul, near Bagdad, in Mesopotamia, a distance of 5,600 miles and the greatest east that we have yet worked. 1ANA heard GHH1 too, and a letter from Sweden reports interception of the work, so it is confirmed. The only other work with Asia was when u7HG worked JUPU last spring, who gave his QRA as Yokohama, Japan. Unfortunately no confirmation of this was ever received, in spite of diligent efforts.

Morocco

We don't know when 1KC sleeps, or else Christmas Eve was an awfully good night. On Dec. 24th he speared another queer one, fAIN, a station of the Service Militaire

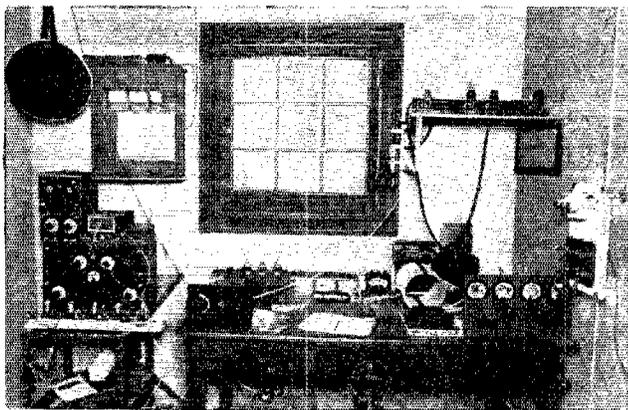
Francais, at Casablanca, Morocco. The same night 2BGG worked him, and on the 27th 8ADG also had him. Congratulations—good work. AIN was also heard by 1ANA, West Hartford, who is doing splendid receiving.

Mexico

On Dec. 13th 6AWT connected Mexican BX and z2AC for a 45-minute exchange, Mexico's first with Australasia. mBX also signs 1EI sometimes, and is located at Guanajuato. QRA at Headquarters if interested.

New Zealand

The Zedders continue their fine work, 2AC apparently being high man lately. The Canadians have QSO'd New Zealand now, c1AR leading off on Dec. 4th by working 4AA, considerably better DX than from any point in the States. c1DQ got 4AA on the 10th, 5BA in Vancouver had 2AC and 4AG on the 11th, 5GO had somebody in N. Z., and c1DD had 4AG on the 15th. Other stations recently QSO N. Z. are 1OW, 1CMP



Chilean FAL at Santiago

(many times), 1ANA, 2BRB, 4XE, 6BJX, 6BQL, 7QD, 9AXS, 9DQU. We have no record of any 8th district station working either N. Z. or Australia. Smatter, 8's? 9AXS worked 2AC from 7:48 to 8:02 a. m. C.S.T. all in broad daylight at his end, with input of but 25 watts, D.C.

Sweden

Sweden joined our family on Dec. 5th when c1AR, "Old Joe" again, worked SMZS in Stockholm, which has been confirmed by our contemporary of that city, *Radio Bladet*. Thus Fassett is first both to Sweden and to Belgium. *Radio-Bladet* advises us that the Swedish amateurs use 70 to 90 meters and are on 0600 to 0800 G.M.T., trying for us.

Spain

Another country! 2BY was first to the Dons, working EAR2. 3HS reports both

EAR2 and EAR3. 1ANA heard EAR3 the night of Dec 22-23d, calling ARRL on about 90 meters, and z1AK has twice logged AR2, believed to be in Madrid.

An International Chess Match

Five and a half hours transatlantic communication without a single repeat on either side! A record for consistent amateur communication was made on the night of Dec. 8th when a chess match was played via amateur radio between Haverford (Pa.) College and Oxford University, the stations engaged being u3OT and g2NM, respectively. The idea originated last year after Haverford had successfully played a game by radio with C.C.N.Y. Early in the summer Mr. Wm. S. Halstead, president of Haverford College Radio Club, took up the idea with Mr. Marcuse of 2NM, who made all the arrangements on the other side. The Oxford team was sufficiently intrigued with the idea to travel seventy miles to Marcuse's home and sit up all night to play. Communication tests were made each weekend to develop consistent contact. When 3OT was cut down to 85 meters the answer was achieved and tremendous signals were passed in both directions. On the night of the match static was very bad, so much so that WGH had called off his transmission tests of that date, and it had rained all day, soaking the insulation, resulting in a rotten radio night in which signals on neither end compared with the strength during tests. Nevertheless at 7:15 p. m. 3OT and 2NM connected and until 12:45 a. m. when the British players decided to adjourn, there was not a single repeat. Eleven moves were completed in each direction, with about the usual interval of match games. The game is to be played off sometime in January. Wonder if Godley ever thought that just a few years after his memorable visit to England we would be playing 5½-hour chess matches across the puddle?

To us the most fascinating angle to this international DX game is that it isn't a rich man's sport and it doesn't take an expert. It's wide open to everybody. The lowest-powered transmitters in the country are heard as far as the big watt-eaters, and the very simplest ham tuner pulls in the signals from the other side of the earth. We don't know to what it is leading but it surely seems to be advancing that dream of ours of the day when large numbers of private citizens all over the world will sit down at their personally-owned apparatus and converse with their friends in every clime. Amateur Radio is performing a powerful service in the advancement of world-understanding.

--K. B. W.

Washington Birthday Daylight Transcons

IN announcing the plans for the second short wave daylight transcons, we hope those weak points, which appeared in the report of the first tests, have been strengthened. They ought to be, as we have more stations on short waves. Now, let's get all messages over this time, OM—what do you say? QRV? Well then, here is the dope!

Messages—There will be six (6) started from each coast—no half-way points this time—we want to get them all the way across this time.

Numbers—Each message will bear a special number for tracing. It may have four or five figures in it. The prefix will be TRANSCON.

Addresses—Messages starting on the east coast will be addressed TO ANY WEST COAST AMATEUR. Messages starting from the west coast will be addressed TO ANY EAST COAST AMATEUR.

Texts—Each message will have five to ten words of meaningless code. Each word will have five or more letters.

Signatures—Each message is to be signed with the name and call of the man who starts it.

Wavelengths—The 75 to 80 Meter band is to be used.

Time—Messages from the east coast will be started at 10.00 A. M., E. S. T. Messages from the west coast will be started at 7.00 A. M., P. S. T. At 5.00 P. M., your local standard time, all messages are to stop, and let us know where they stopped, and why.

Logs—We DO NOT want your complete log. We want exact copies of each message you handle, one on each sheet, showing time received, station from which it was received, time sent, and station to which it was sent—nothing more. If you have comments to make, let them be on a SEPARATE sheet of paper.

There you are, OM, now let's go through with all of them. We want speed, but first of all, accuracy. Be careful in your sending, take your time and send no faster than the other man can copy. Correct your time-piece so all messages will check right through. What we would like to be able to do is to take all messages received and paste them together in one long file without one single gap. That means every station handling a message ought to follow our request and send in copies of them.

Remember Washington crossing the Delaware! That's how we want ALL of these messages to cross the continent in daylight!

Reports must be in Headquarters not later than March 3rd.

--F. H. S.

A Novel Short-Wave Tuner

THE following description is abstracted from an article by Mr. E. H. Robinson (English 2VW) in December issue of "Experimental Wireless."

The tuner has a range of 3 to 5 meters. It is based on the same old Hartley circuit—where all of our tuners come from. Please *don't* start writing us about the "new circuit"—things can be good without having a new circuit.

The fundamental Hartley circuit is shown in Fig. 1. Here C is the tuning condenser, A and B are the fixed plate connec-

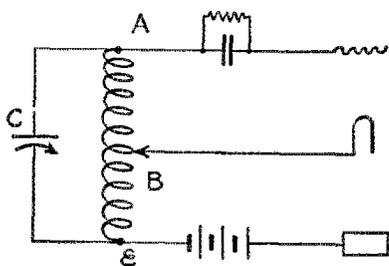


FIG. 1

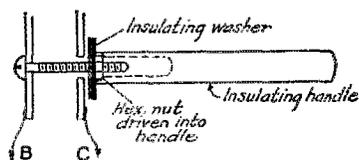
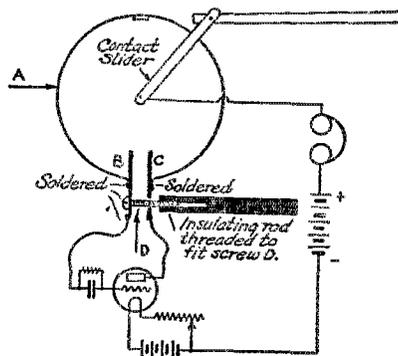
tions and B is the adjustable filament tap. Regeneration is controlled by sliding B up and down the coil.

In Fig. 2 is shown the form used for a tuning range of 3-5 meters. The tuning condenser has become a pair of copper plates right on the ends of the *one turn* inductance. The regeneration control is now a slider that travels around on this single turn. The condenser is controlled by means of the screw with the long insulating handle. This screw pushes the two plates toward each other against the spring of the large inductance-turn. That's about all the description that is needed, excepting the dimensions. Of course these will determine the wavelength range and can be changed to suit other ranges. The same sort of tuner certainly ought to be useful in work up to 20 meters or so. However, the dimensions given under the cut are for the 3-5 meter range.

Now as to precautions; the loop is supported only by its upper edge, therefore the support must be rigid and must not allow the loop to vibrate or to tilt when the slider moves along it. Loose contacts between metal objects *anywhere near the set* must be avoided, they will make noises in the receiver. Incidentally—motor cars nearby will make much QRM with their ignition systems.

Coupling the set to antenna isn't at all difficult because the coupling is quite close if a straight wire is just put into the same plane with the receiver.

The arrangement of the leads to the phones, etc., is important. Changing this arrangement will change the wavelength range. However that doesn't matter, the original tuner was built around a British



Another Construction

FIG. 2 THE TUNER

A—One 8" turn of copper strip, $\frac{1}{8}'' \times \frac{1}{8}''$.
 B and C—Condenser plates, each $4'' \times 2''$. Th: $4''$ dimension should be placed horizontally and the plates may be about $1/16''$ thick.

Naturally any sheet metal can be used.

The adjustment should permit moving these plates from a 1" spacing down to a $\frac{1}{8}''$ spacing with smooth action. The control machinery may be built in several different ways, some of which are suggested.

V-24 tube and American tubes are enough different to make it probable that the range will have shifted.

We will appreciate it if our readers will tell us of new types of tuner, also of the success they have had with this type.

—S. K.

That Wave Meter

By John L. Reinartz, 1XAM-1QP.

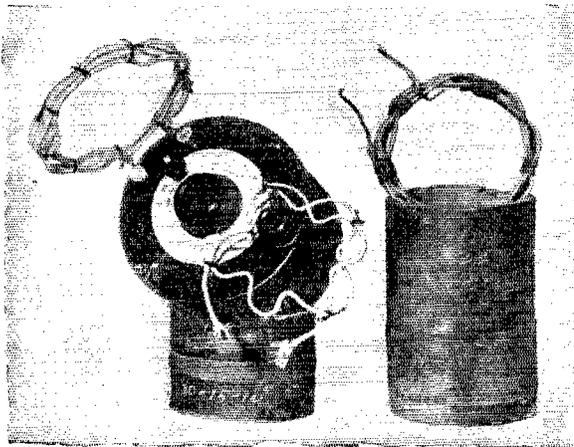
IN my endeavor to entice the amateur fraternity down to the 20 and 40 meter bands, the greatest stumbling block has been that so many are using incorrect wavemeters.

Time after time someone has been heard testing, thinking that he was at 20 meters, but really nearer 50 meters. He probably got the harmonics mixed when attempting to calibrate his wavemeter. At any rate—these men are always very much surprised when told what wave they are really working with, and just *why* they are missing

wavemeter is tuned to resonance with a nearby sending set the tube glows, giving off a bright red light that can easily be seen through the hole in the condenser cover.

A coil form was made next by driving 9 nails, equally spaced, in a 3-inch circle, using a piece of scrap lumber as a base. On this form the coils are wound, basket-weave style, using No. 12 D.C.C. wire. The first, or 2-turn coil, is for the 10-30 meter range. After winding it can be tied securely with twine and taken off the form.

The second coil has 4 turns and gives a range of 20-60 meters, the third coil has 10 turns and gives a range of 40 to 120 meters. The original coil that came with the wavemeter takes care of the waves from 200-600 meters, so that the only gap is from 120-200 meters. This can be taken care of by one of the General Radio short-wave coils which can be gotten to cover the range of 100-300 meters. This coil is called the 247W $\frac{1}{2}$, the " $\frac{1}{2}$ " showing that it tunes to just half the wavelengths shown on the original dial. In the same way our 10-turn coil tunes to just one-fifth the readings on the dial, the 4-turn one to just one-tenth and the 2-turn one to just one-twentieth.



THE WAVEMETER

The 4-turn coil is connected to the condenser and the 2-turn coil is hanging from the vernier knob. Just below the condenser dial can be seen the small hole thru which the neon tube is viewed. The 10-turn coil rests on the pasteboard tube at the right.

The two tubular coils are used for standardization work. How they are made and used will be discussed in our next issue.

the fun that a few of us are having at 20 and 40 meters.

A Very Simple Way Out

The well-known type 247-W wavemeter of the General Radio Co. can easily be equipped with a few extra coils so that it will read from 10 meters on up.

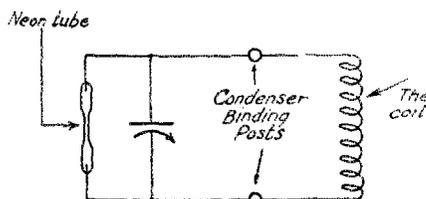
To make such a meter I began by drilling a $\frac{1}{8}$ inch hole through the rubber cover of the condenser and placing just underneath the hole a little vacuum tube (neon tube) taken from a Westinghouse "spark C" ignition tester. This tube was connected across the condenser as has been explained in *QST* several times before. Whenever the

connecting the 4-turn coil to the condenser of the wavemeter and setting it near a short-wave receiver that will work down to 20 meters or so. Now pick up 6XBM, 9XI or WWV when they are sending standard frequencies near 50 meters. 9XI isn't sending regular schedules just yet but WWV and 6XBM are scheduled each month in *QST*. If one of these stations is not handy you can use NKF which always operates on exactly known wavelength, can be heard anywhere in the United States and frequently announces its wavelength. At this moment (for instance) NKF operates at 54.3 meters on Monday-Wednesday-Friday at 8.00-8.10 and 9.00-9.10 P. M., E. S. T., also at 12.20-1.00 P. M. the station is working with 1XAM on this same wave. At

Calibration

10.00 P. M. there is another schedule sending on BOTH 54.3 and 32 meters to NPL at San Diego, handling regular traffic. Leo C. Young, the operator at NKF, is very careful and when the wave is not exactly 54.3 you will hear the correct wavelength stated.

Very well—suppose that we hear 6XBM sending and saying that they are working at 51 meters. Tune the signal in as carefully as possible, then leave the receiving set *entirely* alone while you use the "click method" to find out where the signal tunes



THE CIRCUIT

in on the wavemeter. Suppose that it tunes in at 480 on the dial. The coil is too large and must be cut down until the click comes at exactly 510 meters on the dial—remembering that the receiving set must not be touched all this time. This means that the 4-turn coil all readings will now stand for just one-tenth of the dial reading. Since the dial reads from 200-600 meters, this means that the 4-turn coil will go from 20-60 meters.

The 10-turn Coil

Connect the 4-turn coil, set the dial at 600 meters (this means 60 meters with the 4-turn coil) and then leave the wavemeter alone while you tune your receiver until you get resonance, using the click method again. When the click is found, leave the receiver set and put the 10-turn coil on the wavemeter. Now cut and bend the 10-turn coil until you get a click with the wavemeter set at 300 on the dial. Since we began by setting the receiver to 60 meters this means that the 10-turn coil now tunes to 60 meters at 300 on the dial, in other words all its readings are one-fifth of the figures on the dial. The range is therefore 40-120 meters.

The 2-turn Coil

Connect in the 4-turn coil again, set the dial at 300 meters, which means 30 meters with this coil. Now tune the receiver to this wave, leave it alone as before and put the 2-turn coil on the wavemeter. Cut and bend the 2-turn coil until you get the resonance click with the dial at 600. This means that the 2-turn coil tunes to 30 meters when the dial reads 600, therefore the

tune at all times is one-twentieth of the scale reading. This gives a range of 10-30 meters.

General

This probably does not sound very reliable to you but my wavemeter checks to much better than 3% at all wavelengths, and I am willing to rely on the products of the General Radio Co. enough to say that yours will also be reliable, at least below 60 meters. Above that the scale is not so useful. However a wavemeter that goes from 60 meters down to 10 ought to satisfy most amateurs for a while.

At any time that you wish it is always possible to check several points on each scale by harmonics, working from one of the larger coils or else using the harmonics of one of the stations that were mentioned before. Be sure that you know *which* harmonic you are using.

Obituary

We are sorry to have to report the death of Frank Breitenbauch, an old A.R.R.L. member and ex-SPQ. He was the owner of a well-known spark that roared in enthusiastically on east-coast stations in days past. He discarded this spark for the benefit of the BCL's and was expecting to install a C.W. set when he died. He was an electrical repair and construction man as well as a good amateur.

Tom Banzhaf, 6CTE, died recently while listening in. He had been recuperating from heart disease and was thought to be practically well, so his death came as a surprise. He was well-known on the air, and his familiar call and cheerful personality will certainly be missed. It is a commentary on his interest in Radio that he died with his headphones on.

Index For Vol. VIII.

WITH the membership edition of this issue of *QST* there is enclosed as a supplement an index to the "short volume," No. VIII, which was concluded with the December issue. Non-members may procure a copy by sending four cents (4c) in stamps to cover charges.

Another Chance to Put One Over

By Hiram Percy Maxim, President, A.R.R.L.

NOT since that memorable day in 1917 when the telephone rang and "long distance" told me that the New York Navy Yard wanted me, have I had as much "kick" as I have just got out of a letter from the Director of Naval Communications, Captain Ridley McLean, U. S. N.

The letter asks if the A.R.R.L. will assist the Navy Department in the organization of a topnotch A-Number-One Radio Naval Reserve. I put the matter up to our A.R.R.L. Executive Committee, and it did not take long for the latter to pass the vote, "YOU BET YOUR LIFE", or words of like import. So, we have given our word and now we must make good in true A.R.R.L. fashion.

It means that the Navy Department want to establish a Radio Reserve Force of six thousand skilled operators, and that they look to our organization of patriotic young Americans to help them do it. There is no promise held out that there will be a chance to get into any kind of a scrap, as the whole plan is merely to keep a supply of expert radio operators constantly in the pink of condition, so that in case of necessity they are available. The plan contemplates no drilling nor cruising, unless the operator desires it and makes application for it. In the latter case, he would be given a chance to spend a couple of weeks in the summer cruising on a warship, drilling and learning naval radio procedure at Uncle Sam's expense.

The opportunity is a splendid one for many of us. Any young fellow going into it will be bound to get a lot of education, traveling, and broadening experience that will be a tremendous advantage and help to him all the rest of his life. It will make him a better radio operator, a better son, a better citizen, the cost is absolutely nothing, and it will be doing his bit for his country.

Those interested should communicate with the Commandant of the nearest Naval District, and ask for full details.

Let's show Uncle Sam that we are the same bunch that put that job over in 1917.

[Here are the addresses of the Commandants. Address the one nearest to you.

Commandant, First Naval District, Navy Yard, Boston.

Commandant, Third Naval District, South & Whittall Sts., New York.

Commandant, Fourth Naval District, Navy Yard, Philadelphia.

Commandant, Fifth Naval District, Naval Operating Base, Hampton Roads, Va.

Commandant, Sixth Naval District, Navy Yard, Charleston, S. C.

Commandant, Seventh Naval District, Naval Station, Key West, Fla.

Commandant, Eighth Naval District, Naval Station, New Orleans.

Commandant, Ninth Naval District, Naval Training Station, Great Lakes, Ill.

Commandant, Eleventh Naval District, Naval Operating District Base, San Diego, Calif.

Commandant, Twelfth Naval District, Room 318, Custom House, San Francisco.

Commandant, Thirteenth Naval District, Harbor Ave., & Georgia Sts., Seattle.

These enrollments are desired for Class 6 of the Naval Reserve Force, in which there are various ratings. The Director of Naval Communications will provide a course of instruction, issuing bulletins on naval radio apparatus, naval procedure, etc.—Editor.]

Have You Heard KFUH?

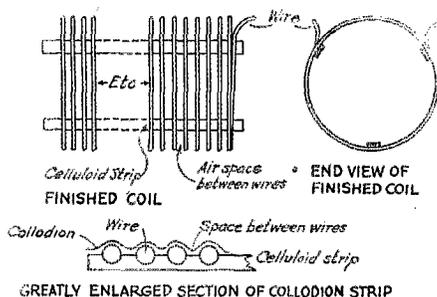
SOMEWHERE down in the South Sea Islands is the steamer "Kaimiloa" carrying the M. R. Kellum Expedition on a three-year cruise which has for its objective the establishment of the route of the Polynesian race. She is equipped with radio and the interesting feature to amateurs is that her operator is Fred Roebuck, prewar 6FD of Phoenix and later 6DZ of Santa Barbara, whom many A.R.R.L. members will remember for his then startling reception of a vast number of stations off Lower California years ago—reception which established new DX records for almost every station reported! KFUH has a 1-k.w. 500-cycle spark for her regular work but also has a short-wave ham C.W. set built by Ralph Heintz, of 6GK, concerning whom it need only be said here that he is the chap who built the transmitter for 6ZAC that put Dow and Hawaii QSO the mainland. KFUH is authorized to work amateurs and is anxious to establish contact. Unfortunately we don't know her wavelength nor have any reports of her been received at this writing. Everybody is requested to watch out for KFUH and to lose no opportunity to get in touch with her, advising QST full particulars.



Celluloid Supported Coils*

A TYPE of coil has been developed of late which has a lower resistance than any other type in general use. In its latest form, it was developed by Prof. J. C. Sanderson of the University of Minnesota. The coil is primarily designed for those fans who want the very best and will go to considerable trouble to achieve the best of everything in every place.

Already coils are on the market which utilize the same principles of construction and in addition are rugged. The addition of the ruggedness is at the expense of the extreme efficiency of the coil, however, and so our original statement holds true—that



the coil here shown actually has the lowest resistance of any type of coil in general use.

It is safe to assume that the best wire size should be either No. 16 or No. 18 wire. Any size up to No. 24 is still so good that No. 24 is justifiable, although wire smaller than No. 20 will be difficult to handle on account of insufficient rigidity. This latter size is very easy to handle and a great many turns may be wound in a given space.

First a cardboard tube should be procured of the approximate dimensions of the finished coil (estimated). Usually this would be about $3\frac{1}{2}$ inches in diameter. This cardboard tube is then split into three longitudinal sections with a sharp knife. The tube is then patched up from the inside with paper. Paper adhesive tape or just plain paper pasted on the inside of the tube is entirely satisfactory. This precaution is necessary in order that the cardboard may be removed when the coil is finished.

Next, three pieces of celluloid about 3-16 of an inch wide should be laid on the outside of the tube and the winding begun. A piece of ordinary cotton string should

be wound between each turn and when the winding is done the string should be removed. We then have a tight coil wound on a cardboard frame, with three narrow strips of celluloid between the coil and the cardboard tube.

Collodion contains a solvent for celluloid, and a film of collodion should be painted along the strips. The wire will sink into the celluloid a trifle, leaving a very rigid coil. The cardboard can then be removed, cutting away the paper with a penknife, leaving a very fine looking coil, held only by three narrow celluloid strips, which, by the way, are about the best material that can be in the field of a coil aside from air. As the spacing of the coil is almost entirely air anyway, we are approaching near perfection in this type of winding.

Collodion can be bought at any drug store and a very small bottle will be sufficient. The celluloid may be purchased at any auto top repair shop, and the wire and cardboard tube at any radio store.

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

1. Before writing, search your files of QST. The answer is probably there.
2. Do not ask for comparisons between advertised products.
3. Be reasonable in the number and kind of questions you ask.
4. Put your questions in the following form:
 - A. A *Standard Business Size* stamped, self-addressed envelope **MUST** be enclosed. No stamp required from foreign countries.
 - B. Write with typewriter or legible ink on one side of sheet only.
 - C. Make diagrams on separate sheets and fasten **ALL** sheets together.
 - D. Number each paragraph and put only one question in a paragraph.
 - E. Keep a copy of your letter and diagrams.
 - F. Put your name and address (**NOT** merely call letters) on each sheet.
 - G. Please don't go off in a tantrum if we refer you to a back issue of QST which contains the information you want. Quite obviously we cannot typewrite reprints of articles which appeared in issues which are obtainable from the circulation dept.
5. Address all questions to Information Service, American Radio Relay League, 1045 Main Street, Hartford, Conn.

*Reprinted from an article in the Minneapolis Sunday Tribune by D. C. Wallace, 92T.

International Intermediates Expanded

AMATEUR radio is humping! When the international intermediates were put into effect in December of 1923 we anticipated international communication in a number of countries where "ham" radio was just beginning to yawn and get its eyes open, but facts far exceeded expectations and today most countries have short wave amateur stations, some officially recognized, some operating in anticipation of government permission and some—well—bootlegging.

Whatever their status, they are operating and their sigs are reaching far and wide. More intermediates are needed. When the single letters were assigned it was in the knowledge these would be used up some day and either an expansion or a new system would be necessary. Under the present system, when single letters are used up either (1) accented letters or (2) double or two-letter intermediates can be used. There are a number of objections to accented letters that would render this system the least desirable, among them being that only half a dozen additional letters would result when two or three times that number will sooner or later be actually needed and also because the majority of Canadian and U. S. Amateurs are not familiar with them. This latter may seem a narrow-minded attitude to European and South American amateurs who could well suggest we learn the accented letters as we may have occasion to use them—a good bit of advice—but that will come naturally as our European and South American communication becomes more frequent and reliable. The calls and the intermediate are the parts of communication which above all things should be simple and clearly sent and to introduce accented letters into the intermediate would result in confusion, incorrect logging and sometimes failure on the part of foreign amateurs to make their nationality plain.

That leaves the two-letter combinations. The matter has been carefully considered and it seems perfectly practicable and the easiest method of extending the intermediate assignments without complication. Finnish amateurs have already tried it by using "FN," and from all reports it is working well. The main thing, of course, is to send such combinations carefully, *spacing well* so the component parts of the intermediates are not improperly run together. An illustration of how this will work out would be as follows. Finnish 3NB calls French 8AB like this:

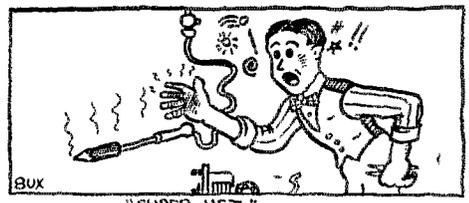
"8AB 8AB 8AB f fn 3NB 3NB 3NB k"
French 8AB answers:
"3NB 3NB 3NB fn f 8AB 8AB 8AB k"

There only remains to make additional assignments as applications are received. Some single letters are available but it is suggested for the sake of easy identification only those countries whose initials correspond to the unassigned letters ask for them. As things are now, it is easy to remember what initials correspond to countries and as long as this continues there should be no confusion. FN belongs to Finland, CH to Chile; they're easy to remember. We would be glad to have requests from foreign amateurs or amateur organizations for additional assignments and suggest the two-letter intermediates also be chosen to represent the country, as Finland and Chile have. Below is a list of assignments to date and for the convenience of all, these will be published every month in the pages of the Traffic Section of QST.

International Intermediates

| |
|---------------------------|
| A—Australia |
| B—Belgium |
| C—Canada and Newfoundland |
| D—Denmark |
| E— |
| F—France |
| G—Great Britain |
| H— |
| I—Italy |
| J— |
| K— |
| L— |
| M—Mexico |
| N—Netherlands |
| O—South Africa |
| P—Portugal |
| Q—Cuba |
| R—Argentine |
| S—Spain |
| T— |
| U—United States |
| V— |
| W— |
| X— |
| Y— |
| Z—New Zealand |
| CH—Chile |
| FN—Finland |

—C.A.S.



The Dakota Division Convention

A GAIN another red-letter day was written at the opening of the Dakota Division Convention held at Minneapolis-St. Paul on November 28th and 29th.

Notwithstanding the fact that the Convention was called to order the day after Thanksgiving, the Electrical Engineering Building of the University of Minnesota was fairly overrun with the delegates as they arrived from all parts of the Division. The efforts of the Publicity Committee were certainly apparent and remarkable when we consider that well over one-third of the entire Division actually attended the convention.

It was interesting to note that as fast as the fellows registered they would gravitate to one of the experimental rooms of 9XI, where R. B. Braden was attempting to give checks on every wavemeter brought by the delegates. 9XI, by the way, we understand will soon be sending out standard waves.

The top floor of the Electrical Engineering Building of the U. of M. is entirely devoted to Communications, and this entire floor was turned over to us, together with the auditorium, moving picture machines and other welcome paraphernalia.

Promptly at ten o'clock a. m., Prof. C. M. Jansky, Jr., Director for the Dakota Division, opened the proceedings with well chosen words. The first speaker was Fred J. Marco, 9ZA, designing engineer for the Bremer-Tully Manufacturing Co., who gave an excellent talk on "Low-Loss Construction in Receiving Sets and Condensers and why it is done." During the course of the talk F. H. Schnell, the A.R.R.L. Traffic Manager, and Mr. Marco inaugurated their now famous debate "Poor vs. Good location" and that started something; wish we had the names of the two fellows who actually admitted having a good location.

G. R. White of the RCA gave an illustrated lecture with moving pictures on "World-Wide Wireless" which proved most interesting. Following this lecture most of the gang managed to get a bite to eat at the Student's Club, and the topic discussed was "Location."

The sight-seeing tour differed from the ordinary "hick" variety in that broadcasting, ham and wired wireless stations were visited. The tour took up the greater part of the afternoon and was followed by the contests to determine the distribution of the \$500.00 worth of "ham" apparatus donated by the various manufacturers.

At 6 P. M. the great "Don Mix" Banquet began. Over 250 sat down in the gorgeous ball room of the new \$3,000,000 Nicollet

Hotel. And what a feast it was, too! Through the courtesy of Mr. Wilbern, manager of the broadcasting station WCCO, a good "Mike" was on the speakers' table and broadcast the program occurring between 8 o'clock and 9:15. The able manner in which Don C. Wallace, manager of the Dakota Division, presided as toastmaster, with Mrs. 9ZT sitting alongside him, surely made things go smoothly. Some very interesting speeches went out over the



Don Mix of WNP, and Tuktu

air, those participating in this being Messrs. Marco, Kruse, Schnell, and A. A. Hebert. And then that "ham" orchestra, "Olsen's Oscillators Supreme", livened up the banquet with their fine selections and certainly did credit to Hamdom. Everybody had been presented with a whistle and the QRM at times was QSA, and we heard a remark from Fred Marco that he didn't make all the QRM even if he did push the key at 9ZN in the old days. Reports from listeners-in claimed it was very wonderful, but some reported that sometimes they could hear an awful lot of interfering code. MIM!

Kruse proved a real drawing card and his talk helped the BCL as well. But one of the surprises of the evening was when Fred Schnell started some of his humorous stuff and finished his remarks by presenting 9CDV five shiny \$20 gold pieces for being the first to work "WNP" after a silence of several weeks, thereby adding more laurels to the famous Dakota Division. (Thanks

to Mr. U. J. Herrmann for his good sport-spirit in donating this prize.)

And say, we must not forget that Liars' Contest. How we "hams" can lie sometimes! The first prize (a loudspeaker) was won by 9IG; the second prize went to St. Louis, 9EIS being the winner.

The events of the evening closed with Don Mix showing us some 125 slides taken at the North Pole and while he was a bit bashful during the convention, he felt perfectly at home as soon as he started displaying the "snow scenes."

After the banquet the "gang" adjourned to the Northwest Radio Exposition given by the Northwest Radio Trade Association. Don't know of any other section where the spirit of co-operation exists so strongly as here and it was good to have a radio show set its dates to correspond with the A.R. R.L. Convention.

Saturday a. m. started with the usual gang attending the 9XI wavemeter party and evidently they forgot all about the meeting scheduled for 10 o'clock, but that

did not faze Prof. Jansky—he just dismissed two classes and sent them up to the lecture room and created his own audience and made the fellows who straggled in realize that they were missing something. The A. T. & T. sent one of its men from Omaha to show us slides on "Side Band Telephony," which proved a real eye-opener.

In the afternoon Hebert, Kruse and Schnell gave us some good talks. Fine constructive work was accomplished at this meeting.

One of the outstanding features of this convention was the great enthusiasm of everybody.

The Convention closed in the evening with the finest Wouff-Hong initiation ever held anywhere, the electrical apparatus of the University being used to good advantage by the cast. Congratulations to Hilgedick for the fine performance, and three cheers for Jansky, Wallace and their Committees!

—9ZT + A. A. H.

The Great Discovery

By James Walter Harte

HIS Great Capacity, King Much-O-Far-Ad, was the greatest of all the Electrified Martians; also, he was the most beloved.

Next to Much-O-Far-Ad no other Martian was thought as well of as the Lord High Tension, Am-Pere-X-Om. Like the king, he, too, was a wise hombre.

Before the conquest of the Earth, the electrified Martians had had no domestic quarrels. Whenever they were sore they let off excess energy by attacking the Earth. Usually their chief weapon was Static. Once in a while, if they were real mad, they called upon their allies, the Elements. Lightning was chief of these, and being a High Potential in his own right, the Martians respected and feared him.

Much-O-Far-Ad had one great failing: he was a nut on treasure seeking. Knowing this, Lightning (who was an exceedingly shocking fellow) in order to further his own ends, told His Great Capacity of the wealth in the Earth below. Despite the pleas of the Lord High Tension, an edict was flashed forth (at a moderate speed so that the lowliest Micro might copy) ordering the Martians to conserve their energy for a great attack upon the Earth. Thereafter, only desultory Static attacks were in order. With the broadcasts from the Earth constantly recurring, it was but a short while before the Martians, every one

a condenser, should become charged to the fighting point.

Finally they were ready and with *one mighty flash* they electrocuted their hereditary enemies, the people of the Earth.

But, alas! In the excitement of the onslaught they had forgotten the treasures of the Earth; when the attack was over they discovered that Lightning had nabbed most of the valuable stuff.

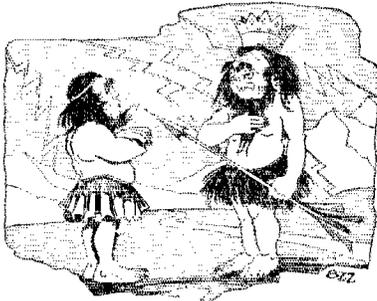


"One flash electrocuted the people of the Earth."

This state of affairs did not lessen Much-O-Far-Ad's desire to accumulate wealth, he now ordered all Martians to make every effort to capture all treasure possible, whenever Lightning was not in action.

This was harder than it sounded, for Lightning was a very swift fellow and very powerful; whenever he caught a Martian, especially one of low capacity, that one did not return. Even when they returned the results were not always satisfactory. A pair of raiders would return and deposit their swag before Much-O-Far-Ad.

"A Microphone", he would chortle, pawing it like an Earthly miser, "mute, yet eloquent." But when he discovered that



"Gave Am-Pere-X-Om an awful Bawling Out."

the diaphragm was foney, his eyes would flash at wicked speed and the poor Micro who had erred would be subjected to a charge that would break down his insulation.

And again—"Knavel! How dare you bring me a refilled tube?"

And the aristocrat of condensers would be stripped of his tinfoil coat, or his glass back would be broken.

All this inculcated into the hearts of the Quadruple-O class of Micros a steadily growing hatred of their king and it must be admitted that Much-O-Far-Ad was daily growing more irascible—intolerant.

The Lord High Tension was sore at Lightning for creating this state of affairs. It got his goat. While sympathizing with the people, Am-Pere-X-Om still loved his king and sought a way of restoring him to his real, true self. It was up to him as the second most powerful factor.

Am-Pere-X-Om was a great historian. His deepest study had been of the race called "Hams". These "Hams" had been largely responsible for some of the first attacks against the Martians. Am-Pere-X-Om was interested mostly in the manner in which these "Hams" had maintained order within their ranks. Besieged on the one side by a belligerent public, and on the other by an exacting government, they were in danger, these "Hams", of an internal explosion, the indiscreet acts of a minority of their tribesmen.

So Am-Pere-X-Om went A.W.O.L. He stayed away about a century, and the longer he stayed the weaker became Much-

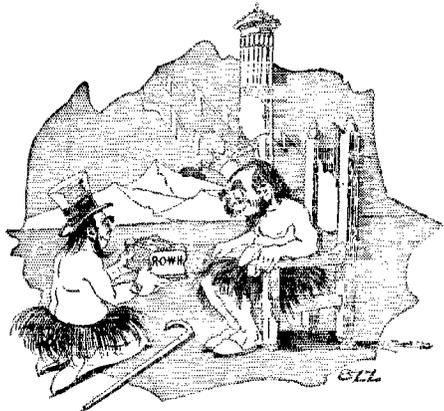
O-Far-Ad's support. His Great Capacity knew well the power of his Lord High Tension. He flashed a QST at regular intervals until his blinkers became tired. Am-Pere-X-Om gave no QSL.

During this time Lightning had gotten the upper hand. Only a few Farads remained loyal to His Great Capacity. But, when the throne of Much-O-Far-Ad was tottering, when the Martian dynasty was about to take the dead air, Am-Pere-X-Om returned.

Although he was glad to see his side-kicker, Much-O-Far-Ad had to keep up a front. His Great Capacity gave Am-Pere-X-Om an awful bawling out.

"How do you get that way?," His Great Capacity blinked. "Want me to lose my job?"

Now, whenever a Martian played hookey from court, he had to make good by bringing a gift to the king. Naturally Am-Pere-X-Om was wise to this ruling. Obviously his gift was a valuable one, the way he handled it. He had it all done up in a case lined with regulations. Upon the case, in copper letters, were the initials: R.O.W.H. Am-Pere-X-Om, with the dignity of a great Potential, raised the strange object on high. A strange calm descended upon the assemblage. The Elements, who had begun their rumbling without the gates,



"Obviously his gift was a valuable one."

were suddenly stilled. Lightning made a grand get-a-way, and all those recalcitrant Micros and Units came scampering back to the fold, becoming orderly immediately they entered the gates.

Much-O-Far-Ad was no longer an oppressor. Again he was the wise, gentle ruler of the Martians.

"Sire," began Am-Pere-X-Om, putting plenty of juice behind his flashes so that all might read, "I bring not only a rare gift, but one that is sacred."

His even spacing, a marked attribute, made reception easy.

"Many have been the weapons of offense and defense through all the ages. But none, Sire, could hold a candle to this. This, Sire and comrades, is a Wouff-Hong!"

A rousing cheer crashed forth. Every eye flashed as it had never flashed before. Sixteen million miles away, Lightning covered behind his ally, Thunder.

"The Moro had his boomerang, the Dyak his spear, the Malay his kris, and the Ham his Wouff-Hong!"

Another rousing cheer. Four hundred million miles away Lightning petered out.

"Not for a sinister motive was the Wouff-Hong contrived. It scorned the razor, the dagger, the hatchet of the Tong man! Rather, it likened itself to the baton of a policeman, or, better, that of the conductor of a symphony orchestra. Often-times it disguised itself as a shillalah, not for the purpose of becoming a cudgel, but to act as a gentle persuader.

"Therefore, Sire and comrades, it is fitting that we adopt the tactics of our ancient enemies, the Hams, and, emulating their example, become members of the Royal Order of the Wouff-Hong!"

R. F. Properties of Insulating Materials

By J. L. Preston, Physicist, and E. L. Hall, Associate
Electrical Engineer, Bureau of Standards

DURING the period from 1918 to 1922 the Bureau of Standards made measurements of phase difference (power loss) and dielectric constant at radio frequencies¹ upon a large number of miscellaneous electrical insulating materials² to answer questions of interest in some radio construction work. The results of these measurements are probably of interest to many persons and in some cases may suggest materials suitable for insulation at radio frequencies. These data are offered as results of measurements on particular samples or groups of samples and not data representative of a class.

The materials considered in this paper are: asbestos filled material, celluloid films, cellulose nitrate, khotinski cement, vulcanized fiber, glass, marble, mica, paper, pulpboard, slate, varnish, wax, and wood. (Regarding phenolic materials and hard rubber, see footnote³.) Most of the data are given in the main table, Table 2. In some cases it seems necessary to give a more complete description of the history or treatment of the samples, and to give fuller data than can be given in the main table.

Asbestos with Hydraulic Cement Binder.
—This was the usual gray-white board not

ordinarily used as a radio insulator. It was first tested as found in the laboratory, then heated to redness for about 15 minutes and retested after it had cooled to room temperature. The sample was then allowed to stand in the room for 5 days and retested. The results are shown in Table 2.

Cellulose Nitrate.—This sample was a laboratory product and similar to the cellulose nitrate used in collodion and celluloid. The solid was dissolved in amylacetate and a sheet sample built up by applying several coats of the dissolved cellulose nitrate. The results are shown in Table 2.

Marble.—Ten samples of marble were tested, all of which had been cut to about 25 cm. by 31 cm. by 1 cm. (10 x 12 x $\frac{3}{8}$ in.), and polished on one side. Table 2 gives the summary.

It is interesting to note in connection with these data that (1) the phase difference of the white samples is comparatively low, (2) the addition of the black coloring in the gray marble increases the average phase difference of the gray samples about 650 per cent. above the average for all the white marble samples, and (3) the addition of the blue coloring matter increases the average phase difference of the blue marble about 90 per cent. above the average phase difference for all the white marble samples.

Wood.—Several samples of wood were selected at random from our carpenter shop supply room. In most cases three 25 x 31 cm. samples were cut from the same board of each type. These samples were then planed down to about 0.6 cm. thick. In addition to making radio-frequency measurements on the wood as received and after drying, the samples were also boiled in

(¹) A method of measurement is given in Bureau of Standards Scientific Papers No. 471, "Methods of measurement of properties of electrical insulating materials," obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., price 15 cents.

(²) Data on laminated phenolic materials are given in Bureau of Standards Technologic Paper No. 216, "Properties of electrical insulating materials of the laminated phenol-methylene type," obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., price 30 cents.

³Published by permission of the Director of the Bureau of Standards of the U. S. Department of Commerce.

ceresin and paraffin wax and again measured. In every case the wax used was from the same supply as that reported under "Wax" in Table 2. The data are given in Table 1.

From the data it is interesting to observe that most of the woods, when dry, are fairly good radio-frequency insulating materials. It can not be definitely stated that the baking of the several samples reduced the moisture content to a minimum or that the moisture in the several samples was reduced uniformly, since the samples

Table 1. Radio-Frequency Properties of Various Woods, Treated and Untreated.

| Kind of Wood | Notes | Average Radio-Frequency | |
|---------------------|--|---------------------------------------|-----------------------|
| | | Phase Difference Degrees ψ° | Dielectric Constant K |
| Basswood | As received | 4.5 | 3.0 |
| | After baking 48 hrs. at about 70°C | 1.1 | 2.0 |
| | Baked 48 hrs. at about 70°C and then in ceresin 4 hrs. | 0.9 | 2.6 |
| | Baked 48 hrs. at about 70°C and then boiled in paraffin 4 hrs. | 1.0 | 2.2 |
| Baywood, California | As received | 2.1 | 3.9 |
| | Baked, as above | 1.4 | 2.4 |
| | Baked and boiled in ceresin as above | 1.4 | 2.5 |
| | Baked and boiled in paraffin as above | 1.5 | 2.5 |
| Cypress | As received | 10.0 | 3.8 |
| | Baked, as above | 1.2 | 2.0 |
| | Baked and boiled in ceresin as above | 1.5 | 2.2 |
| | Baked and boiled in paraffin as above | 1.1 | 2.0 |
| Fir, Oregon | As received | 2.0 | 3.1 |
| | Baked, as above | 1.4 | 2.2 |
| | Baked and boiled in ceresin as above | 1.4 | 2.2 |
| | Baked and boiled in paraffin as above | 1.3 | 2.0 |
| Maple, Hard | As received | 2.2 | 4.8 |
| | Baked 24 hrs. at about 80°C | 1.4 | 2.6 |
| | Baked 46 hrs. at about 80°C | 1.4 | 2.6 |
| | Baked 46 hrs. at about 80°C and then boiled in paraffin for 3 hrs. | 1.7 | 3.0 |
| Oak, White | As received | 8.8 | 6.8 |
| | Baked 24 hrs. at about 80°C | 1.8 | 3.1 |
| | Baked 48 hrs. at about 80°C | 1.7 | 3.1 |
| | Boiled in wax (samples too badly warped to test) | | |

were of different density and structure. Even though the woods may not have been completely seasoned and dried the phase differences are quite small. This charac-

Table 2. Radio-Frequency Phase Difference and Dielectric Constant at One or More Frequencies between 80 and 1875 Kilocycles per Second.

| Material | Notes | Average Radio-Frequency | |
|---------------------------------------|------------------------------|---------------------------------------|-----------------------|
| | | Phase Difference Degrees ψ° | Dielectric Constant K |
| 1 | 2 | 3 | 4 |
| Asbestos with hydraulic cement binder | As received | 42 | 16 |
| | After heating to redness | 4 | 4.8 |
| | After standing 5 days | 19 | 8.5 |
| Asbestos with phenolic binder | As received | 22 | 13 |
| Asbestos with black binder | Switch base | 18 | .. |
| Celluloid | Photographic film | 2.4 | 6.7 |
| Cellulose nitrate | Laboratory product | 1.6 | 3.8 |
| Cement | Medium hard | 2.1 | 3.9 |
| Khotinski Fibre | Black—0.34 cm. thick | 2.6 | 7.6 |
| Fibre | Red—dried | 2.8 | 4.8 |
| Fibre | Natural—impregnated with oil | 2.1 | 5.8 |
| Glass heat-resisting | Baking dishes | 0.35 | 5.7 |
| Glass, photographic | With gelatin coating | 0.57 | 7.5 |
| | Without gelatin coating | 0.49 | 7.5 |
| Glass plate | American | 0.53 | 7.6 |
| Glass, window | | 0.5 | 8.0 |
| Marble, White | | 0.3 | 9.3 |
| | Gray | 2.4 | 11.6 |
| | Blue | 0.7 | 9.4 |
| Mica, clear | | 0.04 | 6.4 |
| India | | | |
| Mica, built-up | Shellac binder | 1.0 | 5.6 |
| Paper, blotting | With synthetic wax | 1.3 | 4.8 |
| Pulp-board | As received | 1.3 | 2.4 |
| Slate, electrical | Natural | 36 | 30. |
| Varnish, spar | Laboratory product | 1.8 | 5.5 |
| Varnish, insulating | Commercial | 3.0 | 4.8 |
| Wax, | | | |
| Beeswax | Unrefined | 0.93 | 3.2 |
| Ceresin | | 0.02 | 2.5 |
| Condenser | Compounded | 0.28 | 2.3 |
| Paraffin | | 0.01 | 2.6 |
| Synthetic | Yellow | 0.17 | 5.4 |
| Wood, | | | |
| Basswood | Quite dry | 1.1 | 2.0 |
| Baywood | Quite dry | 1.4 | 2.4 |
| Cypress | Quite dry | 1.2 | 2.0 |
| Fir | Quite dry | 2.0 | 3.1 |
| Maple | Quite dry | 1.4 | 2.6 |
| Oak | Quite dry | 1.7 | 3.1 |
| Marble, White | | .32 | 9.3 |
| | Gray | 2.4 | 11.6 |
| | Blue | .59 | 9.5 |

teristic makes it possible, in some cases, to use properly dried and treated wood as a radio-frequency insulator where the mechanical requirements will permit.

Acknowledgment.—Credit is due Miss H. H. Smith for assistance in the radio-frequency measurements reported in this paper.

Conclusions.—Owing to the wide variety of materials dealt with in this paper, only general conclusions can be drawn. For the samples selected and under the conditions in which they were tested the following general statements can be made:

1. The following materials had a radio-frequency phase difference of less than 1 degree: glass, white and blue marble, mica, and the several waxes.

2. The following materials had a radio-frequency phase difference of from 1 to 4 degrees: celluloid film, cellulose nitrate, khotinski cement, fibre (thin and dry), gray marble, built-up mica, varnish (spar and insulating), and dry wood.

3. The following materials had a radio-frequency phase difference of above 10 degrees; asbestos filled materials and slate.

Keeping the Filament in One Piece

By B. H. Woodruff, 5XAC-5UE

THERE are two ways to burn out tubes, on purpose and accidentally. Most transmitting tubes are burnt out on purpose.

Every one of us knows that when we step over the limits set by the maker of the tube we are rapidly shortening the life of the tube. As has frequently been stated in these pages a 3% overload will cut the life of the tube down 30%. No one seems to pay any attention to this.

At this station from three to five 50-watt tubes have been in use for six months and not one has burnt out although most of the work was done on phone, which necessitates continuous load on the tubes.

How do we do this? Well, in the first place, when we set up a new circuit we do not put tubes into it but test the circuit by putting in a base of an old burnt-out tube into which has been put a small lamp of suitable voltage. If a misconnection has been made the lamp will burn out when the juice is turned on, but a \$30.00 tube has been saved.

This is hardly necessary, however, if one uses a reliable filament voltmeter. Jewell makes a very satisfactory one with different ranges, selling for \$7.50, which is about the cheapest thing we have in the place because it saves us money. Ours has a scale range of 0-15 volts, A.C. As was suggested in *QST* recently a red line was made on the meter at 9.5 volts and we never let the hand go by that line. That gives us a margin of .5 volts and the tubes are always run 5% below normal. Quite often (in fact most of the time) the hand is kept at 9 which is a 10% underload.

What we have been trying to say all this time is, *run your tubes under the normal rating if you want them to last.*

Not only do the tubes last but the output is steadier, the signal is easier to read, the efficiency is higher. That wobbly half

ampere which you gain by running the filament up a volt is the most expensive half ampere you have, and it will help very, very little.

A Good Filament Transformer

Now to get that nicely regulated current to make the bottles glow.

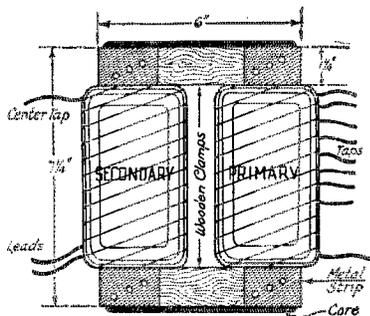


Fig. 1. Top view of the transformer, showing position of the windings. The white circles are nailheads. The core is clamped between the wooden strips which are squeezed together in a vice while metal straps (copper or tin) are nailed to one wooden clamp-strips, bent over and nailed to the opposite wooden clamp-strip, using short nails to keep from hitting the core. This can be seen better in Fig. 2.

Our old Packard half-kilowatt spark transformer was first taken apart, which gave us a good core 6" by 7½" (outside measurement) while the laminations are 1¼" wide and stacked up 2" high. If we had not had the Packard we would have cut the laminations out of an old transformer core gotten from the electric light company. Ordinary sheet iron can be used but is not nearly as good. A tin shop will cut those laminations for you so they will stay flat, and have square ends, a thing which you cannot do.

We put on a primary of 270 turns of No. 14 D.C.C. magnet wire, tapping at 200, 210, 220, 230, 240, 250, 260, and 270 turns. These taps were run to a switch, an ordinary rotary affair. Every other contact point

is left dead to prevent shorting ten turns each time the switch is moved. With this switch we can get anywhere from 9 to 10 volts at the secondary when we are using anything from 1 to 5 tubes, that is to say a load of 6.5 to 32.5 amperes.

For a maximum of five 50-watt tubes a secondary current of 32.5 amperes had to be allowed for. This current called for No. 5 wire or its equivalent. We had a few feet of heavy copper wire about $\frac{1}{4}$ inch in diameter. We wound on 25 turns for a secondary, taking the center tap off in the electrical center, which is not half way along the wire. To find this point take a guess at say the thirteenth turn and try the A.C. voltmeter from the center tap to each end of the secondary. If the reading is the same on both halves of course the first guess was right. If not, guess again.

The outfit has been run for four hours at a stretch and never gets more than comfortably warm. It was made six months ago and the thing is still working perfectly.

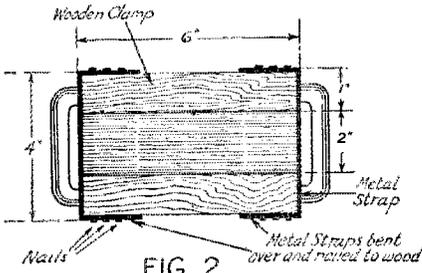


Fig. 2. Side view of the transformer, showing the metal straps that hold the wooden clamps together. Another way of doing this is to use longer wooden clamps with their ends pulled together by carriage bolts or machine screws. The taps from windings are omitted for clearness.

Rectifiers and Filters

IN the past few years I have spent much time on the ever present problem of getting pure D.C. out of R.A.C. Several times I had my tone smoothed out, only to find that in a few weeks it would be all "shot". Now that I am getting good D.C. regularly I want to pass it along to the rest of the gang.

In building a rectifier some authorities say that there should be one jar for every 50 volts, some say one for every 40 volts and I have even heard of one saying one for 30 volts. I am going to go one better.

borax creeping around the sides of the jars. Mine used to be that way too but no more. When making up the solution the average person is afraid that he will not get in enough borax for the amount of

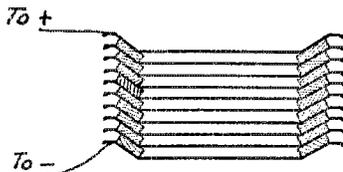


FIG. 1

For best results there should be less than 30 volts to each jar. For a 1200 volt transformer I am using 52 jars.

This is one of the reasons why my tone stays D.C.

Almost every station that I have looked at has a bunch of jars sitting around with

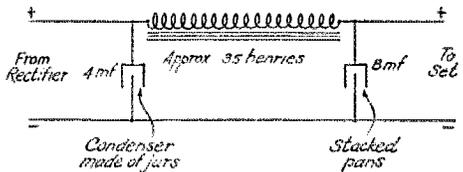


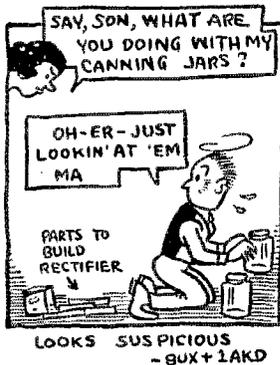
FIG. 2

water used. Make your solution in cold water, allow the borax to settle and then pour off the solution. If oil is now added there will be no creeping.

Now comes the filter. The filter used at my station is different from most filters and can be built with practically no pocket book at all. That has been my condition and is the reason I have used this type of filter.

The chokes will not be discussed as there have been several good articles in *QST* about them. The condensers are all electrolytic. One was described on page 47, August *QST*. I will give some practical

improvements on it. Fig. 1 shows how it is built. Ten aluminum pie tins costing ten cents each, several strips of glass about $\frac{1}{4}$ inch wide and long enough to reach the bottom of the pan, a borax solution and a small amount of oil is used. This condenser costs about \$1.25 and has a capacity of 8 μ f.



In stacking the pans, put twelve pieces of glass around the sides of the bottom pan, then set the next pan on top and place eleven pieces of glass around the sides. The next pan has ten pieces and so on until the last three pans which need only about four pieces each. More pieces of glass are put at the bottom in order to prevent the glass strips in the bottom pans from breaking under the weight of the solution in the top pans.

The solution is made like a rectifier solution. The top pan does not need any solu-

tion in it, but a weight of some kind should be used to keep the pan from floating. The pans should be filled starting at the top and working down. If this is reversed the bottom pans will flood over as the weight above increases. A hydrometer that has not been used on a battery is good for filling the pans. After it is filled put the condenser on the line using the lowest voltage possible. Watch the transformer for heating as the condenser draws a very heavy load before it is completely formed. Never reverse the leads as this means forming the condenser over. It is best to use the condenser on low power for the first few weeks and after that it will easily stand 1500 volts. There is no danger of this type of condenser blowing. When placed on too high a voltage it just draws a heavier load. The main thing is to be patient and you will be rewarded with a high voltage condenser that has a large capacity and very low cost. The other condenser that is used is made with jars like a rectifier except that the elements are both aluminum. Three jars should be used in series for every 500 volts. Use the same size aluminum as you used in your rectifier. This condenser does not take the amount of forming that the big one does—an hour's use will have it working fine. The capacity is from 2 to 4 μ f.

I have told several of the hams around Portland about them and about 50% of the hams here are now using them with fine results. A small amount of oil should be placed on top of the solution after the condensers are formed.

Figure 2 shows my filter circuit. I will be glad to answer any questions about these condensers.

Showing Up Missouri Troubles

By E. C. Brownlee, 9BSF

IN Brookfield, Missouri, we had a source of interference that made radio reception impossible. After reading several articles in *QST*, covering the location of such interference, the writer set out with several other amateurs to see if we could not locate and cure our trouble.

This disturbance was in the form of a loud sharp buzz, similar to the discharge of the 5-inch spark coils that we used back in the old days of spark gaps and crystal detectors. The noise was all over the dials of most of the sets here and had several harmonics. Brookfield is a distributing point for several small towns located from 12 to 60 miles from the local generating plant. The plant proper is located in the northwest part of the town and the high tension lines go south and then at a point

south of the town, separate and go both to the East and West. The generators supply current at 2200 volts which is stepped up to 13,200 volts by the line transformer.

We began with a radio receiving set furnished by the local dealer who is also the operator at 9ADJ. The set was a Radiola super-heterodyne and it was equipped with a loop so that bearings could be taken. This set was placed in the rear seat of a car and a start was made.

The first trial was made in the south part of the town. The loop, when set for the greatest strength of the interfering noise, pointed to the northwest, or to the direction of the main plant which was also the direction of the high tension line that runs south and east from the plant. The next stop was made where the line crosses

the main street of the town and here the loop pointed due west, which was the direction from which the line ran. This line was followed west until it turned north to the plant and no difference at all could be heard in the loudness of the noise.

It was now suggested that we get away from this line as there was a possibility of the line carrying the interference along. If this happened the signal would be nearly equal all along the line and would prevent locating the true direction of the noise. (It will be remembered that Mr. Briggs had a similar experience in "Cornering that Buzzing Interference" in Hartford, Connecticut.—Tech. Ed.)

A trip was made into the north part of the town and another stop was made. This test showed the loudest trouble to be in the direction of the plant itself. The next stop was made due east of the plant about four blocks from it. The loop pointed due west or toward the plant. The car was then turned west and driven slowly toward the generating station, direction being taken at intervals. The noise became very loud half a block from the station and the directional effect disappeared almost completely, but seemed to favor a tower about 50 feet south of the station. This tower contained several high tension transformers and lightning arrestors. It was the start proper of the high tension line leaving the station.

The engineer in charge of the plant stated that one of the lines leading west for five miles and then north for 50 or 60

miles had a ground on it somewhere. This ground caused surging in this particular line. The surge peaks discharged to ground in the form of a stream of sparks in the lightning arrestor and this caused the interference we were hunting.

It might be stated here that the trouble had been much worse after a very heavy rainstorm some three days before our tests were made. By the time our test were made the ground was drying out somewhat and the "spill over" was getting somewhat irregular. The local manager of the plant was called and removed the arrestor from the line. The trouble then ceased, but the next day another rain fell and the company was forced to put the arrestor back on the line to take care of the surges.

And now for the real trouble. The night following the last rain a transformer bushing about 60 miles from the plant burned out. The surging then ceased and the arrestor became quiet. We have not had any trouble since.

It is the intention of the local gang of amateurs to drive over part of this high tension line and to assist as far as possible in locating cracked insulators, bad transformer bushings and other troubles which will cause noises, either at their location or at the arrestors in the generating station.

The writer will be glad to hear from anyone interested in similar problems, also to get any information on similar causes of trouble.

Experimenters Section Report

20 Meter Tests Put Daylight Signals Across America

THE 20 meter tests were a complete success! Amateur signals went across America in daylight, and were copied on the other side. The credit must go to a few men, the rest mainly wandered all over the clock, sent on the wrong waves, turned in undated logs and generally made a mess of things.

The Night-Time 20 Meter Tests

The night tests can be described in one sentence—nothing was heard at any distance over 100 miles. This had been predicted by 4XE, 1XAM and 8XC, therefore we were not surprised. However we wanted to make sure that the same thing would happen everywhere and it did. The *only* work done was between 3APV and 3ZW—3 miles apart or so.

The Daylight Tests

Those of us who have been working with NKF at short waves were sure that the daylight test would be a success—but when we began to hear all the wild wavelengths and crazy off-schedule sending we lost confidence. We need not have done it for the results were beyond expectation. The best proof of this is to give the lists of calls heard in the daylight test of December 21.

9ALF, Joliet, Illinois, cloudy, 10° above 0: On test 8CTC, 9CFI, 3APV, 8CTK. On harmonics, 9AJU, 8ARB, 8CQL.

8XC-8GU, Erie, Pa: 9AXX, 9APE, 9DFH, 1XAM, 9ZT, 9BQJ, 9LA, 1BAL, 9CFI. Worked 9AXX on 18 meters. Worked 9CFI on 19.5 meters.

8AHH, Akron, Ohio: 9APE, 9DFH, 9AXX (last station's wave unsteady).

9DFH, Fowler, Colorado: 8XC (QSA),

6AAJF, 3XO, 1XAM, 9EK, 9ZT (last station unsteady).

SXI, Wooster, Ohio: 9CFI, 5CK, 1CRE, 6AJF, Berkley, California. (Western end of the transcon record): 9AV, 1XAM, 9EK, 9AXX.

1CCX: Canadian 9AV (35 meters), 1IV (30 meters), 2AG (30 M).

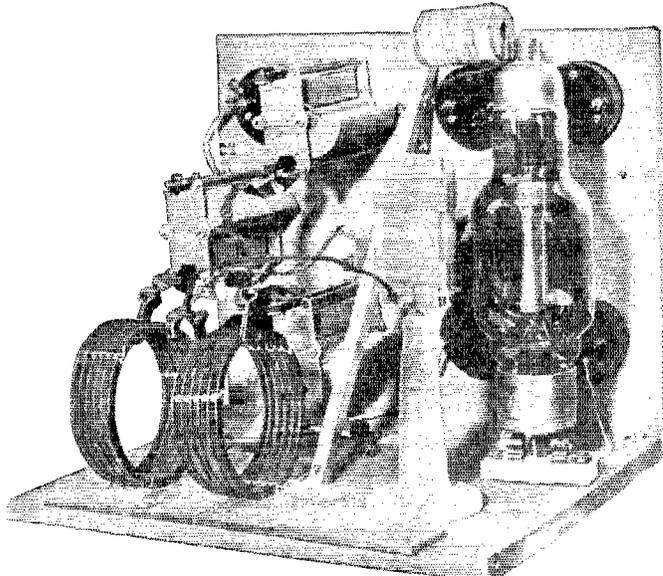
8XC (29 M). These heard on harmonics probably. The following were heard on schedule test: 3BPP (22¼ meters), 3XO (20¼ M).

8XC (on test), 8CJP, 8CAZ, 8KC, 5BB, 4TW, 3SH, 2AX, 2WZ, 2CWN, 1AEA, 1CCX (on test).

9EK, Burgess Battery Co, Madison, Wisc: 1XAM (worked), 9AXX, 3XO-3PZ.

The Daylight Record

At 3.25 P. M., Central Standard Time, 9EK called 1XAM. They had been hearing each other for some time and suspected that they could work together easily. This was correct. They talked until 4.30 P. M. when the signals suddenly dropped out. As



THE BIG SENDING SET AT 1XAM

This set can be worked with an input of a kilowatt at waves as low as 12 meters but also was able to work 9EK at 20 meters with only 16 watts. At the right is the special UV-204 tube which has extra heavy grid-leads to stand the large R.F. currents. At the top of the tube is the plate choke, just to the left of the tube is the plate condenser. Four variable condensers can be seen on the panel. These are used in the circuit shown in Fig. 1B. The two helices are insulated with glass beads put between the turns of strip and secured by string run thru them and around the copper strip. Other insulation burns up.

The antenna for this set is a single wire, 65 feet long and 50 feet high. The c.p. is also a single wire—50 feet long.

2SP Sao Paulo, Brazil: 8BF.

1XAM, South Manchester, Conn.: Worked 9AXX and 9EK—no report of calls heard.

1CRU, Searsport, Maine: 8XC, 9APE on schedule. 9EGH, SDAE, 9DBM, off schedule.

Frank Hicks, Springfield, Missouri: (This log not thoroughly understood but most calls apparently logged on harmonics, showing that they were getting through at a time when main wave cannot be heard.) 9AV, 9CPU, 9CFI, 9BHY, 9EGH, 9BHB, 9DJU, 9CLX, 9CAU, 9BOF, 9AXX (on test), 9DVU, 9CP, 9CET, 9DIX, 8DPK,

usual with 20 meters—darkness had killed communication.

Neither Hoffman nor Reinartz suspected that they were making a record, but they were doing just that thing with the aid of Frank C. Jones of 6AJF, who COPIED THE WHOLE THING FROM START TO FINISH.

There's *real* daylight work; one can't possibly dodge it. The logs of the three stations check *exactly*; there isn't a doubt about the performance.

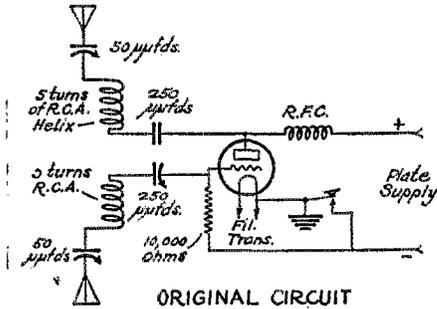
Just to show that the 9EK-1XAM communication was not an accident they did it

again a few days later, cutting down power until 9EK was using $8\frac{1}{2}$ watts input and 1XAM was using 16 watts input. Then they handled this message—

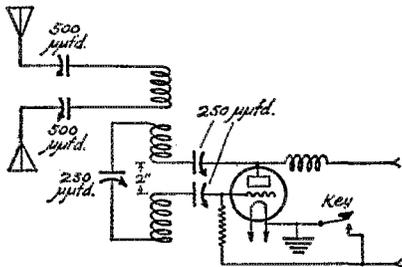
NO. 73 FROM 9EK, MADISON WISCONSIN TO S. KRUSE, EXPERIMENTERS SECTION, HARTFORD.

THIS MSG. TO YOU ON 21 METERS CONFIRMS OUR LAST SUNDAY'S DAYLIGHT WORK. PUTTING THRU SIGNALS TODAY WITH $8\frac{1}{2}$ WATTS INPUT.

HOFFMAN



ORIGINAL CIRCUIT



Inductively coupled circuit giving same results

FIG. 1 CIRCUITS AT 1XAM

Other Good Work

9DFH at Fowler, Colorado, worked directly with 9AXX at St. Paul, although we have no report from 9AXX. 8XC at Erie, Pa., worked both 9AXX and 9CFI of Ottawa, Kansas—who also didn't report.

It Wasn't Circuits

The sending stations that seem to have had the best success were 9EK, 1XAM, 6AJF, 9CFI, 8XC, 9AXX, 3XO-3PZ and 8CTK. It is interesting to see what a very large difference there was in the sending sets used.

9EK used a 50-watt tube which drew 100 milliamperes from a 500-volt battery of Burgess "B" dry cells. The circuit was a loose-coupled Colpitts and the antenna system was vertical and 24' high, the antenna being a vertical 12' cage and the counterpoise another vertical 12' cage pointing down.

1XAM used a special UV-204 tube with raw A. C. supply and a peculiar form of capacity-coupled circuit that will be shown in a figure with this article—provided we can get it through soon enough for this issue.

3XO-3PZ used a vertical antenna system 26' high. This system consisted of a single wire and had a one-turn coupling coil at the center. No series condenser was used.

8CTK used a large antenna working at the 9th harmonic.

6AJF used a vertical antenna with a fundamental of 29 meters. This was cut down with a series condenser and an ordinary loose-coupled set used to put about $\frac{1}{2}$ ampere into the system. The tube was a 203.

3APV used almost the same thing as 6AJF.

According to this we might as well stop where we are not wasting any time in asking "what's the best circuit for 20 meters?" The answer is the same as always—modify some standard circuit and you will be able to make it work at 20 meters—or 5 meters.

The Tuners

The most successful tuner of the test seems to have been the same old "three-circuit" that we all know so well. The one used at Springfield, Mo., by Frank Hicks will do very well as a sample. It used a 3-turn fixed primary, 4-turn tickler and 5-turn secondary. The secondary tuning condenser had a capacity of 125 microfarads and was built with 7 plates. The detector was a single UV-199, no amplifier being used.

The Sending Set at 1XAM

Just to prove that it isn't freak circuits that made the thing get over we wish to show the sending set used by Reinartz at

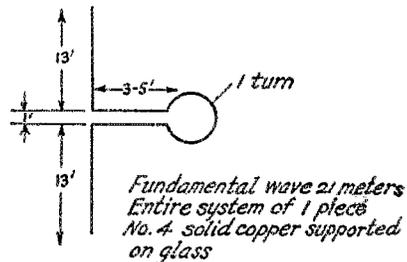


FIG. 2 ANTENNA USED AT 3XO

1XAM. Either this month or next there will be shown a description of the 20 meter sets at 9EK and 3PZ-3XO.

The Reinartz set is based on capacity coupling. The circuit is shown at Fig 1, and a little study will show that the circuit

can be gotten from either the Hartley or ~~Coult's~~ circuit by merely breaking the coil of either of those standard circuits with a condenser and allowing the tube capacities to complete the circuit. The advantage of the particular form used at 1XAM is

down the number of really unhappy customers.

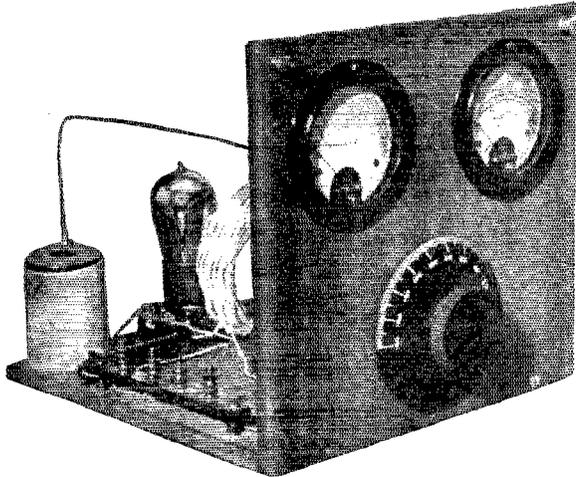
That being the case—why not a bit of co-operation between dealers, set makers and tube makers to get rid of three or four styles of tube bases? At present there is the Standard 4-prong, the under-sized UV-199 variety, the Myers double-ender and the almost-French WD-11 base.

What's the idea? Why handicap the good little UV-199 with a freak base so that an uncertain adapter must be used or else the set built so that it is good for nothing but UV-199 tubes? Or why build an excellent set like the Regenerflex and then limit it to the WD-11 tube when the same firm makes the WD-12 which has a standard base?

Personally the writer does not think much of the Standard base—but *any* standard is better than a lot of varieties that will not interchange. Oh yes—this is partly a personal growl, but there is plenty of feeling along this line, and it isn't just due to the sacred American privilege of kicking.

Why not follow the lead of the Government departments, hold a conference and agree to use

one variety of base—that will replace ALL of the present kinds?



THE SMALL SENDING SET AT 1XAM

This set is just the baby brother of the big one. It is used with a vertical antenna system that consists of two 16 foot pieces of copper tubing, one pointed up and the other down.

that the condensers used in the circuit do not add to the tube capacities but instead act as series condensers. This materially increases the ease of getting down to short waves. In fact it has been found possible to work at 18 meters with 4 UV-204 tubes in parallel, quite a comment on the sort of amateur that "Can't make two tubes work below 200 meters."

The 5 Meter Test

At this writing very little is known about the results of the 5 meter tests—we will report them next month. Meanwhile this section can congratulate itself on a nice piece of work—the indisputable demonstration of the fact that 20 meters can be used for daylight work all over the United States, at a time when other waves are not much good.

A Little Free Advice

SEARS ROEBUCK—or possibly N. W. Ayer—has taught us that a satisfied customer is an excellent source of free advertising. We therefore suspect that an unhappy customer is highly undesirable and that it should be worth some trouble to keep

Official Wavelength Stations

A system of Official Wavelength Stations (O.W.L.S. for short) is being organized by a committee consisting of Dakota Division Manager Don C. Wallace of 9ZT and Dakota Division Director C. M. Jansky, Jr., of 9XI. All appointments are made by this committee and all correspondence on the matter is being handled by them direct—*don't write to anyone at Hartford about it.*

Here is the scheme—

All O.W.L.S. will be chosen for ability to send well, to reach out, and to measure their wavelengths accurately with a really good wavemeter. These stations will *not* send wavelength schedules—they will do something better. Each time one of them sends it will announce the exact wavelength at which it is operating. This will be done at the end of the transmission, the station finishing off by saying

"— u 9XI 81 K"

or

"— u 6BQB 74 K"

These stations will *not* stay on the same wave—but they will always tell you what wave they are using.

The Present Station Network

Stations appointed so far are—
9ZT-9XAX, 9AAL, 8AA, 6BQB, 5MN, NKF,
1XW, 1MK, 1XAM.

Others will be added as rapidly as possible, many of them will be on the air by the time this notice is printed. Look for them on all waves, between 15 and 200 meters.

Notice To Members

THE regular annual meeting of the A.R.R.L. Board of Directors will be held in Hartford on February 6th. Each of these directors is a spokesman from

a territory, charged under the constitution with the duty of representing his constituency. It is thru your director that you have a voice in shaping the course of the League—he is your representative. The name and address of your director will be found on page 6 of this issue. You should take up with him at once any suggestions for A.R.R.L. betterment.

It Was a Premier Socket

IN the descriptions of the 5 meter Goldberg tuner we stated that a Remler socket was used. Now Remler makes a perfectly good socket but this didn't happen to be one, this particular socket was the very neat one made by the Premier Electric Co. of Chicago. It was the type called "Code 2."

Some Radiophone Experiments

By V. Kemp Roberts, 7ZQ

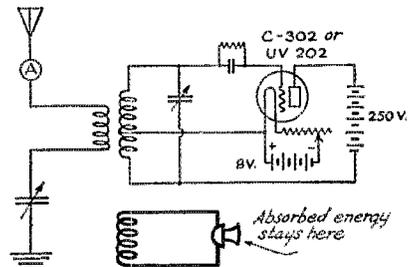
SO much of the amateur's time is given to developing key work that we have done little to develop good phone circuits. A few good hook-ups have been found which should interest fellow experimenters.

Improving the Absorption System

The absorption system of modulation is simple and is very easy to operate with good results. However, it will not handle much power when used in the form shown in Fig. 1. Difficulty is experienced with the microphone burning and sticking if any considerable amount of power is used. To realize the advantages of the absorption system and get away from microphone troubles the circuit shown in Fig. 2 was devised. In this circuit it is not the microphone which absorbs the power but instead it is the plate circuit of a modulator tube. When the microphone is spoken into it varies the amount of absorption in this modulator tube. The efficiency of this system is less than that of the Heising system, partly because the output of the oscillator is modulated (instead of the input as in the Heising system) and partly because any absorption system always modulates downward and never upward. However, the quality is always very good if any care at all is taken. This is in spite of the fact that the modulator tube is modulating a radio frequency and must accordingly rectify as well as absorb.

The absorbing coil A is about 40 turns of No. 18 single cotton covered wire on a three-inch tube, the shunting condenser C-1 having a capacity of 500 $\mu\text{f.}$ (.0005 micro-

farad.) The coil B has 36 turns on a three-inch tube and is tapped in the center, being shunted by a Cardwell 500 $\mu\text{f.}$ (.0005 microfarad) condenser. In practice the circuit performed best when the spacing between coils A and B was about two inches and the condenser C-1 was set to decrease the antenna current about one-quarter. The



Common microphone absorption circuit used with loose-coupled Hartley oscillator. Heavy lines show absorption circuit.

FIG. 1

modulator tube slightly dampens the circuit but no trouble is experienced with its going out of oscillation.

Another experiment was to use a 60-turn coil for A, omitting C-1 and forcing the absorption without tuning by placing coil A inside of coil B.

A Low-Power One-Tube Set

The next thing was to devise a circuit which did not lose all this good power in

absorption and which would still give the good modulation of the absorption circuit. The result is shown in Figure 3.

Using the usual modulation transformer with a ratio of 20 to 1, the perfection of modulation is surprising. The circuit will work without the 60-volt battery, the voice being used to generate all of the plate current, but the speech is then very poor and "drummy" because of missing one-half of each cycle. If the B battery voltage is too high no harm is done.

This phone at four miles operates a loud speaker and sounds as if it could go a hundred.

The coil A has 36 turns of No. 18 single cotton covered wire on a three-inch tube, the winding being tapped at the center.

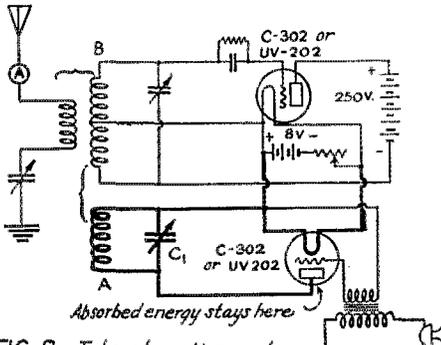


FIG. 2 Tube absorption system used with same oscillator as in Fig. 1 Heavy lines show absorption circuit

The variable condenser is a 500 μ f. (.0005 microfarad) or 250 μ f. (.00025 microfarad) one. If you use the same A and B battery as on your receiving set, be sure

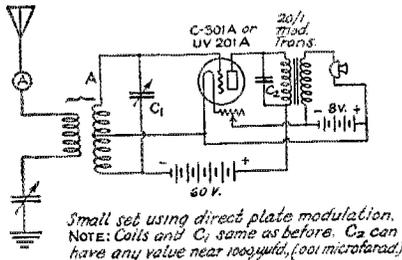


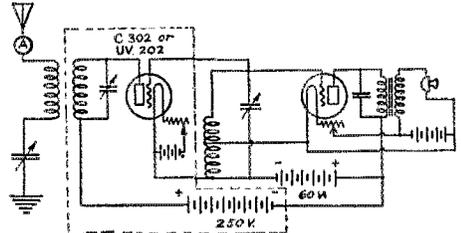
FIG. 3 Small set using direct plate modulation. NOTE: Coils and C1 same as before. C2 can have any value near 1000 μ f. (.001 microfarad)

to put in a switch to disconnect the A and B battery or you will short-circuit the lower half to coil A.

Increasing Power

The circuit just described works so well and gave such pleasant quality that an amplifier was added to increase the output. The resulting circuit is shown in Figure 4

and no detailed description is necessary. Experimentally another stage of amplification was added and was made to work. How-



System of Fig. 3 with an amplifier added Size of coils, etc., can be judged by studying text and previous figures

FIG. 4

ever, only 250 volts were available so one cannot say with certainty whether that idea would be practical in a larger set.

Second District Convention

THE Fifth Annual Amateur Convention and Radio Exposition, of the Second District, Hudson Division of the A.R.R.L. will be held March 2nd to 7th, 1925, as usual at the Hotel Pennsylvania, N. Y. C., under the auspices of the Executive Radio Council, 2nd District, 136 Liberty St., N. Y. C.

The five dollar ticket as usual admits to the Banquet, March 7th, season pass for the Convention, and all other amateur activities except the R. O. W. H. Make your reservations now, by writing to R. T. Morris, Treasurer, Executive Radio Council, 2nd Dist., 136 Liberty St., New York, N. Y.

A Correction

IN our article entitled "Three Cups Offered for Short Wave Work", in January QST, we made an unfortunate error when announcing the donor of the 40-meter cup. He is Mr. J. C. Cooper, Jr., of Jacksonville, Florida, well remembered by old-time A.R.R.L. members. From February, 1917, to September, 1920, Mr. Cooper was Manager of the former East Gulf Division and an A.R.R.L. Director. During the war he served as Lieutenant, U. S. N. R. F., in the office of the Director of Naval Communications, Washington, in charge of the high-power transatlantic service. He is now practicing law in Jacksonville and pounds brass at 4XE.

A Few Kinks on Reception

By Charles E. Blalack, 6GG.

HAVING operated on 110 meters with an "X" license, the 80-meter band offered no difficulty. However, such operating, particularly reception, seems to present some new problems for a considerable number of amateurs who are on low waves for the first time. The experience at this station indicates that the design and flexibility of the receiver has much to do with the cure of the interference problem.

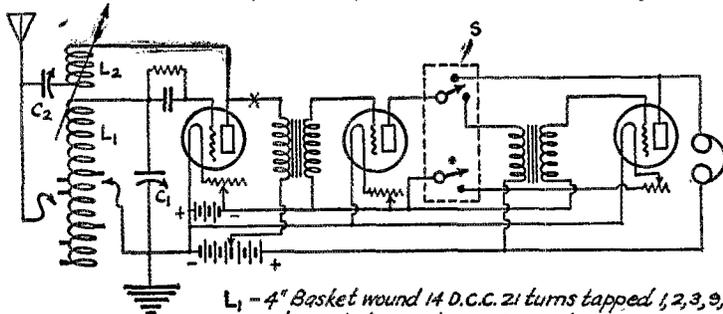
The receiver which I use is shown in the diagram. The circuit is a modified Weagant or Reinartz, whichever you choose to call it. The feature which is somewhat different from the average tuner of this sort is that the tickler is not stationary but movable. This coil has just enough turns to cause oscillation at 200 meters with the plate condenser set at 50 degrees. Since the movable coil is at the *grid* end of the coil L-1 it causes a tuning effect. This has been condemned by amateurs as objectionable but I find this variation of wavelengths to be a very desirable feature, particularly on waves below 80 meters. Sharper tuning can be accomplished by a variation of this coupling than can be had by using the vernier condenser in the grid circuit. This feature enables me, in nearly

station that I could not copy because of QSB.

Unfortunately I have found no kink which will enable me to improve the character of the sending operator's fist. I believe much good can come to amateur radio if we will frankly tell the truth about transmission. I will admit that sometimes I feel a cold blast coming from the "cans" when I inform someone that I can't read his sending. However, though a station usually signs off rather hurriedly after such a criticism, I frequently keep him tuned in and find much improvement when he works the next station.

This set works from 50 to 200 meters. The two variable contacts on the inductance are made by clipping onto projections on the coil and seems to be the most satisfactory method, though not very sightly.

In the dotted enclosure in Fig. 1 is shown a little kink which I find very valuable in going from one to two steps. The drawing is self-explanatory. The switch used is a Carter D.P.D.T. jack-switch, one contact of which is not used. This arrangement has the desirable feature of permitting instant change from one to two steps without throwing the set out of balance, a trouble I have always encountered when



- L₁ - 4" Basket wound 14 D.C.C. 21 turns tapped 1, 2, 3, 9, 10, 11.
- L₂ - 2 1/2" Basket wound 18 D.C.C. 12 turns
- C₁ - 13 plate General Radio Vernier
- C₂ - Ordinary 23 plate
- X - 250 turn Remler-Giblin Choke
- S - Carter jack-switch D.P.D.T.

every instance, to make copy regardless of QRM. Also the swinging of the weaker distant stations can be successfully followed by a slight adjustment of the coupling of this coil.

Two turns in the aerial circuit are the most I can use, and generally one turn is preferable. The signal strength is less with one turn but much QRM and QRN is avoided.

The plate condenser C-2 enables me always to get the best tone quality out of the sending station. I have yet to hear a

using a plug on the phone and plugging out of one jack and into another. Note that the two amplifier tubes use a common rheostat. This is an advantage in that when you switch from one to two steps you do not stand quite as much chance of having your ears split, due to the low filament current when the two tubes are in parallel. To increase the volume you have but to cut out resistance by turning up the rheostat. No doubt this arrangement has been used before but I have never seen it applied.

The Receiving Experimenter



CONDUCTED BY S. KRUSE, TECH. ED.

Concerning Oscillators

The Editor will admit that he cannot share the general agitation about oscillators or superheterodynes. It is a matter of such absolute simplicity to build this portion of the set that it would seem better to worry about some other portion. All one has to do is to stick to the recognized types of oscillators which are used for transmitting work. About the simplest of all is the plain, ordinary Hartley. When this circuit is used with a UV-199 or UV-201A it takes something approaching genius to make the thing stop oscillating. In fact about the only thing that will make it stop is to use outrageously close coupling between it and the rest of the set. If that is avoided it oscillates smoothly and uniformly over whatever tuning range the coil and condenser will give. The exact position of the filament tap is of no special consequence and it is a matter of the greatest simplicity to change the wavelength range by simply putting in a different coil.

A nice example of this type of oscillator is shown in the "Compact Superheterodyne" shown on page of the August issue.

Well we thought there had been enough said about this business of building short wave tuners so that everybody had fallen on to it himself, but in the last week several different fellows have gotten all excited about the grand discovery that you can copy most amateur stations better on the half way than on the main wave. Since all of this is from different districts maybe this is really news. Make yourself a tuner that will go down to 30 or 40 meters and try it.

C. W. on a Loop.

The past summer has shown that some pretty good C.W. receiving can be done with an ordinary loop, a detector with a variometer in the plate and a single step of audio. There is not much to this for phone but it works beautifully for C.W.

It will be recollected that Dunham of 3ZY was doing this in Washington several years ago and told all about it in QST. Wonder why it took so long for the rest of us to recognize a good thing.

Low-Loss Neutrodyne

The authorities we have quizzed seem to agree that one could make a splendid neutrodyne by winding the coils in the fashion of our low loss tuners and putting high-grade rubber insulated condensers across them.

Two of the men we asked have tried this and found it worth while, very fine amplification obtained.

Of course there was a difficulty, the neutralization was pretty critical and had to be done just so to keep the tubes from oscillating. No unusual methods were required however. It may even be possible that one cannot exchange tubes without some readjustment of the neutralizing condenser.

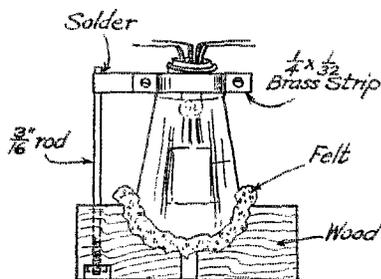
In addition to this the various stages tune quite sharply and stations are harder to find; but the results are beautiful when they are once tuned in.

This reminds us that we have seen some neutrodyne of unknown origin in which it was possible to take out the neutralizing condensers entirely without having the thing oscillate. This simply showed that the transformers and condensers were so bad that the losses prevented oscillation.

"A Socketless Socket"

The diagram explains itself. The idea is to avoid the capacity effects that occur in the ordinary tube bases and sockets.

This has always been of considerable importance in work below 300 meters, but is of particularly big importance on both



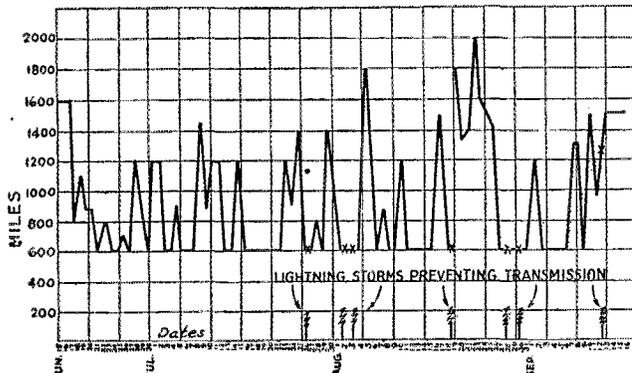
A SOCKETLESS SOCKET

amateur and broadcasting waves below 100 meters.

By the way, why don't American manufacturers make some sort of attempt to reduce tube capacity? We don't think much of the British V-24 on 600 meters, but it certainly does show up very beautifully on low waves.

How Transmission Ranges Vary

The curve shown here represents the ranges of 6KW, operated by Mr. Frank H. Jones of the Tuinucu Sugar Company, Tuinucu, Cuba. The station operates at 332 meters putting 290 milliamperes into the plate circuit of the oscillator at 1050



Graph represents average distance of all letters received on each day of 100 day period

TRANSMISSION RECORD OF "6KW" FOR 100 DAYS DURING SUMMER STATIC SEASON, YEAR 1923

volts. Operation is on voice as a broadcast station and the modulator takes an average additional current of 225 mils. The antenna is an inverted "L" 90 feet high and the normal antenna current is $5\frac{1}{2}$ amperes. A counterpoise is used.

Notice that during the 100 days there was actually transmission on only 93 days, 7 days having been blanked out by lightning storms.

Concerning Pancakes

Mr. John L. Peters of 1CQK calls our attention to the following paragraph in Morecroft's "Principles of Radio Communication" page 148,

"It is interesting to note that the same length of wire will give about the same inductance whether wound into a flat spiral or a single layer solenoid provided that the mean radius of the spiral has the same value as the radius of the solenoid." Translated into our own language this means that thirty feet of wire will give about the same inductance when wound in a single layer on a tube as if they were wound in a flat pancake with the turns touching and the average diameter of the pancake turns equal to the diameter of the tube. Please notice that a flat spiral is *not* the same thing as one of our "spider-web" coils. The "spider-web" will give a slightly lower inductance and a considerably lower distributed capacity.

Sparking Brushes

The following is quoted from a letter of

Mr. H. W. Northover of Toronto, Ontario, Canada. "I reported aboard the Bayfield and tried out the receiver. A beautiful induction hum greeted my ears. She was an old wooden boat and her wiring was in bad repair. Finally I found that by moving the brushes of the man ship generator about one-eighth of an inch all the induction disappeared. It had been so bad before as to shut out VCS who was only five miles away.

"I had lots of fun trying to keep the brushes at this setting for the engineer had the idea firmly fixed in his mind that the generator would burn up or something equally terrible happen if the brush rigging were moved from the position marked by an ancient chisel mark.

"The sparking was all under the brushes and not visible from the outside but was enough to cause an awful racket in the set.

"I have also had the doubtful pleasure of working as a radio engineer with a company which manufactured Violet Ray machines and if you have never tried to listen in while twenty of these infernal machines were working on the test bench in the same building you have no idea what QRM really is."

Unscrambling Things

"Direct Current Resistance of Antennas"

A frequent question is "How is the direct current resistance of an antenna found?" The best answer to this that there is no object in finding it. If we connect a source of direct current to an antenna as shown in Figure 5 the current will flow into the antenna for a very small part of a second and then stop as soon as the antenna is charged to the battery voltage. You cannot measure resistances in a circuit unless a current can be made to flow, so the only hope of finding a direct-current resistance is that something about the antenna insulation will leak and allow a small current to pass. What it comes down to is that you will be measuring simply the leakage resistance of the insulator which is ordinarily well up in the millions of ohms. Most of the leakage usually takes place right at the lead-in. If any attention is paid to insulating the antenna at the ends and the lead-in in accordance with

the past articles of QST, the leakage resistance would be so enormous that it is not worth measuring.

However, if you wish to measure it, the most convenient way of doing it is to

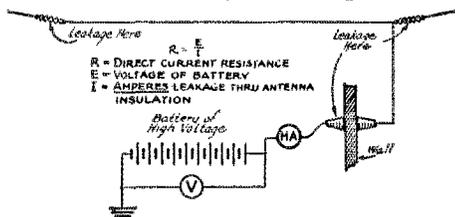
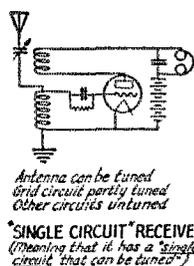


FIG. 5 DIRECT CURRENT RESISTANCE OF AN ANTENNA

borrow a "megger" from the local lighting company. They are almost sure to have one for measuring the resistance to ground (insulation-leakage resistance) of their high voltage lines. If you cannot get such an instrument the scheme of Fig 5 is useful.

"Thermo-Couple Amperes"

Who keeps alive this wild idea that there are several varieties of amperes? We have raved about this before and have insisted that in ordinary practice there is *only one*



"SINGLE CIRCUIT" RECEIVER
(Meaning that it has a *single* circuit, that can be tuned)

FIG. 6

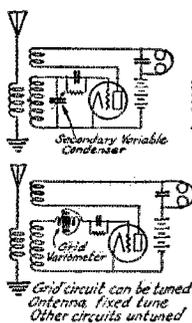


FIG. 7

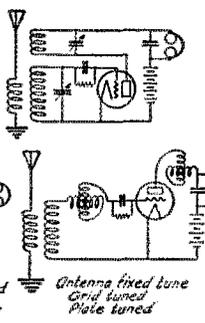
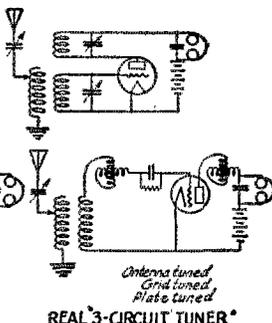


FIG. 8



REAL "3-CIRCUIT" TUNER*

FIG. 9

kind of ampere. Of course in the University Laboratory they know of another thing called an "Abampere" which is equal to 10 ordinary amperes. But that isn't what the radio man means when he begins to use this silly term "Thermo-couple amperes".

There is just one kind of ampere and the size of it does not depend on what you measured it with.

"HWA"

By the same token there is no such animal as a "Hot wire ampere".

Personally we have never been able to see what difference it makes whether your 5 amperes measured by heating a wire or by heating a thermo couple. Isn't the radiation in watts just the same?

The So-Called "Three Circuit" Tuner

The circuit shown in Figure 6 is generally known as a single-circuit tuner. This is only a convenient term meaning "in this tuner there is only a single circuit that is capable of being tuned". Actually there are four circuits:

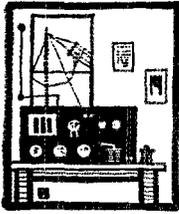
- A. The antenna circuit, which is tuned.
- B. The grid circuit, which is directly coupled to the antenna and is tuned only by reason of the antenna tuning.
- C. The filament circuit, which is untuned.
- D. The plate circuit, which is not tuned.

In the tuner shown in Figure 7 the antenna circuit is not *tunable* but it most decidedly is *tuned*. It might well be called "fixed tuned". The grid circuit is tuned. The plate circuit is not tuned. Thus we have the same number of tunable circuits as before and by the same line of reasoning this also should be a single-circuit tuner. However, this causes confusion and another name would be handy. We cannot correctly say that this is a "tuned circuit" tuner because we are tuning only one circuit. Perhaps it would be best to speak of it simply as a "coupled tuner". That

isn't strictly correct, either, because the difference is that this is loose coupled while the so-called "single circuit" is directly coupled. However, the term is as good a one as one can invent without using too many words.

In the circuits shown in Figure 8, we are actually tuning the plate circuit. We now have two circuits that are tunable and one that is tuned but not adjustable. Perhaps it would be fair to call this thing a "coupled tuner with tuned plate".

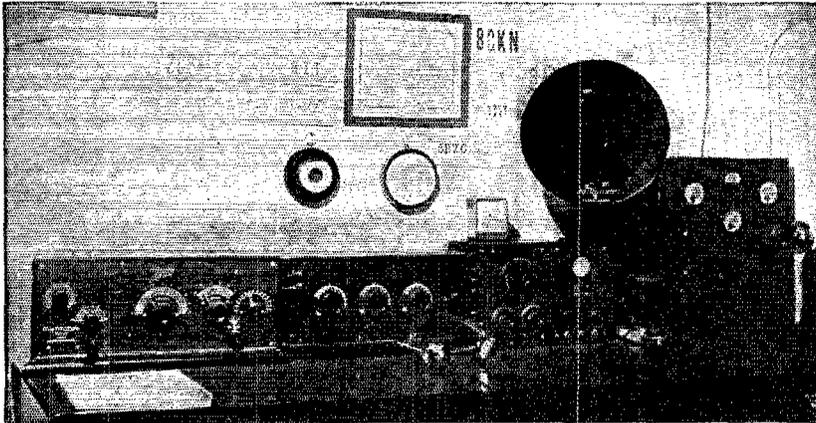
In the circuits of Figure 9, we are actually tuning three circuits, the antenna, the secondary, and the plate. This is therefore a true "three-circuit tuner". However, if we leave the tuning control out of any one of the three circuits we no longer have a true "three circuit tuner."



Amateur Radio Stations



8DGS Cleveland, Ohio



For over a year Don H. Johnston of Euclid Beach Park, Cleveland, Ohio, and his father, Dr. Wm. H. Johnston of Collins, Ohio, have had daily chats by Radiophone.

Both are licensed amateurs and use the calls 8DGS and 8BEI respectively. The distance between the two stations is 70 miles but the noon-day chat has never been missed so far. Other members of the family use the microphone, so letter writing has become a thing of the past.

A log of atmospheric conditions and resultant radio audibility is kept. Along this line it is peculiar to relate that much of the best reception is during rain storms or when the antenna system and counterpoise is wet.

These two Radiophone stations are well known to broadcast listeners and much emergency work has been accomplished when the regular channels of communica-

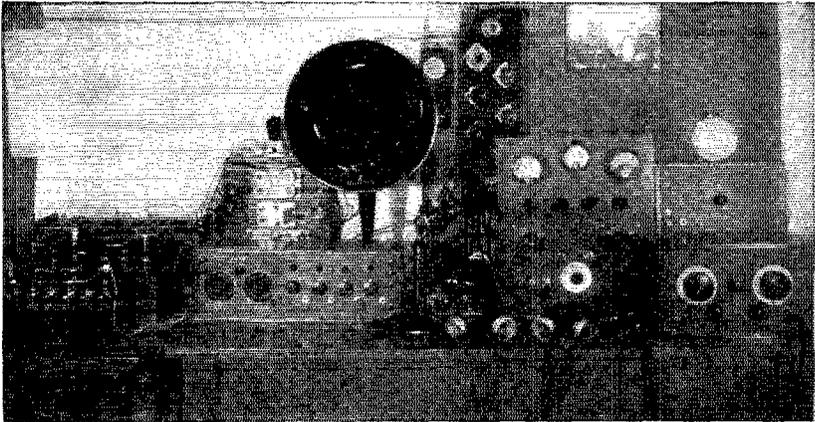
tion were deranged. Reports and station cards show that the voice range of these stations is from the Rocky Mountains to the Atlantic and south to the Gulf.

A description of the stations follow.

The receiving equipment at 8DGS consists of three separate sets. A Zenith 4-R is used for broadcast reception and short wave work down to 150 meters. The set in the center of the photograph is for short waves and tunes from 38 to 204 meters. It is homemade and was built by Mr. Johnston. The Westinghouse RC set is found very good for phone work.

The transmitter was also constructed by 8DGS and uses two Western Electric fifty-watt tubes. A voice amplifier is provided using a WE-216-A tube with 45 volts on the plate. A motor-generator furnishes 1000 volts for the power inductive-coupled Hartley with Heising modulation.

8BEI Collins, Ohio



Dr. Johnston's station 8BEI differs in several respects. Being located in a small country town, A.C. current was not available so a 32-volt D.C. Delco plant furnishes the power.

The receiving set on the left is a single-circuit detector-and-three-step and was constructed at this station over three years ago. West coast and foreign broadcasting has been heard. On the right is the short wave set which is low loss type, tuning from 56 to 250 meters. Above it is the speech amplifier cabinet. A bank of storage "B" batteries is shown at the extreme left of the photograph. Battery charging equipment is seen in the background.

The transmitter is 20-watt and is recon-

structed from an old DeForest panel. The circuit used is also the inductive-coupled Hartley with Heising modulation. Change over switch from send to receive is the silver dial at the center and bottom. A 500-volt motor-generator run from the 32-volt Delco plant furnishes the high voltage. The tubes are never allowed to overheat.

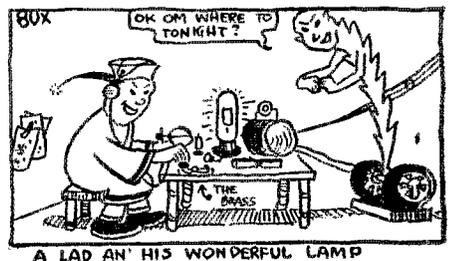
The antenna system consists of two 70-foot masts carrying a four-wire flat-top inverted L aerial with fan lead in direct to the set. The counterpoise is of six wires on twelve-foot spreaders directly under the aerial and 7 feet from the ground.

This station while only using 10 watts on voice is heard throughout the United States east of the Rockies.

TUBES FOR COILS

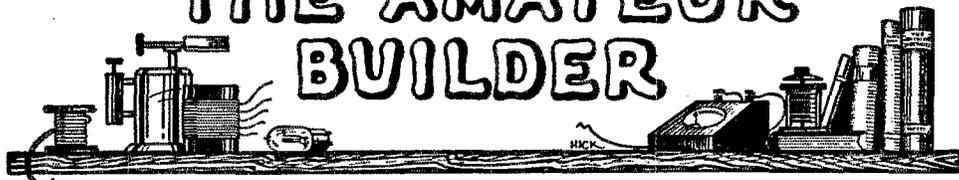
By S. H. Akers

"Concerning the matter of cardboard tubes in which to wind coils; the writer chased all over the whole town and was unable to find any material thin enough until he happened on the very common round quart ice cream container. These things are fairly common, are not over 1-16-inch in thickness and are already coated with paraffin, making them waterproof. The slip top can be used to wind tickler and pick-up coils on and can be slipped up or down on the main coils. The material is not only light but substantial."



THE Michigan State Convention this year will be held East Lansing, Mich., with meetings in the Engineering Building of the Michigan Agricultural College. The dates are Feb. 13th and 14th. Turn out, gang, and help make this the "bang up" affair that it promises to be!

THE AMATEUR BUILDER



More About Coils

By L. W. Hatry, Department Editor

PERHAPS now since reading last QST, we know a little more about coils. At any rate, let's talk some more about them.

In starting we will choose a coil which we feel is fairly good: 25 turns of No. 16 double-cotton-covered wire, closely wound and supported in air. When we talk about losses in coils we generally speak of the losses in terms of "resistance," for all losses affect the coil in much the same manner as if a resistance had been inserted in series with it. In other words the amount of power that the coil will absorb or waste has been increased. That being true we express the increase in losses in ohms. The resistances* used herein are guess resistances used for illustrating the actual effects, not accurate measurements nor resistances that you can use as actual figures for other coils. The coil's resistance we will call 5 ohms and the fundamental wavelength 40 meters. (The fundamental wavelength of a coil is the wave to which it is inherently tuned, without the addition of other apparatus, by the combination of its distributed capacity and its inductance.)

We are going to do several things to this coil that often happen to coils when put into radio sets. Furthermore we are going to give you guess-figures that show what happens to the electrical constants of the

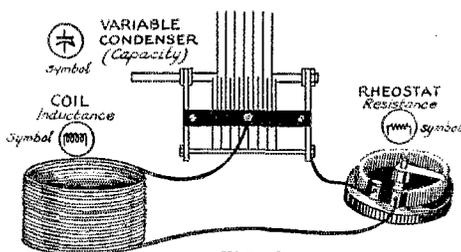


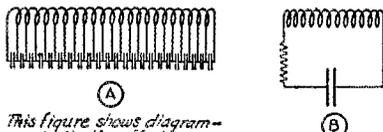
FIG. 2

Picturing the schematic diagram of Fig. 1B by actual instruments. As the coil passes through the various stages in the article you may consider the condenser above as gradually interfering and the rheostat as being varied toward, "increase"

coil when the various things are done to it, as figures illustrate more concretely than most other ways.

The first thing we do is to put in a tubing to fit the coil snugly and to furnish mechanical strength. The form can be any one of these things: thoroughly shellaced cardboard tubing, varnished ditto, tubing of any of the moulded materials (except hard rubber), or heavily varnished wood. Having slipped the coil on this form we find if we measure it that two things have happened to it: its resistance has increased and its fundamental wavelength has gone up. Let us call the new figures 7 ohms and 45 meters. See Fig. 1.

Then let us decide for convenience that the coil must have binding posts handily situated, so we add them: we put them an inch apart at one end of the form and run leads to them. One of the leads goes through the form to the post smoothly against the tubing. We measure the coil again and find that the resistance is now about 12 ohms and the fundamental wavelength is 55 meters. Fig. 3 shows this effect with the schematic equivalent.



This figure shows diagrammatically the effect produced on a coil by the addition of tubing. The figure would be the same to show the effect of coating the coil with varnish

The effect in (A) and in all the circuits to follow is completely shown by the above for practical purposes.

FIG. 1

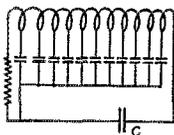
* If actual resistance measurements of any coil were made they would all have to be made at the same wavelength, if they were to be considered comparative. Therefore the guess-resistance used in this article may be considered to have been so measured, for they are given merely to serve as comparative figures.

Credit should have been given in the article preceding this one to the Institute of Radio Engineers from whose Proceedings for August, 1922, we quoted when we mentioned certain findings of Professor Morecroft.

Now we decide that the coil does not look good enough because the cotton is likely to absorb moisture; so we varnish or shellac the coil rather heavily and bake it dry. Then we measure it again. The resistance has jumped to 14 ohms and the fundamental wavelength to 60 meters. (Fig. 1.)



Adding binding posts to coil



Binding posts act exactly as a small condenser (c) while the lead thru the coil acts like a great many small condensers. This, thus, represents two effects, the final result of which is shown in Fig. 1B

FIG. 3

However, we have arranged to tap the coil in five places (this is a surprise) and run the taps to the usual type of panel switch with switch points set a sixteenth of an inch apart in the usual fashion. Not desiring to complicate matters too much we will consider the switch itself so good as to add practically no resistance to the circuit. However, the effect of the switch points and the leads to them is interesting. Merely as a matter of experiment, before we connect up all of the taps and their leads—having only two connected—we measure the coil once more. Its resistance is now 16 ohms and its fundamental wavelength 65. Now we finish up all of the connections to the switch-points and we measure with the coil completely connected to the switch but with the entire coil in the measurement. It finally measures 20 ohms with a fundamental wavelength of 70 meters, and we have yet to connect it up to complete the circuit given in Fig. 5. The effects of the switch and points are given in Fig. 4. From the figures given on the effect of the switchpoints you can see that it is not the capacity that the arrangement adds that we have to worry about—the taps would take care of that automatically—but the resistance that is added because the average panel is of a material that makes the switchpoints act like very poor condensers.

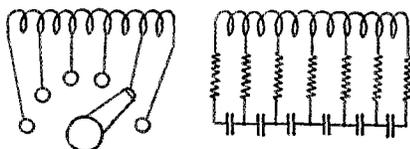
Then we complete the connections according to Fig. 5. Because the minimum capacity of the condenser is noticeable along with the capacity of leads and the addition of the tube capacity, our wavelength (at zero on the condenser dial) takes a jump to 110 meters. The final total resistance is 22 ohms. The reason for the small final jump is that the variable condenser is considered to be one of the low-loss type and

hence adds only an ohm of resistance or less. However, other connections add other resistance.

Fig. 6 gives a schematic diagram of what has happened to the coil in the various steps through which it has passed, as clearly as it can be shown.

Some Other Things That Coils Meet Up With

We will take an imaginary coil of 75 turns whose resistance is 10 ohms and whose fundamental wavelength is 115 meters. Over its range of 180 to 450 meters with a certain size of variable condenser of the proper design, the two function as a fairly low-loss and effective combination. However, we tap it at 15 turns to tune in some short waves and our tapping is done by means of a clip so that we will not have the extra resistance (hence, increased losses) and capacity that are caused by a switch with switch-points mounted on a panel. With the fifteen turns and the same condenser we have a combination that will tune over a range of 90 to 200 meters, we will assume. It is entirely possible that the 60 dead-end turns determine the actual minimum wavelength of this new tuning combination by their fundamental wavelength (for they have one) instead of the actual minimum of the fifteen-turn section, and the condenser, being the determining factor, as it should be. At the different wavelengths, the resistances, using the fifteen turns as the inductance, would appear something like this, for the dead-end has a fundamental wavelength approximately 80 meters: 90 meters and 100 ohms, 100 meters and 90 ohms, 110 meters and 70



THE TAPPED COIL

This diagram pictures the effect of the switch points and connections thereto on the coil. It is expressed fully by 1B and hence by Fig. 2

FIG. 4

ohms, 120 meters and 40 ohms, 150 meters and 20 ohms, etc. Possibly these figures are not reasonable but they serve to show what happens and what can happen to a coil which has a number of unused turns. To be certain of some safety, when tap-

ping a coil, never have a dead-end or unused portion whose turns number a greater amount than one-fifth of the total of the coil. Shorting the dead-end, by the way, is not always an effective method of reducing the losses—often the opposite is true.

Another thing almost as bad is to have two coils close to one another, one of them not in use. Professor Morecroft has found that this has raised the resistance as much as 90 ohms in a particular case. The dead-coil absorbs the energy so that the live one receives as little as if it had an additional resistance of 90 ohms to reduce the current.

The familiar plug coil mounting has an interesting effect similar to the two binding posts close together on the end of the coil, except, usually, much worse. We will say we have a coil whose fundamental wavelength is 200 meters and whose resistance is 15 ohms. We mount it on the plug similar to Fig. 10 and find that our fundamental is now 230 meters and our resistance has jumped to 20 ohms or more unless the plug is made of hard-rubber or other material with a very satisfactory phase-angle, which is generally not the case.

Proper Switch Construction

Now then, after what I have said above, you will most likely be in the frame of mind of not wanting to use a switch and switch points, which after all, is an excellent attitude to take except that some sets almost demand such an adjustment. So it may as well be done the best way if it has to be done.

Stuart Ballantine in his "Radio Telephony For Amateurs" suggests the design

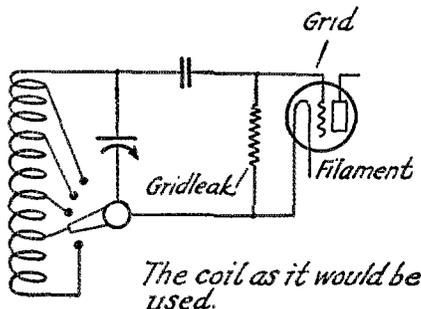
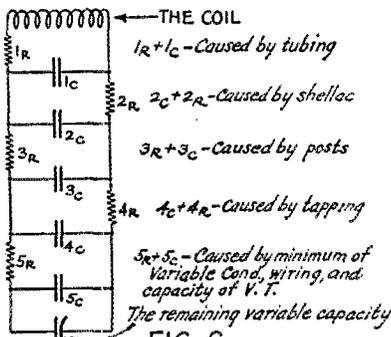


FIG. 5

of switch shown in Fig. 7. This switch arrangement supports the switch-points on a pane of electrically-good mica. Ballantine states, too, that care must be used to see that good mica is obtained as otherwise the trouble you go to in building such a switch will have been wasted.

The main trouble with the switch on the ordinary panel is that the phase-angle of the insulating material (which is after all the measure of the panel's radio worth) is bad and the losses therefore relatively high; introducing a good deal of apparent resistance in the coil. Then the obvious thing to do is to choose a material in which the phase-angle constant is low, such as hard rubber,

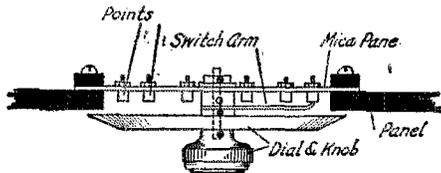


THIS CIRCUIT IS A CONVENIENT AND GRAPHIC WAY OF THINKING OF WHAT HAS OCCURRED.

or else reduce the volume of material used to a minimum, which is what Fig. 7 does. In using hard rubber it is advisable, if possible, to obtain phosphor-bronze split washers to be used on each switch-point, Fig. 8, so that the points will not loosen appreciably for quite a time. Hard rubber has a habit of "giving" under pressure and allowing all mechanical connections on it to loosen unless some such arrangement as the split (spring) washer is used.

The second worry about switch points is the capacity they shunt across the coil, thereby raising the minimum wavelength to which your tuning system will resonate. The effect of this can be reduced by well separating the switch-points. If you don't desire to have large blank spaces between points, then every other one can be left dead as in Fig. 9.

As to the plug mountings: you can build plugs on your coils similar to those described



SWITCH ARRANGEMENT SUGGESTED BY BALLANTINE FIG. 7

in the December QST (1924) in "The Amateur Builder" department, as such an ar-

rangement separates the opposite ends of the coil well, and, in using hard rubber, is very well insulated.

Regarding the Antenna Coil

There seems to be a misapprehension existing regarding the antenna coil. A number of readers do seem to recognize that the antenna circuit is a high resistance circuit which it does not pay to couple too closely to the secondary because then the set will stop oscillating and the tuning will

mistreat the coil with shellac and tubing and, we guess, double its resistance, making it 6 ohms. Thus the antenna circuit now has a resistance of 48 ohms, or an increase

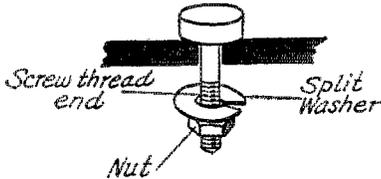
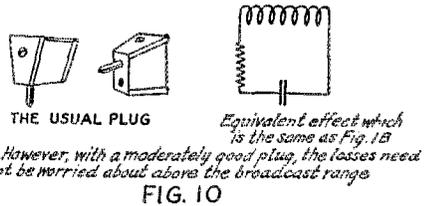
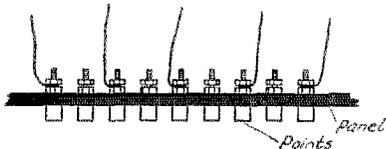


FIG. 8



USING EVERY OTHER SWITCH POINT IN CIRCUIT

FIG. 9

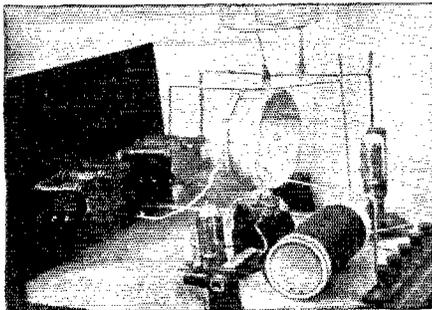
usually go bad, along with selectivity; but many do not realize that because the antenna circuit is of high resistance it is not so important that construction in its coil or condensers be low loss. That is important in the actual tube circuits only. To give you an idea of the lack of importance of low-loss construction in the antenna coil,

of approximately 5 percent, which is certainly not much and to my mind actually negligible, so far as practical purposes are concerned.

The Coil in the Set

A coil when installed in a set, as has been said time and time again, should not be close to other things such as the panel, shafts of metal, metal angles, variable condensers, fixed condensers, sockets, and so on. The closeness of the coil to these things depends on the field of the coil, of course, and the field of the coil is dependent on its size and diameter. In general, the greater the diameter of the coil, the greater the distance it should be kept away from external solid or semi-solid bodies. One inch, by the way, is just about the minimum distance.

And finally, the reason for all this coil-talk is that we have gotten to the point where it is no longer necessary to worry much about variable condensers. They are, in general, far ahead of the ordinary coils as far as relative low-lossness is concerned—so much ahead of the coil that sometimes the condenser adds a resistance to the circuit that is negligible because it is only a fraction of that of the coil.



consider the following: the actual antenna resistance is always high and with a low-loss coil the total antenna circuit resistance, we will say, is 45 ohms; 3 of which are caused by the coil, because it is one of the usual five-turn fixed primaries. We then

BOOK REVIEWS

Standard Electrical Dictionary by T. O'Connor Sloane amended by Professor A. E. Watson. The Norman W. Henley Publishing Company, 2 West 45th Street, New York. Price \$5.00.

The Standard Electrical Dictionary has been long and favorably known. It has now been amended by adding two new sections, one containing terms comparatively recently introduced into General Electric matters, the other one dealing with radio terms of recent origin. The result is a convenient modern handbook of general information. It is really quite surprising what a satisfactory class of information the authors have managed to get into the 790 pages of the book.

We have a notion that most of our members would be considerably more straight on a few of the basic things in radio if they would put in an occasional evening with the Standard Dictionary.



INTERNATIONAL Amateur Radio

Italian 1ER, Milano, Italy

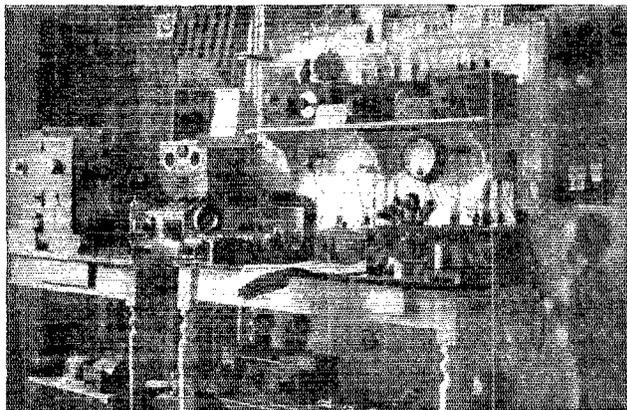
11ER is the station of Mr. Santangeli Mario of Milano, Italy, who is doing a great deal of radio communication in continental Europe.

The transmitting circuit is a slightly modified Colpitts. The transmitter is completely homemade, even to the variable antenna series condensers. 2000 volts from a 50 jar rectifier which is supplied from a 42

a pure c.w. carrier, or for radiophone: no other modulation of the output being allowed. Inductive coupling is required, too, for all wavelengths below 120 meters to avoid harmonics, clicks and broadness.

All Argentine amateurs must own government licenses, issued in a manner similar to ours.

S. C. Pleass of South Africa is begin-



Italian 1ER, Milano, Italy

cycle power line and transformer, is used for the plate supply of a French power tube.

The receiver is a low-loss of the usual type and entirely constructed by Mr. Mario. He has heard a good number of American and other foreign stations using detector and one stage amplifier.

Mr. Mario states that he will be glad to acknowledge any reports of reception of his station, and that he will be glad to arrange test schedules with any American amateur with the idea of continuous communication, if possible, in view.

Foreign Notes of Interest

Argentine amateurs are required to use frequencies from 1200 to 500 kilocycles, 250—120 meters. The higher frequencies are licensed only for the use of a station using

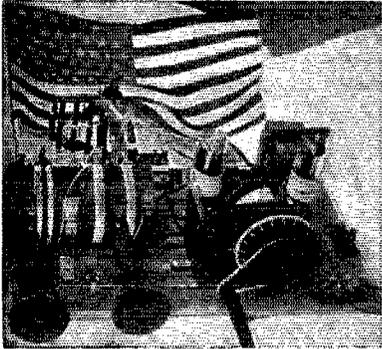
ning to be on the air regularly, so far as receiving is concerned, in spite of the heavy static he suffers from. He hopes possibly to become one of the regular air fraternity at some future date, and is a good A.R.R.L. member now.

Z2AC of Gisbourne, N. Z. was presented with a fine silver cup for his success in communicating with CBS of Buenos Aires. The inscription on the cup reads:

PRESENTED TO IVAN H. O'MEARA, Z2AC, GISBOURNE, N. Z. BY THE RADIO SOCIETY OF CHRISTCHURCH IN RECOGNITION OF HIS ESTABLISHING DIRECT TWO WAY TRANS-PACIFIC RADIO COMMUNICATION WITH MR. CARLOS BRAGGIO, CBS, OF BUENOS AIRES ON THE NIGHT OF MAY 12TH, 1924.

Mr. O'Meara certainly gets our congratulations for an excellent accomplishment and a suitable reward.

G5GB, Leonard Humphries, of Liverpool says that he has sent out 150 cards and photographs of his station to U. S. amateurs, but has only received eight replies. In spite of this discouraging experience he says that he will send a photograph and



The Receiver at 11ER

card to any that cares to write him, but he will not send out any more unsolicited reports.

David Harrell, Jr., of Bogota, Columbia, S. A., claims that he is going to be on the air with the call 5EN, which was his call when in the U. S., using the intermediate "CO." The intermediate has not been officially assigned to Columbia, it being thought by the A.R.R.L. officials that R could be used in South America as an intermediate with the beginning number of the call telling which country the amateur is living in. The intermediate actually to be assigned Columbia is under discussion at present.

We certainly wish Mr. Harrell luck and hope that the gang will be on the watch for his signals.

There have been a number of requests for the meaning of some of the familiar radio abbreviations, so they are given here with:

73 is an old land-wire term and means "best regards."

OM is the abbreviation for "old man" and is used as a friendly salutation.

CUL is the abbreviation for "see you later" and is often used as "CU" agn," a variation.

HI is another old land-wire expression which has been inherited by Radio and is the telegraphic method of laughing.

DX means distance and is taken from the land-wire habit of using the initial letter of a word plus "x" to stand for the word.

WX, similarly, means weather, and Xmitter, a reversal, means transmitter.

88 means "love and kisses" for those who need such an expression. It, too, is an old land-wire expression that was used to conserve time on that stereotyped phrase.

Mr. Gunnar M. Dahl of Stockholm kindly sent in the following regarding the Radio regulations in Sweden: 1. Both receiving and transmitting are permitted but with a tax of 3.50 Kronen for the receiving and 40 Kronen for the transmitting amateur. On the first of the present year, this tax was raised to 12 Kronen for the receivers. Those who neglect to pay the tax must pay a fine up to 1000 Kronen.

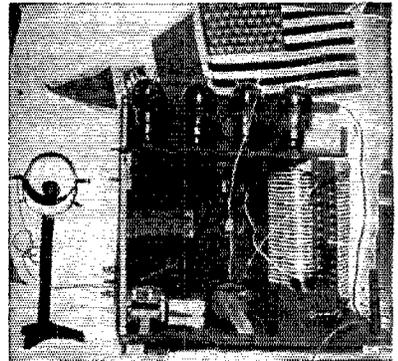
2. The call letters consist of four letters in certain combinations (the first two letters are always SM) and they are assigned by the government. The call letters of our amateurs are published in some radio papers such as "Radiobladet" issues 21-22 of 1924.

3. The name and address of the government department of radio activities is Kungl. Telegrafbyråen, Stockholm 2, Sweden.

4. The government has not assigned fixed wavelengths to the amateurs, nor a power limit, but most of them are on wavelengths from 50 to 100 meters or above 150 meters. There is no spark transmitter in Sweden (amateur) so far as I know.

5. There are now about 80 amateurs here and their number increases daily.

6. The leading amateur organization here is Svenaka Radioklubben, Hamngatan



The transmitter at 11ER

1A, Stockholm. The popular magazine is Radioamaboren, Goteborg, but the one devoted more to the transmitting amateur is Radiobladet, which I just spoke of, and which is probably the best conducted radio paper we have.

You may be sure that we Swedish amateurs shall be glad and thankful to receive advice and assistance from our brother amateurs in the U. S.

Strays



S. W. Strong of Dunedin, N. Z., suggests that, when traffic is on the hook from one foreign country to another, in calling CQ a signal be used to indicate from where and to where the traffic goes. Example: 6PQP has traffic from New Zealand to France. In calling for France, if CQ is used, the call would be like this: CQ FU 6PQP F QCT Z.

If you have any questions to ask that come under the "Information Service," don't include them in a letter to another Headquarters department. Either write the questions on a separate sheet headed "Information Service" or else address them directly to that department.

Professor F. S. Dellenbaugh has resigned his chair at Massachusetts Institute of Technology and is now a student of the Institute with the Degree of Ph. D. in view.

There have been five objections to the change in Calls Heard whereby we leave out calls worked. That representing a very small minority, we will allow the new system to stand.

Someone has suggested that O.R.S.'s sign O.R.S. after their call when answering anyone so that he will know that he is in communication with a reliable relay station and can depend on his message being forwarded.

At the request of Mr. James A. Wilson of 8CPY, Kalamazoo, QST regretfully announces that Mr. Wilson has been obliged to abandon his idea of publishing a book of American amateur stations, as previously mentioned in our columns, because of insufficient response on the part of the gang. This is too bad; the idea was a fine one. All thanks to 8CPY for his generous efforts, anyway.

Canadian 3EN, James W. Cotter of 72 Victoria Street, Ottawa, is the latest member of our League. Although totally blind he is progressing rapidly in the game and is going to be on the air for traffic. 3AFP, Harrison, is responsible for all the help Jimmy has received. We are inclined to think that c3EN is a unique case in the QST FOR FEBRUARY, 1925

annals of the League, so if we have any more blind members we would like to know of it. We certainly do welcome Mr. Cotter as a sincere enthusiast and amateur.

Miss Lillian Overton—5FX's sister, as she labels herself—writes in to say about QST; "I read in it about radiobugs, as you call them, and enjoy it very much." Then she writes to say that 5FX deliberately and with malicious intent did say that QST would not publish her letter or any girl's letter. Whereupon we hereby rise to announce that even we have a better opinion of ourself than that. (Aside) Say, 5FX, is your sis a YL yet, or does she still think Jackie Coogan is a sheik?

Unfortunately we failed to give credit to Mr. Roslyn V. Russell of Niagara Falls, N. Y., for description and photo of the "glass-supported" coil on page 10 of the January issue. Sorry!

By buying the radio publications of the Government Printing Office any amateur can have a complete radio reference library of the most accurate sort at a total cost in the vicinity of six dollars.

7BM says that he visited a Jap ship and found the ops studying short-wave dope out of QST. He says perhaps just that sort of thing was what caused that JUPU incident of a few months ago.

Where does anyone get the idea that gold is better than silver as a conductor? Silver is the resistance standard and is rated as unity, 1, copper about 1.1, and gold above 3. Think that over.

9FK says to get some fairly thick water-glass from the drug store for that tube with the loose base. With a feather or fine brush it should be worked into the base and then the tube lighted so that it will get warm and dry out the water-glass which will harden and hold the tube firmly.

Calls Heard



NOTICE

Thanks, fellows, you surely did co-operate! Very, very few improperly prepared lists were received. That's an FB spirit. Thanks again.

1. Make the list in numerical order according to districts and arrange each district alphabetically. Exactly as the lists herewith.

2. Use commas between calls and print or type with double spacing—skip a line between lines.

3. The list must be in our hands on the first of the month after month of reception. State period of reception.

4. Leave out all stations worked except the one which represents your best dx worked, and insert it in the proper place with an asterisk on either side; viz, *9PDQ*.

5. Please include your call, name, and complete address, indicating how much of it you desire to be published.

A. H. Fielding, 2AUI,

32 Stanley Avenue, Birkdale, Lancs, England.

1abf, 1afn, 1ana, 1ahn, 1are, 1ary, 1aww, 1axw, 1bal, 1bbe, 1bdb, 1bfq, 1bqg, 1by, 1ck, 1cmp, 1ctj, 1czv, 1ga, 1goa, 1gv, 1ij, 1ikx, 1jxk, 1pl, 1sf, 1sr, 1sw, 1wi, 1xl, 1xz, 1yz, 2afp, 2bbn, 2bd, 2bg, 2bgs, 2bgo, 2blu, 2bn, 2brb, 2bg, 2ego, 2evi, 2gdo, 2dn, 2kgs, 2mu, 2pl, 2oh, 2qrh, 2ud, 2um, 2xq, 2agd, 2ajd, 2akx, 2an, 2bdo, 2bhv, 2bof, 2bp, 2btf, 2cd, 2che, 2chg, 2cux, 2hh, 2jw, 2kmi, 2ahf, 2ot, 2sf, 2ux, 2ch, 2fz, 2io, 2mi, 2si, 2so, 2xe, 2zu, 2vjh, 2hl, 2if, 2seu, 2awt, 2bjj, 2cej, 2ego, 2chl, 2of, 2uf, 2zp, 2acy, 2afo, 2amr, 2awj, 2etz, 2evi, 2ham, 2iq, 2omj, 2sey, 2sm, 2xb, 2ybj, 2bdu, 2bfn, 2bki, 2dft, 2elb, 2xi, Canadian, 1ar, 1dq, 2cg, Mexican, bx, Unknown, jfwa, fnl, rr8. One tube and indoor aerial, pse, qsl, crd.

A. G. Wood, 5RZ,

93, Upper Tulse Hill, London, S.W. 2, England.
(September and November, 1924).

1aac, 1abs, 1acr, 1afc, 1aip, 1ajw, 1al, lak, 1ana, 1aom, 1ar, 1are, 1arc, 1ase, 1ate, 1axv, 1ayz, 2ax, 2ad, 2afp, 2ana, 2awf, 2bco, 2bg, 2bgs, 2bpd, 2bh, 2brb, 2brn, 2bsl, 2buc, 2eel, 2eun, 2evj, 2cvs, 2gk, 2ly, 2jil, 2jij, 2kii, 2ky, 2mc, 2mu, 2qh, 2tp, 2uz, 2wb, 2xi, 2xww, 2abt, 2ajd, 2akj, 2auv, 2bco, 2bdo, 2bof, 2bse, 2bsa, 2bsv, 2bta, 2cdg, 2che, 2ckj, 2ge, 2gg, 2hh, 2hsp, 2og, 2qv, 2rv, 2eh, 2fg, 2fo, 2fz, 2io, 2jt, 2mg, 2sa, 2tl, 2uk, 2uu, 2vu, 2uk, 2no, 2ad, 2add, 2aly, 2aol, 2ba, 2cbp, 2ccs, 2cco, 2do, 2eb, 2sm, 2sup, 2wo, 2xab, 2xau, 2xk, 2cs, 2dq, 2em, Can., 1ar, 1dq, New Zealand, 4aa.

H. E. Nicholson, G6VP,

42, Southsea Avenue, Walford, Heris, England.
(November)

1ana, 1bgu, 1cmp, 1crv, 1gv, 1ow, 1xav, 2afp, 2boa, 2brb, 2bum, 2eel, 2eqz, 2ers, 2cvs, 2evu, 2mc, 2qh, 2ub, 2wr, 2add, 2ajd, 2bq, 2cdg, 2cjm, 2ckj,

2ot, 2fz, 2lo, 2jr, 2lj, 2tg, 2add, 2ago, 2amr, 2aol, 2ga, 2ly, 2up, Canada, 1ar, 1dq, 2bn, Chile, 2tc.

Captain L. A. K. Halcomb, G5DN,

South Deu, 106 Millhouses Lane, Sheffield, England.

American, 1ab, 1aac, 1aea, 1ajo, 1alk, 1ana, 1al, 1ar, 1aww, 1aur, 1bal, 1bdt, 1bh, 1bhm, 1bk, 1bsd, 1cak, 1ckp, 1cmp, 1gv, 1il, 1jp, 1lw, 1nc, 1ow, 1pl, 1se, 1sf, 1sw, 2abs, 2afp, 2agb, 2az, 2brb, 2buu, 2by, 2cbs, 2ck, 2ek, 2ela, 2evg, 2xq, 2ajd, 2bg, 2hh, 2og, 2ot, 2ss, 2io, 2cu, 2en, 2oc, 2bgs, 2bqa, 2ai, 2ago, 2bcj, 2bcj, 2bhh, 2tb, Canadian, 1ar, 1cmp, 1oar, 2cg, 2ut. QRK my sigs on 110-114 metres.

Roy W. Galpin, G5NF,

Bank House, Herne Bay, England.
(November)

1aac, 1ajw, 1bgu, 1bkh, 1bkr, 1boa, 1bsd, 1cab, 1cak, 1ckp, 1cmp, 1cin, 1dm, 1er, 1fd, 1gv, 1kc, 1kv, 1mb, 1pl, 1sf, 1sw, 1xae, 1xak, 1xav, 1xw, 2afp, 2ana, 2awf, 2brb, 2bse, 2buv, 2chk, 2ck, 2ekp, 2evu, 2gk, 2mu, 2xz, 2ajd, 2ats, 2bco, 2bdo, 2bg, 2bof, 2cdg, 2che, 2cjm, 2qv, 2rv, 2io, 2ku, 2gf, 2sa, 2tl, 2xe, 2mi, 2uq, 2ba, 2bhw, 2bhh, Can., 1ar, 2cg, Chile, 2tc, New Zealand, 4aa, 4ag. Please QSL crd.

W. Hartley, 3 Spring Bank, Follifoot, Yorks, England.

1aja, 1aww, 1bec, 1bdt, 1bgu, 1cmp, 1fd, 1kc, 1pl, 1sf, 1sqf, 1zlf, 2awf, 2brb, 2buu, 2by, 2buu, 2evj, 2ed, 2rk, 2wr, 2xqf, 2ajd, 2gt, 2aly, 2ama, Canadian, 1ar, New Zealand, 2ac, Australian, 2bq, Nerki, Kdka.

G2TA, North Grove Highgate, London, England.

(Heard on Nov. 2 only.)

1aja, 1aur, 1bcu, 1bk, 1boa, 1bw, 1bgo, 1bgu, 1bsd, 1bul, 1ckp, 1cin, 1cmp, 1eir, 1gv, 1hw, 1ke, 1mz, 1okz, 1our, 2bw, 2ca, 2ng, 2ud, 2bco, 2che, 2dk, 2zw, 2vr, 2uu, 2rz, 2dir, 2bd, 2avr, 2cs.

R. L. Royle, G2WJ,

"Southwold", Aldermans Hill, Palmers Green, N. 13.
(November)

1ajw, 1aw, 1bdt, 1bgu, 1bgu, 1bhm, 1bna, 1bng, 1cmp, 1dg, 1gv, 1my, 1ow, 1py, 1xv, 1xav, 2add, 2afp, 2bbn, 2xg, 2ai, 2rr, 2aly, 2amr, 2vg, 2zg, Canadian, 1ar, 1dq, 2cg, New Zealand, 2ac, 4aa, 4ag, 4ak.

G2AWP, W. Hartley, 3 Spring Bank, Follifoot,

Near Harrogate, Yorks, Eng.

1aag, 1aar, 1aea, 1ana, 1apk, 1are, 1ary, 1atj, 1avf, 1avr, 1awe, 1axz, 1azu, 1azr, 1bic, 1bid, 1bwj, 1bzz, 1ck, 1cmp, 1da, 1fd, 1hn, 1il, 1sw, 1vl, 1xak, 1xw, 2axq, 2bgo, 2bm, 2br, 2brb, 2bsl, 2cpa, 2cjk, 2cy, 2dd, 2em, 2gk, 2iw, 2mc, 2wz, 2add, 2jw, 2lg, 2lt, 2mf, 2gv, 2io, 2jr, 2kv, 2sb, 2uk, 2xe, 2lu, 2aro, 2bpl, 2dal, 2ry, 2dmj.

J. Allan Cash, G2GW,

"Foxley Mound", Lymn, Cheshire, England.

1abf, 1abs, 1aen, 1aid, 1kfc, 1ajc, 1ajg, 1atj, 1ajw, 1aom, 1ar, 1arc, 1bck, 1bdt, 1bgu, 1bhm, 1bz, 1bjo, 1cak, 1ckp, 1fd, 1mu, 1my, 1ow, 1py, 1up, 1ze, 1sf, 1sz, 1xav, 1xw, 1ze, 2afp, 2ady, 2azy, 2brb, 2bum, 2eel, 2eaw, 2evu, 2dn, 2id, 2vr, 2add, 2add, 2aha, 2ajd, 2bg, 2bva, 2cc, 2cjm, 2hr, 2kd, 2og, 2sw, 2wb, 2fz, 2io, 2jr, 2qv, 2tl, 2xe, 2aei, 2agj, 2ajl, 2amh, 2ek, 2zu, 2mi, 2bau, 2brn, 2bo, 2cbw, 2il, 2pl, 2vg, 2bcj, 2cjc, 2xw, NKE, NFY, Australian, 2bq, 2me, New Zealand, 4aa, 4ag. Unknown ain.

**N. G. Baguley, G-2NB, 33, Castle Gate,
Newark, Notts England.**

1aac, laar, laid, lary, lbhd, lbjt, lme, lli, lxam,
lxz, *lyb*, 2big, 2by, 2mu, 2add, 2add, 3bco, 3bmb,
3bss, 3chc, 3mb, 3ot, 3fz, 4io, 4tj, 4tr, 4uz, 5tr.
Australian, 3bq. Canadian. lar. N. Z., 4aa, 4ak.

**Frederic L. Hogg, G2SH,
37 Bishop Rd., Highgate, London, Eng.**

laac, labr, ladg, laid, laig, laip, lajx, laik, lana,
laur, lapk, lapu, laze, latj, laur, layp, lazu, lbal,
lbcc, lbdt, lbdx, lbcs, lbfg, lbvg, lbhm, lbie, lbjo,
lbkq, lbhd, lbth, lboa, lbvd, lbvl, lbw, lbx, lbz,
lme, lomp, loru, lda, lef, lez, lfd, lfg, lga, lgs, lgu,
lgy, lgh, lhd, lli, liv, lke, lik, lml, lmo, lmy,
loa, low, lpl, lrp, lse, lsf, lwl, lwy, lxam, lxav,
lyg, lzt, 2aco, 2ag, 2agw, 2am, 2ana, 2ann, 2aoz,
2avn, 2axf, 2az, 2bba, 2bga, 2bgi, 2bgo, 2bm, 2bo,
2bqu, 2br, 2brb, 2bsc, 2bum, 2cbg, 2cee, 2cei, 2cej,
2ela, 2epa, 2eoz, 2ety, 2ev, 2evi, 2evs, 2eym, 2dd,
2dn, 2kf, 2ku, 2mc, 2mt, 2pd, 2qh, 2rk, 2rx, 2ab,
2abw, 2adb, 2adp, 2ado, 2adt, 2adv, 2aha, 2aic, 2auv,
2bay, 2bco, 2bg, 2bf, 2bhv, 2bjp, 2bng, 2bob, 2bof,
2bss, 2bz, 2cdg, 2cej, 2che, 2chg, 2cjn, 2ckj, 2dk, 2hh,
2kl, 2kg, 2lr, 2mf, 2ot, 2at, 2st, 2it, 2vw, 2wn, 2xx,
3yo, 4bq, 4du, 4eq, 4fg, 4fr, 4gz, 4gw, 4io, 4iz, 4jr,
4ju, 4kl, 4ku, 4mb, 4my, 4ne, 4oa, 4sa, 4sb, 4tj, 4uk,
5ail, 5ca, 5en, 5ek, 5hl, 5il, 5lu, 5lo, 5ph, 5rh, 5uk,
5ada, 5ago, 5aki, 5aly, 5ame, 5amo, 5amr, 5ani, 5atp,
5avd, 5bau, 5bfe, 5bjv, 5bwb, 5ccr, 5ced, 5cie, 5cyl,
5dal, 5dea, 5dhw, 5dwf, 5gz, 5ja, 5sm, 5tr, 5tt, 5uf,
5vg, 5xav, 5zk, 5ze, 5zy, 5ami, 5bel, 5bht, 5brz, 5cje,
5eko, 5ekv, 5evo, 5dqu, 5dxx, 5eld, 5ep, 5vz, 5xw,
Canadian, lar, 2az, 2be, 2bn, 2bv, 3gc. New Zealand,
4ak. Australia, 3bp.

**G2TD, K. I. Palmer, Vyrnwy House,
Llansantffraid Mont, North Wales, Eng.**

1abf, 1abt, 1ac, 1awd, 1bge, 1bse, 1bvl, 1cm, 1eme,
1cmp, 1ev, 1dd, 1dbn, 1deq, 1ke, nk1, 1ow, 1pl, 1zt,
2adq, 2aj, 2ana, 2awf, 2brb, 2by, 2bu, 2em, 2evj,
2mah, 2tj, 2rk, 3bg, 3ade, 3bof, 3ekj, 3hh, 3uf, 3vw,
4eq, 4jr, 4sb, 4uk, 5aly, 5hcz, 5hhx, 5esv.

**Hugh N. Ryan, G5BV, Home Park Road,
Wimbledon Park, London, Eng.**

1acd, 1afc, 1aja, 1ana, 1alj, 1anr, 1bal, 1bdt, 1bqg,
1boa, 1bvl, 1cib, 1ckp, 1ere, 1er, 1fg, 1li, 1ke, 1lw,
1ow, 1rk, 1rp, 1sf, 1sw, 1xam, 1xav, 1xw, 1xz, 1ze,
2ag, 2agw, 2ann, 2brb, 2cbg, 2cvs, 2ka, 2kf, 2kl, 2mu,
2rk, 3adq, 3aic, 3ido, 3buq, 3bwt, 3ca, 3cb, 3chg,
3hh, 3jh, 3mf, 3og, 3wb, 4chc, 4zw, 4mb, 4sa, 4tj,
4xx, 6awt, 5add, 5bkh, 5ese, 5nb, 5vg, 5ccm, 9ela,
Canadian, lar, 1dq, 1ef, 2ax, 9al. Mexican, 1b. Ar-
gentine, ch8. Porto Rico, 4sa. New Zealand, 4aa,
4ag, 4ak. Australia, 2em, 3al, 3bq.

**J. C. Lloyd Edwards, G5OQ,
Trevor Hall, Trevor, Wrexham, England.**

1aac, ladg, lbal, lbqg, 2by, 2xi, 3chc, 3mb, 3tr,
4bq, 9aen, 9bkl, 9dix. Canadian, lar.

**S. K. Lewer, G6LJ, 32 Gascony Ave., West Hamp-
stead, London, Eng.**

1aac, laar, labf, labv, labt, laea, lafc, lag, laja,
laig, lajo, laju, laik, laix, lana, lanh, lanr, lapa,
lapk, laqz or laum, laze, laze, laze, lazi, lazj, laur,
lawe, laww, laxz, laxt, lbce, lbdb, lbdt, lbdt, lbdx,
lbqg, lbhm, lbhw, lbvt, lbvp, lbz, lbz, lbz, lbz, lbz,
lbqg, lbzd, lbvl, lbw, lbz, lbz, lbz, lbz, lbz, lbz,
lme, lomp, lora, lre, lru, lru, lru, lru, lru, lru, lru,
lfd, lga, lgy, lhn, lli, lin, lke, lli, lwy, lmy, low, lpl,
lpy, lrp, lsd, lsf, lsw, lsv, lwl, lxx, lxm, lxu, lxx,
lyb, lza, lzt, 2aco, 2ad, 2afp, 2ag, 2agb, 2agc,
2agk, 2agw, 2ana, 2ann, 2aoz, 2apv, 2au, 2awf, 2axf,
2axt, 2az, 2azr, 2bba, 2bga, 2bgo, 2blu, 2bm, 2bnp,
2bo, 2bkb, 2bq, 2buu, 2br, 2brb, 2bre, 2bse, 2bvl,
2bum, 2bvw, 2by, 2byw, 2cbn, 2ccj, 2cgj, 2chk, 2cje,
2cjk, 2cf, 2epk, 2epz, 2equ, 2eqz, 2erg, 2etb, 2ex,
2evj, 2evs, 2evu, 2ev, 2dd, 2dw, 2em, 2ec, 2fd, 2gu,
2ju, 2kf, 2id, 2mc, 2mu, 2pd, 2qh, 2rk, 2am, 2tp,
2ud, 2vc, 2wr, 2xc, 3abw, 3ade, 3adq, 3aj, 3ak, 3avk,
3bco, 3bdo, 3bdr, 3bfe, 3bhv, 3bjp, 3bmn, 3bof, 3bng,
3bq, 3bss, 3hwj, 3bwt, 3ca, 3cg, 3edg, 3che, 3chg,
3chr, 3cjn, 3cjp, 3ekj, 3eh, 3gc, 3hd, 3hg, 3hh, 3hq,

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3if, 3jh, 3ju, 3kd, 3ll, 3lm, 3mb, 3mf, 3oq, 3ot, 3qt,
3sf, 3vw, 3wn, 3xq, 3xx, 3yo, 4al, 4bq, 4do, 4eh, 4eq,
4fg, 4fs, 4fz, 4io, 4jr, 4ke, 4kr, 4ku, 4mb, 4my, 4oa,
4sa, 4sb, 4tj, 4uk, 4xe, 5aef, 5agj, 5agl, 5ail, 5aiu,
5ca, 5es, 5ih, 5iv, 5hl, 5in, 5kc, 5lh, 5lu, 5mi, 5ox,
5ph, 5qy, 5rh, 5se, 5uk, 5uo, 5zal, 5zas, 6ao, 6awt,
6bep, 6bnn, 6chl, 6cks, 6eni, 6ma, 6oi, 6xad, 7sy,
8add, 8ade, 8adg, 8ago, 8ah, 8ain, 8aly, 8ame, 8amr,
8aol, 8aro, 8atp, 8bak, 8bga, 8bhk, 8bjv, 8bk, 8cbp,
8ccq, 8cko, 8cmi, 8cms, 8ese, 8esj, 8eyi, 8dal, 8dea,
8dgo, 8dhw, 8doo, 8gz, 8hn, 8hp, 8jq, 8kc, 8nb, 8pl,
8tr, 8tt, 8ur, 8vq, 8wo, 8xav, 8zb, 9abf, 9asv, 9axt,
9bhx, 9brk, 9bpy, 9brz, 9bwp, 9cap, 9cej, 9ch, 9cmi,
9evo, 9dal, 9dpr, 9dqu, 9dsa, 9ebh, 9eia, 9ek, 9eky,
9eld, 9em, 9oa, 9yb, 9zt. Canada, lar, 1bq, 1dq, 2ax,
2az, 2be, 2bn, 2cg, 2bp, 5an, nkf, nfv, nerkl, wgh.
Australia, 3bd, 3bq, 2ds. N. Z., 4ag. Mex., 1b, bx.
QRK my CW signs? All cards QSL'd.

**Frank R. Neill, "Chesterfield"
Whitehead, near Belfast, Ireland.**

1aja, 1ajt, 1ana, 1bdt, 1bdx, 1bge, 1bsf, 1cab, 1cmp,
1da, 1on, 1pl, 1py, 1st, 1zt, 2afp, 2ag, 2agw, 2bge,
2bm, 2brb, 2brv, 2by, 2mc, 2qn, 2rk, 2ud, 2wb, 3adb,
3aid, 3cf, 3chc, 3cfn, 3hg, 3kd, 3lg, 3ot, 3sf, 3adq,
3xe, 3atc, 3ese, 3dnf, 3gk, 3hn, 3vg, 3bq, 3ej, 3efc,
3etg, 3kka, nerkl. Canadian, 2cg, 3bp, wgh. Aus-
tralian, 3bq, 2df. New Zealand, 4aa, 4ag.

**Heard by C. Haumont, B7,
18 F Avenue, Albert, Brussels, Belgium.**

1bhe, 1nb, 1hu, 1cv, 1daa, 1drj, 1ddk, 1ahw, 1bc,
1pl, 1mc, 1boa, 1wf, 1as, 1aj, 1gw, 1cm, 1ef, 1bs,
1sf, 1rt, 1ap, 1ga, 1axf, 1bhm, 1da, 1axm, 1bqg,
1cik, 1bdt, 1cv, 1cc, 1aar, 1ro, 1bse, 1ck, 1cco, 1kd,
1dnv, 1sw, 1apq, 1go, 1une, 1dr, 1lw, 1chk, 1cab, 1kw,
2wb, 2wr, 2pbc, 2eg, 2mu, 2br, 2dd, 2ab, 2ccx, 1aj,
2dh, 2by, 2chi, 2edo, 3bdo, 3bof, 3ama, 3bhr, 3wb,
3ade, 3jh, 4ku, 4acx, 4bar, 4bte, 4sb, 4tj, 4fra, 4uk,
5afu, 5uh, 5ctu, 6boo, 3brf, 3tro, 3ccq, 3dac, 3bas,
3ese, 9bh, 9eo.

**P. Motycka, Praha I. 355, Na Peratyne 14,
Czechoslovakia.**

1aac, laig, 1ana, 1bal, 1bpb, 1bz, 1cmp, 1ic, 1ll,
1my, 1pl, 1sf, 2by, 2bgo, 2bba, 2pd, 2nb, 2ud, 2eb, 2xi,
3qv, 3xx, 4ew, 5dme. Canada, 1aa, 1ar, 2az.

**S. C. Pleass,
Box 1077, Johannesburg, South Africa.**

4sa, 6apw, 8bau, 8pl, 8sz, 9bhx, 6ba, 5ame.

**R. R. Davis, A2DS
Fisher Avenue, Vaucluse, Sydney, Australia.**

1be, 1bk, 1cmp, 1ff, 1fw, 1gl, 1gy, 1kc, 1lv, 1pl,
1sf, 1bqg, 1brb, 2xq, 2asy, 2afp, 2bab, 2arb, 2brb,
2evu, 2drb, 3sf, 3alx, 3bdo, 3bvs, 3btu, 3chg, 3tna,
4ab, 4io, 4oa, 4ol, 4sa, 4sb, 5al, 5ao, 5dv, 5gd, 5gn,
5gy, 5mi, 5uy, 6kl, 6za, 5akw, 5enh, 6ac, 6ab, 6ao,
6bo, 6bd, 6bx, 6cw, 6fh, 6gt, 6lj, 6of, 6tg, 6vc, 6vw,
6xm, 6yb, 6abp, 6adt, 6afg, 6agb, 6age, 6agk, 6ahp,
6ahw, 6aib, 6aj, 6akw, 6alg, 6adn, 6apw, 6arv,
6awt, 6bon, 6bol, 6bn, 6bru, 6buf, 6bx, 6ces,
6cft, 6go, 6gk, 6gt, 6gw, 6chl, 6cjr, 6cmi,
6cl, 6ese, 6prt, 6trb, 6ab, 6fd, 7lj, 7rm, 7sr, 7hb,
8gz, 8zg, 8bau, 8bpa, 9eh, 9ky, 9em, 9td, 9xe, 9hcz,
9bf, 9bj, 9btk, 9byv, 9ccm, 9cic, 9cmi, 9efy, 9eky,
Mexican bx, Chile 9c.

**Z4AR W. G. Wolkinson
21 Melrose Street, Roslyn, Dunedin, New Zealand**

U—1bkk, 1cmp, 1rv, 2ccq, 4jr, 4tj, 5ail, 5amh,
5dw, 5ke, 5hk, 5pl, 5ox, 5uk, 6aa, 6ac, 6ab, 6afz,
6age, 6agk, 6apw, 6ase, 6asp, 6ard, 6arb, 6bar, 6bbz,
6awt, 6bcr, 6bjj, 6cfn, 6eda, 6em, 6ego, 6ema, 6ess,
6lj, 6uc, 6vo, 6sj, 7abb, 7id, 7gc, 7ot, 8bau, 8sv,
8zz, 9bfe, 9bm, 9bj, 9dy, 9eky, 9xi, 9xs, 9zd, M—1b,
G—2nm, 2jf.

**R. Stader, New Zealand 4AG,
15 Harkom Terrace, Dunedin, New Zealand.**

1gv, 1bgq, 1sf, 1cmp, 2br, 3aha, 5ml, 5uk, 5dw,

5aa, 5bq, 6age, 6arb, 6cgs, 6cgw, 6bfw, 6lj, 6ap, 6civ, 6bra, 6tm, 7ij, 9ccx, 9em.

W. Gray Wilkinson, Z4AR,
21 Marrose Street, Roslyn, Dunedin, New Zealand.
(September)

1aal, 1all, 1kc, 2agb, 3gm, 3cqi, 3bhv, 4sa, 5ank, 5ud, 6aap, 6aao, 6arb, 6bep, 6bol, 6bsa, 6bul, 6bwp, 6bjj, 6cft, 6cec, 6cng, 6cgp, 6cgw, 6chw, 6ic, 6ou, 7aim, 8blw, 8xax, 9bm, 9rb, South American cb8, British 2m, 2sh, 2od, 2ot, 2sz, 2kf, 5nn, Special wgh, wgx, nfu, nkf, all cards answered.

Calls Heard by ACD-1HT, Bahia, Brazil to Cadiz, Spain — All More than 3,500 Miles.

1arf, 1ajw, 1aur, 1aww, 1bbo, 1bsd, 1hub, 1bul, 1bxq, 1bgq, 1bw, 1emp, 1ern, 1er, 1kc, 1pd, 1sf, 1sw, 1xo, 1xy, 1xae, 1xv, 1xav, 1y, 1zo, 2apy, 2aan, 2brb, 2buy, 2bgs, 2by, 2brc, 2bqg, 2enk, 2cnd, 2cum, 2gk, 2mu, 2pd, 2rp, 2ud, 2uw, 2cr, 2adq, 3cdo, 3bd, 3bc, 3bwt, 3bg, 3bp, 3bv, 3bt, 3ta, 3q, 3hs, 3pz, 3tf, 3ur, 3zq, 4kl, 4fg, 4fi, 4io, 4oa, 4ol, 4rr, 4sa, 4tj, 4uf, 5al, 5kq, 5ky, 5mi, 6bfw, 6br, 6ac, 6aj, 6bka, 6bqa, 6ccq, 6cei, 6cn, 6evi, 6cy, 6cr, 6dd, 6gz, 6ld, 6ky, 6xv, 6xz, 6zp, 6aaw, 6auw, 6axz, 6bbr, 6bm, 6buz, 6byd, 6cbf, 6cdv, 6cct, 6dih, 6eid, 6em, 6vt, 6xbx.

Jules Bastide, 8DD,
16 Place, St. Sernin, Toulouse, France.

1aac, 1abf, 1aid, 1aly, 1ans, 1aww, 1ayt, 1bec, 1beb, 1bd, 1bep, 1bhm, 1bie, 1bgq, 1bhw, 1cak, 1cab, 1cfn, 1ck, 1cme, 1cmp, 1cmx, 1dd, 1ij, 1kp, 1lw, 1my, 1pl, 1sd, 1sf, 1xam, 1za, 2aac, 2ajg, 2afp, 2arf, 2ana, 2awf, 2awp, 2bbn, 2bhw, 2boc, 2brb, 2by, 2bgo, 2bst, 2gh, 2bac, 2bbn, 2bnb, 2bsc, 2ca, 2xq, 3auv, 3ab, 3ajd, 3aha, 3bdo, 3boc, 3bf, 3bhv, 3cgb, 3ch, 3chc, 3chw, 3cjin, 3hh, 3hd, 3khg, 3mf, 3ot, 3oz, 3qv, 3wb, 3wd, 3zm, 4ca, 4eb, 4mb, 4tj, 4k, 5lf, 5lu, 5uc, 7abb, 7cc, 8add, 8aly, 8ago, 8apn, 8bal, 8bhx, 8bjv, 8bpa, 8ccq, 8cnp, 8cvi, 8doo, 8dx, 8gz, 8ugo, 8xk, 8rcv, 9bhc, 9dqu, Canadian 2ax, 2bn, British 4rn, 4gs, Danish 7zm.

T. Mezger, 8EM-8GO,
45 Boulevard De La Saussaye, Neuilly Sur Seine France

1aac, 1abq, 1abs, 1ajg, 1ajx, 1ajz, 1ana, 1aow, 1aom, 1ati, 1au, 1avb, 1bc, 1bcu, 1bqg, 1bia, 1bqk, 1bs, 1bvb, 1by, 1cak, 1cc, 1cip, 1ck, 1ckp, *1emp*, 1dd, 1dt, 1er, 1fd, 1fg, 1if, 1ij, 1kc, 1om, 1ow, 1pd, 1pw, 1qp, 1sw, 1vj, 1vw, 1wl, 1xav, 1xax, 1xf, 1xv, 1xz, 1xb, 1zad, 2aal, 2aax, 2ax, 2qjd, 2afp, 2au, 2ana, 2arf, 2ari, 2ag, 2bqg, 2bh, 2bqu, 2brb, 2brc, 2bum, 2bx, 2cgb, 2cg, 2cil, 2cqv, 2evp, 2du, 2dx, 2gc, 2hh, 2ief, 2in, 2iw, 2jf, 2kc, 2mg, 2mu, 2my, 2qh, 2rr, 2ts, 2ajd, 2ajp, 2aix, 2ar, 2auv, 2bc, 2bco, 2bd, 2bdo, 2brg, 2bqg, 2bhv, 2bss, 2btu, 2cbl, 2cog, 2cdm, 2cei, 2chh, 2cia, 2hh, 2hg, 2mb, 2mu, 2oo, 2ot, 2qv, 2vh, 2vw, 2wb, 2yo, 4ew, 4eg, 4eq, 4fi, 4lo, 4rr, 4xx, 5aal, 5agj, 5cn, 5cy, 5uk, 7afz, 7bd, 7ets, 8ada, 8add, 8aex, 8aly, 8amr, 8ar, 8atp, 8ava, 8bfe, 8cer, 8cei, 8nb, 8ss, 8uar, 8adh, 8bye, 8cii, 9ded, 9ffy, 9dtk, 9nu, Canadian, 1ar, 1bq, 2be, 2bo, 2cg.

F8AQ, Gassi, Rue Marcellin, Barcelot, Arpajon, France.

1aar, 1abd, 1ajg, 1are, 1arf, 1bal, 1boc, 1bdb, *1bd*, 1ckp, 1cmj, 1fd, 1hn, 1lw, 1sf, 1tv, 2aay, 2agk, 2awf, 2bco, 2biy, 2bqu, 2pd, 2qh, 2xq, 3og, 8adg, 9bvt, nkf, wgh.

J. L. Menars, F8FJ
Longchamp, Bordes, (B.P.), France

1aac, 1aaz, 1abc, 1abp, 1ael, 1afn, 1afu, 1agj, 1aky, 1anq, 1apc, 1aq, 1ary, 1asf, 1asr, 1auu, 1au, 1axa, 1bef, 1bcr, 1bd, 1bdx, 1bel, 1bhm, 1bqk, 1bkr, 1boa, 1bsd, 1bsz, 1bwi, 1bz, 1cak, 1cap, 1ccx, 1cjj, 1cmp, 1cpo, 1erm, 1osw, 1gr, 1er, 1iv, 1kc, 1ky, 1xae, 1xaf, 1xv, 1yb, 1ze, and 1agd, 1are, 1arp, 1bqg, 1ob, 1ju, 1my, 1ow, 1py, 1rp, 1sf, 2agd, 2av, 2bkn, 2blu, 2bu, 2brb, 2bse, 2bv, 2ccl, 2cga, 2cjl, 2ck, 2ca, 2cnk, 2cpd, 2csl, 2cx, 2cxw, 2dx, 2gk, 2kf, 2ku, 2kx, 2pd, 2na, 2xu, 2bg, 2xao, 2ad, 2ad, 2ad, 2aq, 2av, 2aw, 2bx, 2bz, 2bg, 2bja, 2bia, 2bf, 2bov, 2bq, 2ba, 2bs, 2bt, 2ot, 2btu, 2bdo, 2bco, 2bwj, 2bva, 2bzb, 2bv.

3vda, 4adp, 4ady, 4bz, 4cr, 4dq, 4eq, 4eo, 4fg, 4io, 4iu, 4pk, 4oa, 4tj, 4xe, 4sa, 4zd, 5ct, 5fu, 5kc, 5mi, 5nn, 5ov, 5ph, 5vau, 5xaa, 5xau, 5xe, 5za, 5bg, 5apw, 6arb, 6bar, 6bel, 6bjj, 6bor, 6bra, 6bur, 6cgv, 6gx, 6lv, 7abb, 7age, 7ahl, 7bj, 7da, 7fq, 7gr, 7iw, 7sl, 7zu, 8aba, 8agm, 8abs, 8aly, 8awj, 8bbf, 8bfe, 8cew, 8cge, 8ctv, 8cyl, 8dk, 8dl, 8fm, 8nz, 8sp, and 8gz, 9ade, 9bmu, 9cnd, 9ckp, 9clq, 9cog, 9dmk, 9mcc, 9cky, 9eky, 9elq, Canada, 1ar, 1dd, 1dq, 1dt, 2cg, 4io, 9al, Mexico, 1b, bx, Cuba, 2by, dz, Argentine, da8, Chile, 9tc, Hawaii, 6bdt, 6tq, 6zac, Australia, 2cm, 3bd, 3bg, 3bm, 3bq, Japan, 1fwa, India, 2iv, South Africa, 5sa, 1j, New Zealand, 1ao, 1ac, 1ax, 1ya, 2ac, 2xf, 3ap, 4aa, 4ag, 4ak, 4ar, 4ao, 4fz.

J. Westerhoud, Jr.

32 Utrechtschestraat, Amsterdam, Holland.
(November)

1aac, 1aid, 1ana, 1anr, 1agg, 1asi, 1aww, 1bqg, 1bhm, 1bie, 1bis, 1blb, 1boa, 1bvl, 1cab, 1cak, 1cmp, 1cv, 1gw, 1kc, 1kc, 1ko, 1my, 1pl, 1sf, 1sw, 1xi, 1kd, 1kw, 1kz, 2afp, 2agb, 2awf, 2bbn, 2brb, 2brd, 2bg, 2bse, 2cei, 2cog, 2cvi, 2cb, 2kuj, 2rk, 2ud, 2ab, 2bco, 2bss, 2cbl, 2cdg, 2ckc, 2dy, 2hs, 2mb, 2ar, 2wb, 2kk, 5lu, 5uk, 5adg, 5amr, 5aol, 5aly, 5cbp, 5eko, 5dgo, 5doo, 5nb, 5pl, 5up, 5wo, 5xax, 5kav, 5kb, 5emr, Canadian, 1ar, 2ak, 2az, 2bs, 2cg.

IIER, Milano, Italy.

1aw, 1bvs, 1boa, 1bie, 1bgq, 1bec, 1bsd, 1cmp, 1ca, 1gv, 1kc, 1sf, 1xm, 2ana, 2bvs, 2btw, 2bg, 2co, 2sp, 3adb, 3ajd, 3bcm, 3cbe, 3qv, 3vu, 4rr, 5hl, 5mco, 5bur, 6ows?, 8add, 8pl, 8up, Canadian, 3bu.

L. O. Doran, KUDG.

SS. West Jester, Struthers & Barry SS. Co., San Francisco, Cal.

At Kobe, Japan, 2ac, 4aa, 4ag, U. S., 6agk, 6apw, Inland Sea, near Moji, Japan, Aus, 2cm, 3bq; New Zealand, 4aa, 4ag, 4ak; United States, 6ag, 6ahp, 6bdt, 6ccl, 6cto, Yellow Sea, near Dairen, Korea, Australia, 2ac, 4aa, 4ak; U. S., 6akz, 6awt, 6bcp, 6bl, 6ego, 6zp.

2,000 to 3,000 miles west of San Francisco.
Aus, 3bq; Can, 5an, 5bz; Mex, 1b; N. Z., 1ao, 2ac, 2ap, 4aa, 4ag, 4ak, 1bqg, 1gv, 1kc, 2zz, 3bhv, 4xe, 5ds, 5dw, 5in, 5ij, 5mi, 5mc, 6ac, 6age, 6agk, 6ajh, 6aly, 6apw, 6ar, 6bjh, 6br, 6bdt, 6bfw, 6bjj, 6blw, 6bql, 6bvg, 6cay, 6ced, 6cei, 6ccl, 6cfl, 6clx, 6cjj, 6cln, 6ctf, 6ctg, 6gr, 6gt, 6of, 6uf, 6ut, 6vo, 6xbn, 6xp, 6yb, 7abb, 7ahl, 7aim, 7ajy, 7fd, 7gr, 7pn, 7qd, 7zm, 8auw, 8bvn, 8gr, 8ado, 9bm, 9buk, 9cjc, 9emm, 9ctr, 9dcd, 9dhw, 9dyn, 9nv, 9xi.

3,000 to 4,000 miles west of San Francisco.
Aus, 3bq; Can, 5an; N. Z., 2ac, 4aa, 4ag, 5dw, 6ag, 6age, 6agk, 6ahp, 6ai, 6al, 6alb, 6ame, 6arb, 6br, 6bdt, 6bfw, 6blw, 6bql, 6bcr, 6bts, 6bur, 6ccl, 6cgo, 6civ, 6cmi, 6fy, 6gt, 6is, 6vo, 7aim, 7fd.

In and near Yokohama, Japan.

Aus, 3bq; N. Z., 2ac, 4aa, 4ak, 5dw, 6aao, 6abc, 6agk, 6ahp, 6arb, 6bql, 6cgo, 6lj, 6of, 7fd.

Logged by Ex 7ZG, SS. Lillian Luckenbach.
En route from New York to Los Angeles.

November 25, About 150 miles NE. Panama Canal, 1aid, 1awa, 1bec, 1bqg, 1bhm, 1ck, 1dd, 1ga, 1py, 1xam, 2aan, 2ag, 2bqu, 2cjj, 2epa, 2esa, 2evu, 2qh, 2tp, 2adp, 3apv, 3auv, 3bco, 3bhv, 3bof, 3bss, 3btu, 3cdg, 3chg, 3cin, 3hh, 3jo, 3oq, 3jw, 4mi, 4my, 4ke, 4sl, 5at, 5adv, 5afu, 5apc, 5oi, 5ox, 5py, 5za, 5zh, (Cu) 6ec, 6adt, 6ame, 6vc, 8add, 8bcl, 8rv, 9dqu, 9dbm, 9cjc, 9cm, 9dqa, 9eky, 9zt, (Cu) dz, (M) bx.
Nov. 26, South of Panama Canal, 1bge, 1bri, 1bhn, 1cak, 1eme, 1fr, 1kc, 1lw, 1pl, 2aan, 2ag, 2agq, 2ahw, 2ajz, 2ajd, 2aoq, 2atg, 2avt, 2ax, 2azy, 2bbn, 2bc, 2byw, 2cbq, 2cjj, 2ela, 2ent, 2esa, 2cty, 2cvs, 2xsf, 2czr, 2eq, 2fk, 2ka, 2ld, 2qh, 3adb, 3adq, 3auv, 3bco, 3bdo, 3bof, 3beb, 3chg, 3hh, 3jo, 3ll, 3og, 3oq, 3wb, 3wr, 4cl, 4mi, 4pk, 4ny, 4uk, 5ac, 5adv, 5afu, 5ags, 5lu, 5ot, 5ov, 5qv, 5fr, 5se, 5uk, 5vy, 5xt, 5zav, 6adt, 6akw, 6ame, 8add 8ag, 8bjv, 8bhn, 8bpl, 8cta, 8dhw, 8no, 8pl, 8xav, 8zf, 9adq, 9axv, 9ghg, 9bht, 9bje, 9bnk, 9bnu, 9bvz, 9cee, 9cfl, 9cjj, 9dbp, 9dqu, 9duw.

(Continued on page 55)

Radio Communications by the Amateurs

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



Biassing Batteries for Detection

West Baldwin, Me.

Editor, QST:

I have been in the Radio game actively for three years and all that time I have had rather bad interference from 60-cycle hum from a 13000-volt power line that runs about 75 feet from my antenna (both receiving and transmitting). Today I got mad with the thing and swore I'd fix either the source or the set. I grounded a 110-volt power line that runs to the shack, and that helped a bit. Then I took the top off the receiver and put different values of condensers across every wire I could find with no result. I then happened to think of the note in QST last year some time, about putting a 3 volt battery in series with a 1250 ohm potentiometer in place of the grid leak and condenser, this didn't seem to work at all satisfactorily so I put a 4½ volt "C" battery in place of the leak and condenser, then I listened; every noise had stopped both 60 cycle and tube noises; it sounded dead but I tuned around a bit and what signals were going (3:30 P. M.) sure did roll in. A couple of hams were testing on fone and came in very clearly (which never happened before). Taking all in all I was very much satisfied. Tonight, after 9 P. M., I put on the fones to see what was going on and the harmonics from B.C. stations were fierce; almost one for every division of the dial. Some were easily readable thru QRN and best of all I heard a couple of 6s and previous to this I have heard only one. QRN is moderate on what I would not call a good DX night. I don't believe this is at all new but why in the name of the Woof Hong isn't the system used?

The set I am using is a Low Loss Reinartz 30-200 meters and a 201-A tube for detector with 45 volts on the plate.

I tried several grid leaks and condensers in the bargain. If this is of any help to anyone in the same fix, go to it and use it.

—Dick Chase, A.D.M., A.D.P.M.

Antenna Fundamentals

241 S. 17th St.,
LaCrosse, Wis.

Editor, QST:

Here is a stunt that we use to find the fundamental of antenna systems. I don't

know if it is old stuff or not but have not seen it used anywhere before.

We use a receiving circuit as shown in sketch with exactly two turns in series with antenna and ground or counterpoise as the case may be. With the tube oscillating we tune the secondary to resonance with the primary and loosen the coupling in order to get a close adjustment. Resonance is of course indicated by the stopping of oscillations. We then substitute the wavemeter for the primary and tune it to resonance. We then repeat the performance with exactly one turn in series with the antenna and get the wave reading. We then subtract the difference of the two readings from the second reading which gives us the fundamental to close margins.

The above is the same as plotting turns in the sending inductance against wavelength but I have found that it is easier and more accurate than the second method. I hope this stunt will be of use to somebody.

—Edwin L. Benton, 9ZY-9XBE

(This is good. Also it is accurate with only one careful reading from a single turn in the antenna, but the double reading is very accurate. Loosen coupling between the coil, in the antenna, and the secondary until the click that signifies stopping of oscillation is apparent in only one spot. This loose coupling holds true, too, with the wavemeter. An extremely high resistance antenna will not work with this idea. A real low resistance, at the waves below 50 meters, will work, often, without any coil and merely with the set under it. This may clear up some freak performance.)

SUX On Call Cards

1551 E. 93rd St.,
Cleveland, Ohio.

Editor, QST:

Having started this accursed fad of DX wall paper, permit me to make a couple additional suggestions in connection therewith:

1. That when having DX cards printed, also add at the bottom in very small type your "occupation". The bugs are much interested in each other's occupations.

For example if one ham is a lawyer and he receives a card from another fan and reads that he is a lawyer, more friendships will spring up thru the air because the hams will frequently find they have something more in common than radio alone. An

American machinist might be tickled to death to get a card from an English or Australian machinist for then he might want to write and ask how certain things were done overseas.

It certainly would put individuality and kick into this DX card fad.

2. I have received a number of cards lately from listeners who have no official call as yet. I would like to suggest that BCL'S and other listeners print the name of their city or town in colored type on their cards as that gives an indication of the location of the listener at a glance when visitors come in to see your array of DX wall paper.

—D. A. Hoffman, 8UX

Re Conventions

445 McKee Ave.,
Monnesen, Pa.

Editor, QST:

Have been wondering ever since I began to get notices of radio conventions why they don't hold them when someone else besides the gentlemen of leisure can attend.

The largest radio conventions are always held in September and October, just too late for the largest part of the DX men to attend. Why not hold them during the summer months when the college men, the high school fellows and the working men are on their vacations? Of course its warm then but why not sacrifice comfort and have the convention when the most can attend, especially when the convention is being held for the gang. The college man cannot attend because it comes at a time when he can't get away without falling behind in his classes and for the high school fellows—well the Sr. operator has something to say about that. The working man gets his vacation in the summer when work is slack and couldn't possibly have it later when work is picking up again.

—Ned Culler, SCIX.

Suggestions for Transmitters

c/o U.S.S. Wood
San Diego, Cal.

Editor, QST:

Have been visiting several ham stations lately and of course I have a bean full of new ideas. Well, I guess ur the goat and I am writing you in case I might have hit on one good one. Anyway, that's what a wastebasket is for.

It has been known for some time that there is dead-end loss in a receiver where there is any appreciable amount of inductance on the dead end side. Well, how about transmitters? My idea is that as there is considerable more power there it would be all the more reason for not having so many dead ends. A lot of fellows buy a

large inductance which is fit for about 300 meter work and try to build an efficient 80 meter set on it.

In makinig some tests on short waves I had occasion to use a condenser in series with the aerial. I obtained a tinfoil-mica condenser with the correct capacity and put it in there. Well, my note was hardly readable, as can be testified to by 6ACZ or 6AOH, seemed to change frequency the longer the key was held down. To counteract this I built a condenser using ruby mica 2" by 1½" and two pieces of brass about 1/16 inch thick and 2¼ inches long by 1¼ inches wide, using the mica between and on each side of the brass strips. This unit was clamped between two pieces of bakelite 2½ inches square. That cured the note.

Some 9 rediscovered the fact that an oscillator of most any type will work better with a C battery than with a grid leak. This includes transmitters. Guess the reason for discarding the C battery was because the upkeep was a nuisance. Well, here's the idea. Most hams are using a plate transformer similar to the Radio Corp. which uses a filament winding and also a kenetron winding and also a plate winding. Well, what's wrong with having a chemical rectifier of two jars (which will not have to be very large) and using the kenetron winding on the grid in conjunction with an old 4000-ohm receiving potentiometer? This arrangement to be fed to the grid on the low-potential side of the inductance and applied to the circuit in series with a R.F. choke, and put across a condenser large enough not to effect the period of the circuit.

—Deen W. Imel, "WN," 6BOI, ex-9BZZ.

How Much Longer Must This Be True?

Str. J. J. Boland,
Marine Post Office,
Detroit, Michigan.

Editor, QST:

I notice every day hams are dropping from the relay game because they are disgusted with the fact that after raising about 30 stations in an evening 29 will come back with, "QRK? QTC? ur QSA om nil hr cul pse QSL crd 73 sk", and the 30th will hand you a message as follows, "Best regards by radio, sig. John." Now the reason for this condition is that the public realizes it can get a message to its destination quicker by using a penny post-card and even the amateurs admit we don't move traffic fast enough because we waste time handling a msg. more times than necessary, and connecting up with stations who are in the wrong direction to take our traffic.

At present a station located in Ohio hav-

ing traffic for New York, for instance, CQs and says "traffic east." Chances are he connects with a station in an eastern state but the station he raises might be a long way from N. Y.

Now my plan is as follows. Take for example station 8BIU, located in Ohio, having traffic for Indiana, Mississippi, Texas and New York. He will proceed as follows, preferably during the first 15 minutes of the hour; QST QST QST de 8BIU 8BIU 8BIU Ind Ind Ind Miss Miss Miss Tex Tex Tex NY NY NY QST QST QST de 8BIU 8BIU 8BIU ar. That will give listeners in those states who are listening for traffic an opportunity to hear their state called and if one of them raises 8BIU he will land a msg near its destination with little time lost. Since almost every station nowadays has a range of 500 miles at night, with this method we could put messages near or right at their destination with less waste of time and less pounding of the key.

This idea if put in practice would tend to do away with the CQ pest for stations would no longer listen for a CQ when looking for traffic but would listen for the call QST, being sure then to land a station with traffic that meant something, and not connect with a CQ pest looking for new DX.

I don't mean however, that only the first 15 minutes of each hour should be devoted to the above arrangement, but I do mean that is the time we should all try to QRX if possible to give stations an opportunity to connect up, and then too, many an evening about 7 P. M., for instance, just before leaving to see the YL we have about 15 minutes we could sit down and probably grab off a msg right for our state, city, or neighboring state.

How about it, operators, is the plan worth trying?

—Herbert Matzinger, 8BIU, Opr. KDWB.

Losses in Sockets

6233 Webster St.,
Philadelphia, Pa.

Editor, QST:

Since a socket is usually in parallel with the tuning condenser, it is of no value to have low loss construction in the condenser when a poor socket forms an appreciable shunt. (True when using a "C" battery and no grid condenser or leak. In case of grid condenser and leak, the loss, essentially, consists of leakage from plate and grid to filament.—Dept. Ed.) On the other hand, in dealing with the very short waves, any metal in close proximity to the leads in the tube base causes a considerable increase in the tube capacity making it difficult to get "down". A step in the right direction has been made in the construction of the De Forest tubes where the

base is of porcelain without the usual metal shell.

QST recently published a suggestion for mounting tubes to obtain a minimum amount of capacity but this involved the removal of the shell around the base and made a rather cumbersome arrangement for connecting the leads. In consideration of this I would suggest a perhaps better arrangement. It is well known that the General Radio Socket has a removable nickel plated shell which is held in position by two screws. If the shell is removed, the remaining portion is merely a bakelite ring containing the contact clips and screw connections. This, I feel, in connection with a tube with a porcelain base, forms an ideal arrangement and the tube is held firmly in place by the peculiar clamping action of the springs. It is needless to suggest that care is required in inserting the prongs of the tube in the proper contacts, otherwise the tube may necessarily be relegated to a condition of permanent desuetude.

—Louis H. Buehl, Jr., 3AEI.

As we go to press we learn that 4XE and 1XAM have hung up another daylight record. They worked perfect two-way communication on about twenty meters from 10.20 A. M. till 12.07 P. M. The distance is about 1200 miles.

CALLS HEARD

(Continued from page 52)

9egh, 9ek, 9eky, 9eld, (Cu) 9eel.
Nov. 27 300 miles N.W. Panama Canal, 1aul, 1bec, 1blb, 1fg, 1kc, 1xam, 2av, 2afp, 2ecu, 2brb, 2cei, 2eq, 2ub, 3bof, 3bss, 3jh, 3vw, 3zd, 4io, 4ip, 4js, 4uk, 4sb, 5ail, 5ew, 5mi, 5zav, 6ame, 6cgv, 6cto, 6xi, 8ecd, 8ecd, 8evo, 8gz, 9bhz, 9dtk.

Nov. 28, 700 miles N.W. Panama Canal, 1aaw, 1abf, 1bcu, 1boa, 1bdt, 1bvb, 1cmp, 1fd, 1sf, (Can.) 1ar, 2cjj, 2ety, 2brb, 2evs, 2dh, 3bof, 3bhv, 3hh, 3jo, 3jh, 3wb, 4fs, 4ow, 4hw, 5air, 5auq, 5ac, 5rh, 5uk, 6br, 6eks, 6eto, 8ada, 8hau, 8bqr, 8cto, 8cie, 8gz, 8pl, 9aip, 9dau, 9dfo, 9eha, 9eky, 9zt, nkf, (M.) 1j.

Nov. 30, 1600 miles S.E. of Los Angeles, 1aaw, (Mex.) 1el, 1ez, 1gv, 1zl, 2by, 2le, 2bg, 3bp, 3cjin, 3uf, 3ni, 4ba, 4tj, 4jr, 4io, 5agu, 5auw, 5air, 5amh, 5md, 5ik, 6awt, 6bdt, 6bcp, (Cu) 6eel, 6efz, 6esa, 6eax, 6chl, 6enl, 6ea, 6aph, 6bvg, 6bur, 6bny, 6gz, 6rc, 6vc, 7mf, 8aly, 8atp, 8aal, 8bau, 8bqr, 8ci, 8ado, 9ape, 9alm, 9bgh, 9bmx, 9ecc, 9ccm, 9cdv, 9er, 9ny, 9hn, 9vd, nfv.

Dec. 2, 1,000 miles S.E. Los Angeles, 1abf, 1fd, 1pl, 1op, 1st, 1xav, (Mex.) 1b, 2by, 2cei, 3ade, 4ne, 4ku, (P. R.) 4sa, 5adh, 5afu, 5ame, 5aju, 5ahd, 5ea, 5ek, 5ew, 5hl, 5ik, 5in, 5lu, 5ny, 5ox, 5ay, 5se, 5uk, 5zai, 6aan, 6age, 6awt, 6bcp, 6bgv, 6bjj, 6blw, 6bny, 6buw, 6cae, 6edn, 6egk, 6efe, 6emo, 6erw, 6erx, 6eaz, 6eb, 6ih, 7ab, 8cvt, 8day, 8doo, 8gz, 8ke, 9bei, 9bfg, 9bhz, 9tj, 9vvo, 9efi, 9evo, 9ccm, 9dqu, 9eky, 9of, 9rc, 9xi.

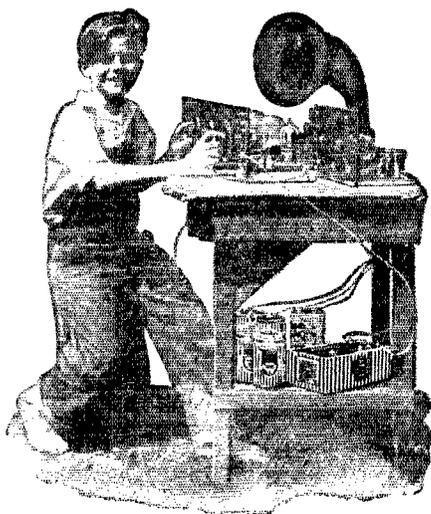
M. Castro Fernandez, ARL
Athur E. Saldana, ATL

No. 13 Olimpo Avenue, Santurce, Porto Rico.

1aac, 1aci, 1aap, 1alw, 1aea, 1ar, 1aur, 1bec, 1cmc, 1eme, 1doz, 1eb, 1pl, 1sf, 1txl, 1vj, 1xav, 2brb, 2bse, 2bvy, 2ekc, 2epa, 2eqz, 2gk, 2tu, 3abq, 3ccu, 3cdv, 3l, 4df, 4ta, 4jk, 4ku, 4mb, 4sb, 5aaz, 5ail, 5aiv, 5ie, 6xi, 7gb, 8ayw, 8hft, 8hxt, 8eci, 8daa, 8zh, 8hn, 8rv, 8vq, 8xav, 9auy, 9car, 9efi, 9db, 9dbf, 9ep, 9ky.

BURGESS RADIO BATTERIES

Radio Engineer *Extraordinary!*



Old folks can take a tip from the family radio expert, for he and his gang constitute the last word in the choice of receiving set parts.

And when boys get together and talk Radio "A," "B" and "C" batteries there's only one brand that they're strong for—BURGESS—because Burgess Batteries are *quiet, serve longer, and they do everything a battery should do—better.*

"Ask YOUR Boy"

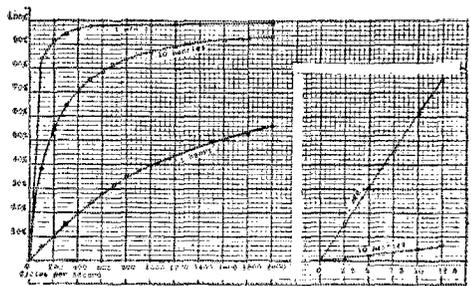


BURGESS BATTERY COMPANY

Engineers DRY BATTERIES Manufacturers
Flashlight - Radio - Ignition - Telephone
General Sales Office: Harris Trust Building, Chicago
Laboratories and Works: Madison, Wisconsin

In Canada: Niagara Falls and Winnipeg

No. 3 of a series of 10.
"FILTER FACTS"
Follow them thru monthly



INDUCTANCE. Inductance in series with the plate supply suppresses a certain per cent of the a.c. component, dependent upon the frequency of the ripple and the value of the inductance. The curves show the per cent of suppression for a 1 henry and a 10 henry choke at common ripple frequencies for a small transmitting tube. For comparison the percentage of ripple by-passed by a 1 mfd. condenser as outlined in "No. 2," is plotted to the same scale. The insert curves are the 1 mfd. and 10 henry curves replotted to show their effects at the very low frequencies common to moving contact disturbances. Note the change in the shape of the curves as the inductance is increased, that the increase in suppression is not directly proportional to the value of "L" and that a small choke will be of little use especially at the lower frequencies.

The condenser curve should not be mistaken for a percentage reduction in ripple. It does not represent suppression, but by-pass. Reduction of the ripple thru the plate circuit takes place only when the current thru the condenser has become so large that it "breaks down" the ripple voltage. This action is dependent upon the design of the generator, and the load that it is operating under.

ESCO generators are so designed that their minute ripple is of as low amplitude and as high frequency as is practical.

ELECTRIC SPECIALTY COMPANY

TRADE "ESCO" MARK

225 SOUTH STREET

STAMFORD, CONN., U.S.A.

IF INTERESTED IN MAXIMUM MILES PER WATT YOU WILL BE INTERESTED IN BULLETIN 237B



Two Towers

As the Eiffel Tower stands as a monument to skilled engineering construction so TOWER'S Scientific phones stand as a monument to supreme radio achievement. Each phone is carefully tested and approved before it leaves the factory by a Government Licensed Radio Operator thus guaranteeing perfection in tone quality with a positive uniformity of volume. Lightest of all in weight (only 8 1/2 oz.) they do not catch in the hair and are unusually easy to adjust conforming gracefully to the head.

If your dealer cannot supply you, order direct, we will ship immediately Parcel Post C.O.D.

THE TOWER MFG. CORPORATION

95 BROOKLINE AVE. Dept. G BOSTON, MASS.

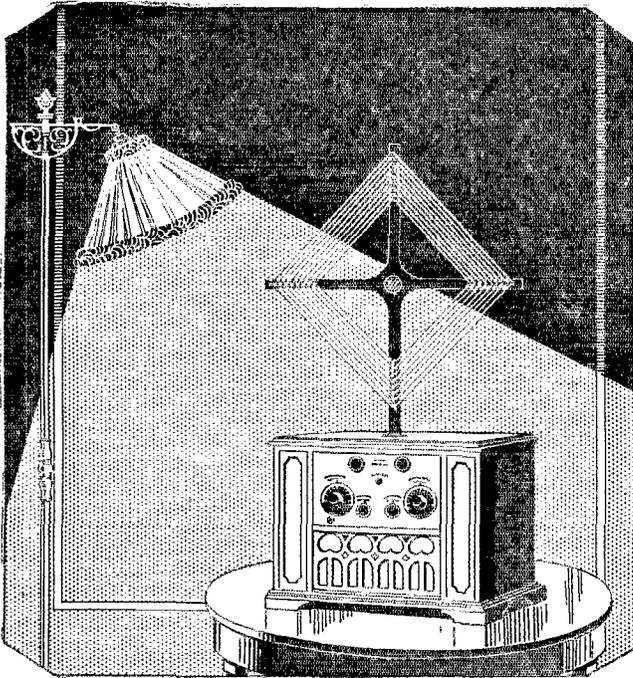
MILLIONS are enjoying music and entertainment reproduced in clear, mellow tones, characteristic of TOWER'S Scientifics.



One of the seven wonders of the world - The Eiffel Tower built in 1887-89 on the Champ-de-Mars contains 3 stories. Reached by a series of elevators, the platform at the top being 985 feet above the ground. In the top story is located the powerful Broadcasting Station F.L.

The World's Greatest Headset Value

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



De Forest Radiophone

*Requires no aerial—
no ground wire*

Batteries, De Forest Loud Speaker and Tubes complete within cabinet.

Easily movable from room to room, it is ready to operate within five minutes after it is delivered to your home.

You have the radio habit now! *You'd better have a De Forest*

WHETHER you have an instrument or not, whether you know it or not, you have the radio habit already. Do you go to the theatre? Do you go to political meetings? Do you read the day's news? Do you seek contact with people who offer either amusement or information? Then you're essentially a radio fan, for radio is giving many of the best of these things in a way in which they cannot be obtained elsewhere.

The De Forest is a complete and self-contained instrument with a loop the size of a picture frame instead of an aerial wire, with batteries and loud speaker self-contained.

It can be easily moved from room to

room. It has a remarkable tone quality. It brings out the voice or instrument as sincerely and truthfully as the performer himself does. And it is an immediate result-getter that is simple to operate!

Whatever there is in radio, the De Forest can give it to you. It yields good results from the beginning and gradually increasing results as your skill grows. *There is nothing else like it.*

It will pay you to look up a De Forest Agent

He is willing and equipped to teach you the simple technique of using the De Forest. Let him demonstrate it in your own home.

DE FOREST RADIO COMPANY, Jersey City, N. J.

Also makers of De Forest Tubes—The "Magic Lamp" of Radio

DE FOREST RADIOPHONE

REG. U.S. PAT. OFF.

REG. U.S. PAT. OFF.

TWIN GIANTS

It requires good audio transformers to take the output of the detector tube and add nothing but volume. And AmerTrans are real giants when harnessed to the task of transforming weak signals into clean-cut, enjoyable, loudspeaker entertainment.

Give the audio side of your set the consideration it deserves and use a pair of AmerTrans.

AmerTran is made in two types, one quality — A F 6 — Ratio 5:1 and A F 7 — Ratio 3½:1.

Buy them by the pair!

Price either model \$7.00 at your dealer's.

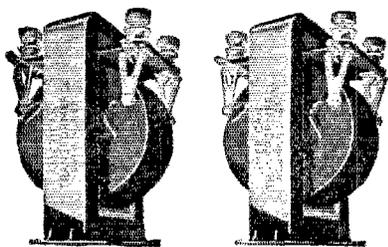
Send for leaflet giving useful amplifier information.

AMERICAN TRANSFORMER COMPANY

176 Emmet St.

Newark, N. J.

"Transformer builders for over twenty-three years"



BLUEBIRD Radio Tubes

Distinctly New and Efficient

Satisfying every radio fan's wish in performance and price. Our direct sales plan enables us to sell at this low figure. "Bluebird" is a sensitive and powerful tube, assuring increased range and clear volume.

| | | |
|-----------------|-----------------------|---|
| Type—200 | 5 Volts, 1 Ampere | Detector Tube |
| Type—201A | 5 Volts, .25 Ampere | Amplifier and Detector |
| Type—199 | 3-4 Volts, .06 Ampere | Amplifier and Detector |
| Type—199A | 3-4 Volts, .06 Ampere | with Standard Base Amplifier and Detector |
| Type—12 | 1½ Volts, 25 Ampere | Platinum Filament Amplifier and Detector |

ALL ABOVE TYPES \$2.50

Type—202

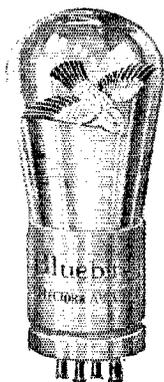
5 Watt, Transmitters, \$3.00
Shipped Parcel Post C. O. D. When Ordering Mention Type.
Designed to give best results in all circuits—Radio Frequency, Neurodyne, Reflex and Super-Heterodyne sets, etc.

Every Tube Guaranteed

BLUEBIRD TUBE CO.,

Dept. S,

200 BROADWAY
New York City



**HAMS! Be Distinctive! Wear
RADIO CALL PINS**

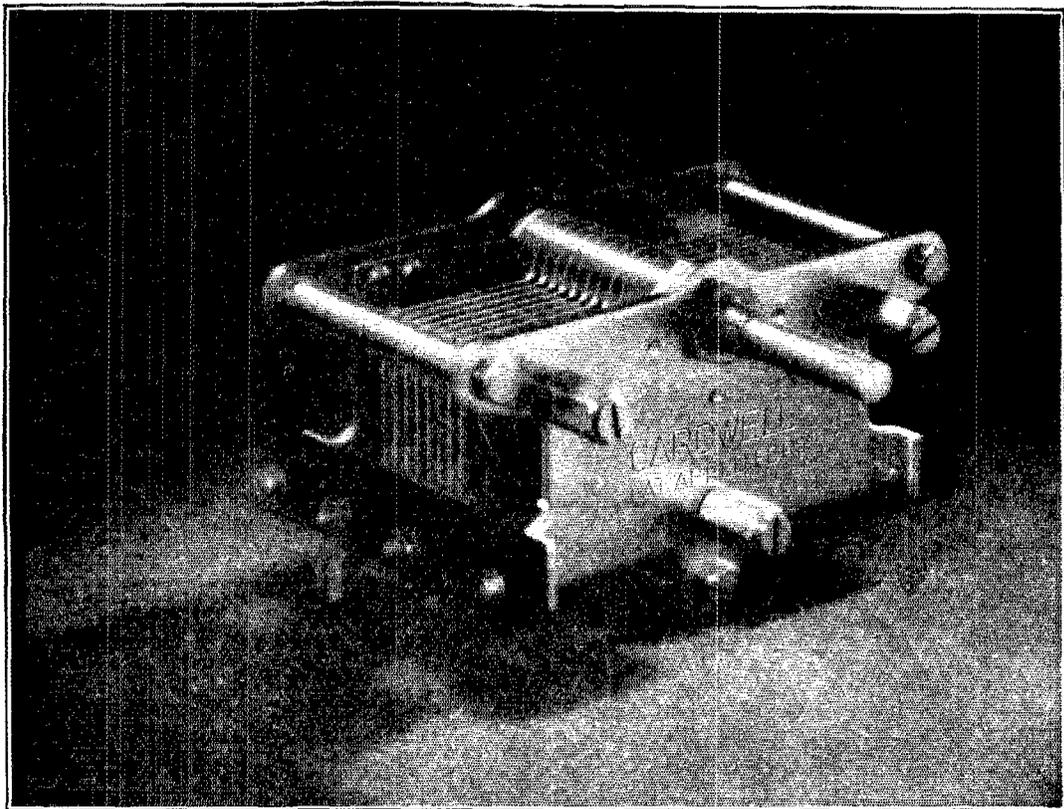
The INSIGNIA of RADIO OPERATORS Everywhere

YOUR STATION CALL in SOLID GOLD LETTERS!
(Actual Size)



Pat.
app'd
for

Slip \$2.50 into an envelope with your call to
R. C. BALLARD
9FZ, 1522 W. Sunnyside Ave., Chicago, Ill.



Insist on **CARDWELLS**

The *first* "low-loss" condensers

CARDWELL invented the original *low-loss* condenser, using metal end plates and a grounded rotor. The phrase "low-loss" was in fact first applied to Cardwell Condensers by engineers to distinguish these highly efficient condensers from the ordinary varieties.

Cardwell Condensers have been universally adopted by radio editors, experts, and professionals. Cardwells have become the standard of comparison.

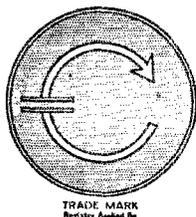
Performance is the only real test of a condenser. And Cardwell Condensers have proved their superiority because of their scientifically correct

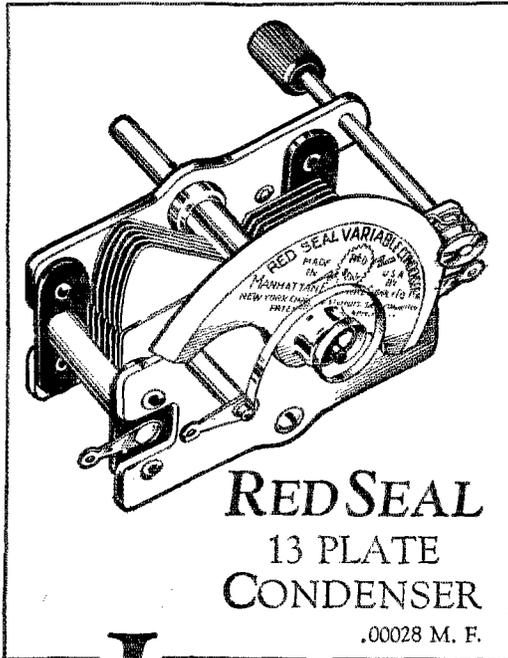
design—small area of contact between insulation and stator supports, rigid three-point frame, permanent alignment, accurate adjustment, etc.

Such details permit exceptional distance records, smooth tuning free from noise, and prevent changes in capacity at given settings.

Use Cardwell Condensers in all receivers. There's a Cardwell Condenser for every requirement—seventy-six different types. A post-card brings you an education on condensers.

Allen D. Cardwell
Manufacturing Corporation
 31 Prospect St., Brooklyn, N. Y.





-Ideal for the amateur set!

GREAT interest is now being shown by amateur set builders in reception and transmission on short wave lengths. Eighty meters is a popular wave length and corresponds to frequency of 3,750,000 cycles. The amateur receiving set of the regenerative type requires setting to within approximately 1000 cycles. The condenser used, therefore, must be adjusted as closely as one part in 3,750. This is a close setting and requires an excellent condenser to make it possible.

The 13-Plate Red Seal Variable Condenser has the correct capacity for amateur receiving sets. A superfine vernier assures easy setting to the desired wave length, and the sturdy mechanical construction insures a permanent adjustment once the condenser has been set. Compare the Red Seal Variable Condenser with others and convince yourself.

The Red Seal Variable Condenser is also supplied in three other capacities

| | |
|----------------|--------|
| 17 PLATE . . . | .00037 |
| 23 PLATE . . . | .0005 |
| 43 PLATE . . . | .001 |

Made by the

MANHATTAN
ELECTRICAL SUPPLY CO., INC.
NEW YORK CHICAGO
ST. LOUIS SAN FRANCISCO

MAKERS OF FAMOUS RED SEAL DRY BATTERIES

on the dot

It's as easy as placing your pencil point on a town on the map—this tuning in with Apex Vernier Dials.

They make logging a simple matter and "getting a station" positive. The ratio is 12 to 1. Sell in Royal Brass Finish for \$2.00—Satin Silver Finish \$2.50—DeLuxe Gold Plated (24k) \$3.50. Applied to any shaft—quickly.

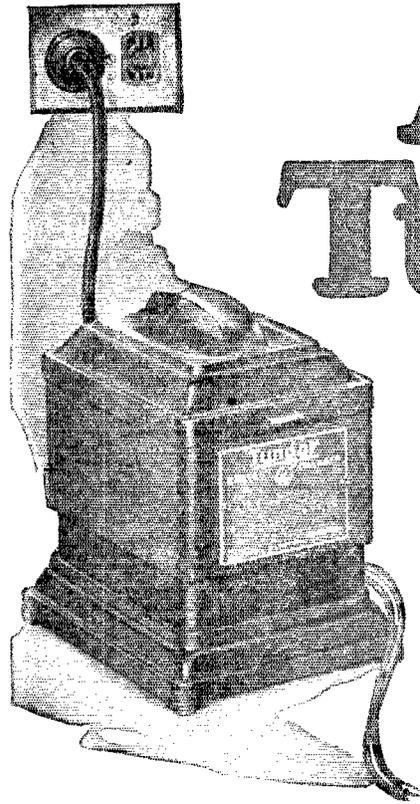
Apex 7-Tube Microdyne—Super-Heterodyne knock-down sets sell for \$97.50. The Apex Super-Five in a Walnut Cabinet is \$95.00. See your better Radio Dealer.

Apex Electric Mfg. Co.
1414 W. 59th St.
CHICAGO
(Dept. 207)

40c each in any value from 1.4 to 10
FRESHMAN SUPERIOR

You can depend upon them to remain accurate at all times. Made of high resistance material impregnated throughout the coated paper. Unaffected by climatic conditions. Will not deteriorate. Clamped between solid knurled ferrules assuring rigid construction and firm contact at all times. At your dealer's, otherwise send purchase price and you will be supplied postpaid.

CHAS. FRESHMAN CO., INC.
Freshman Bldg., 240-248 W 40 St., N. Y.



A new Tungar!

The new Tungar does all the old Tungar did—and more. It will charge both radio A and B batteries, with no change except slipping the wire from one terminal to another. It charges 2, 4 or 6 volt A batteries — 24 to 96 volt B batteries — and auto batteries, too.

It is simpler than ever to use. Just two clips and a plug. No need to disconnect your battery from your set, or make any change in the wiring. The Tungar charges overnight while you sleep. And it makes no disturbing noise.

It is more compact than ever. It has a new bulb, unchanged in principle, but more convenient in size and use. G-E research has made a good product better!

Keep your batteries charged with a Tungar—and get the most out of radio.



300,000
Tungars
already
in use!

The new Tungar charges both radio A and B batteries, and auto batteries, too. Two ampere size (East of the Rockies) . . . \$18

The Tungar is also available in five ampere size (East of the Rockies) . . . \$28

60 cycles—110 volts

Tungar

REG. U.S.

PAT. OFF.

BATTERY CHARGER

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

Merchandise Department, General Electric Company
Bridgeport, Connecticut

GENERAL ELECTRIC

The Daven Super Amplifier

DAVEN AMPLIFIER KITS

For those who build their own
Supplied in form for either 3 or 4 stages—without sockets and condensers.

Sold Everywhere
Manufacturers of the Daven Grid Leak, Resistors and mountings.

Read the Daven "RESISTOR MANUAL" By Zeh Bouck

It is the best Radio Text Book of the season. Full of hook-ups and valuable information for the experimenter and radio designer.
Sold everywhere. Price 25c.

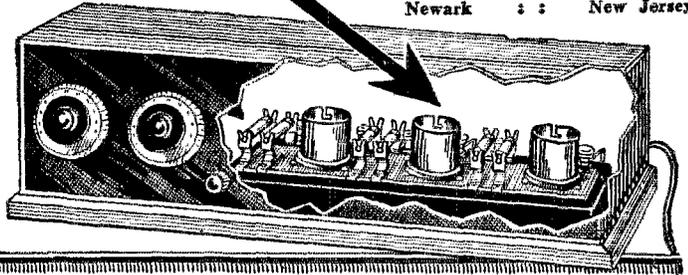
DAVEN RADIO

IS IDEAL FOR ALL TYPES OF RECEIVERS -

This winter thousands of Radio Fans will change over their Amplifiers to the Resistance Coupled System. The DAVEN SUPER AMPLIFIER illustrated in the cut-out, is the most compact amplifier unit on the market. The base is of molded bakelite, in which sockets and all necessary essentials are inserted. It comes ready for immediate use and is unquestionably the simplest method of adding distortionless amplifiers to any receiver.

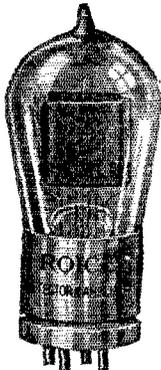
The DAVEN SUPER AMPLIFIER is especially recommended to those who desire the advantages of Resistance Coupled Amplification, but who have hesitated because of the difficulty of obtaining a complete unit. All connections invisible beneath the base. Sold by all First Class Radio Dealers.

DAVEN RADIO CORP.
"Resistor Specialists"
Newark : : New Jersey



No. 4

"ROICE" Radio Tubes



SHIPPED
PARCEL POST
C. O. D.

The Royalty of Radio Tubes. A powerful and durable tube that will greatly improve reception, increase range and volume with a maximum of clearness. Our direct sales plan enables you to buy "Roice" at the lowest possible price.

| | |
|------------------|---|
| Type—200 | 5 Volts, 1 Ampere Detector Tube |
| Type—201-A | 5 Volts, .25 Ampere Amplifier and Detector |
| Type—199 | 3-4 Volts, .06 Ampere Amplifier and Detector |
| Type—199A | 3-4 Volts, .06 Ampere with Standard Base Amplifier and Detector |
| Type—12 | 1½ Volts, .25 Ampere Platinum Filament Amplifier and Detector |

ALL TYPES \$2.50

Type—202

5 Watt, Transmitters, \$3.00

EVERY TUBE GUARANTEED

to work in Radio Frequency, especially adapted for Neutrodyne, Reflex and Super-Heterodyne Sets. *When ordering mention type.*

ROICE TUBE CO. (Dept. S) 21 NORWOOD ST., NEWARK, N. J.

MARLE ENGINEERING CO.

"Radio's Best Transformers"

WRITE FOR LITERATURE

MARLE ENGINEERING CO.

Orange, - - - New Jersey

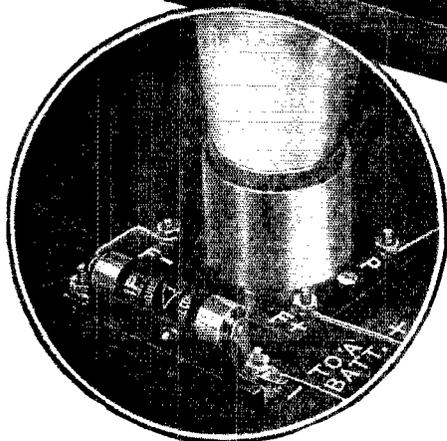
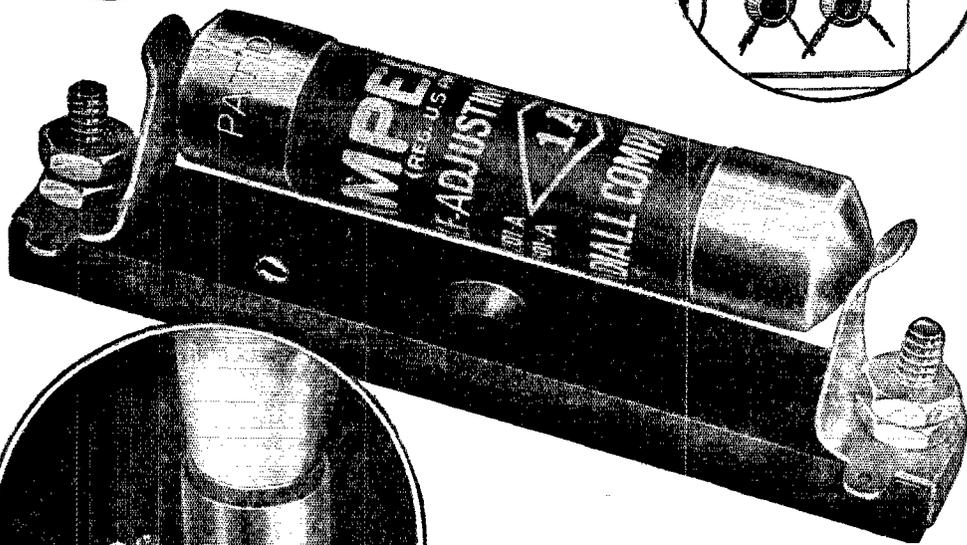
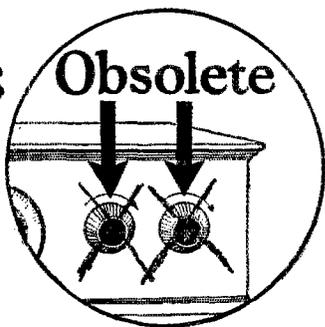
RADIO ENCYCLOPEDIA



FREE! Thousands of radio bargain standard sets standard parts for sets, vacuum tubes, etc., at one-third less than regular prices, also latest information on all circuits, complete list of broadcasting stations and other valuable data. Send name and address, we'll send you 50c book **FREE!** **FREE SERVICE DEPARTMENT**, Mr. Carter at N. Y. 606. *World's best tube you save your radio problems, and furnish up-to-date information of set construction, operation, improve them. The service **FREE!** to our customers. Write today!*

NORWALK RADIO CORP.
Dept. 58 B 66 READE ST., NEW YORK

8 improvements
at ONE stroke



The Self-Adjusting Rheostat

Price \$1.10 Everywhere

Write for
FREE
Hook-Ups

1. Eliminates hand rheostats—simplifying control and giving compactness.
2. Simplifies wiring.
3. Prolongs life of tubes from 2 to 3 times.
4. No moving parts—therefore no grinding noises.
5. Permits use of any type of tubes or combination of tubes.
6. No filament meters necessary.
7. Brings the most out of each individual tube — automatically—no guessing.
8. Makes perfect tube operation absolutely fool proof.

AMPERITE takes the place of a good hand rheostat, a delicate meter and an expert operator. Operates on the thermo-electric principle. Automatically changes in resistance as the "A" battery voltage changes. Mounts conveniently inside the set. No knobs to turn. Nothing to get out of order. Approved by every prominent laboratory. Standard equipment in such sets as Somerseset, Ultradyne, Marshall, Pfansteihl, Kilbourne & Clark, Heteroplex, Cockaday and numerous others. Fully guaranteed.

RADIALL COMPANY

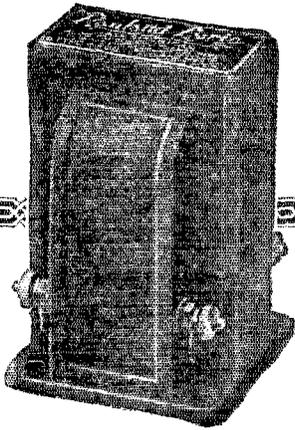
Dept. QST-2

50 Franklin St., New York

AMPERITE

REG. U.S. PAT. OFF.

"means right amperes"



Tonal Beauty Lies Deeper than the Varnish

DEEPER even than the circuit diagram—chiefly, indeed, in the audio transformer.

All-American engineers, builders for years of the largest selling transformers in the world, have achieved another triumph, in the world's finest transformer at any price. Rauland-Lyric amplification, with an ordinary tuner and loudspeaker, has received the plaudits of musical authorities hitherto skeptical of all radio reproduction.

Perfect amplification makes of radio a joy unending. Whoshall say that such a benefit is not worth the slight additional cost?

There is romance in the story of Rauland-Lyric. A request will bring it to you complete—from the original laboratory studies to the auditions with world-famous music critics. Rauland Manufacturing Company, 2642 Coyne St., Chicago.

The price is nine dollars

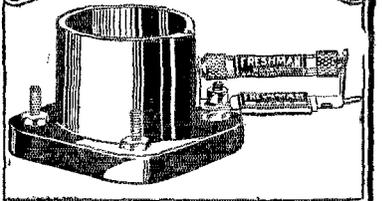
Rauland-Lyric
AN
ALL-AMERICAN
TRADE MARK
TRANSFORMER

The Choice of Noted Music Critics

No Leads, Low Loss!

THE ONLY
PERFECT MICA
GRID CONDENSER

FRESHMAN



Fits right on the Binding
Post of the Detector Tube

It is both a grid condenser and
a perfect grid leak mounting,
made in .00015, .00025, .0005.

At your dealers, otherwise send purchase price and you will be supplied without further charge.

Chas. Freshman Co. Inc.
Radio Condenser Products

FRESHMAN BUILDING
240-248

W. 40th St.,
New York

40¢

DeForest
License



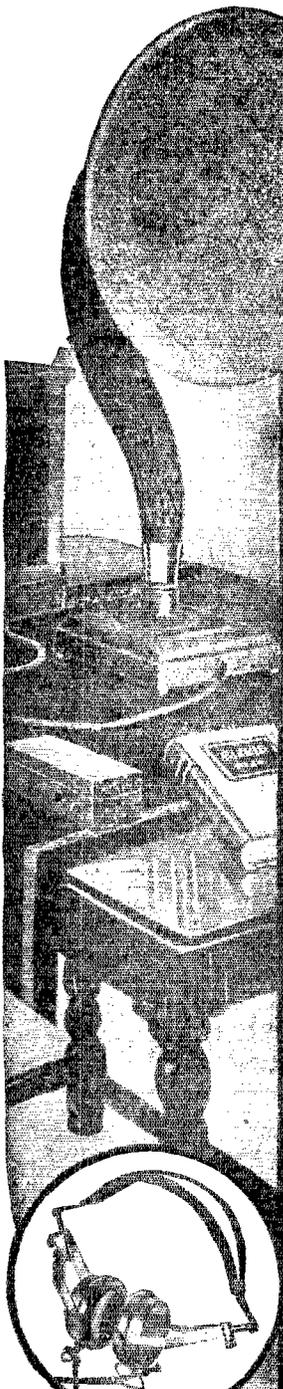
Honeycomb Coils

Back and Front
Panel Mountings
Plain or Geared
Genuine Bakelite

The Universal all-wave inductance—accepted as standard in regard to superior construction and electrical units of measurement. Ask your "Old Timer" radio friend why sets using honeycomb coils are better. They give closer tuning, greater selectivity and range. No dead end losses, easy to operate, in sizes, mounted and unmounted. Interchangeable with all mountings. Be sure the set you buy or build has them.

Send 25c for Super Heterodyne, Radio Frequency and Honeycomb Coil Circuits and Complete Catalog.

Chas. A Branston, Inc.,
Dept. 3—815 Main St., Buffalo, N. Y.
In Canada—Chas. A. Branston, Ltd., Toronto



*The New Stromberg-Carlson
No. 2-A*

Loud Speaker

A Triumph of Radio Engineering

Sensitive to the highest degree, this superb new Loud Speaker reproduces programs with naturalness of tone while its volume of sound is sufficient to fill the largest room on distant station reception.

Graceful in design, with soft, oxidized silver finish, it is unobtrusive; so light it may be readily carried from place to place.

Requires neither extra batteries nor extra stages of amplification; simple and economical to operate.

Price \$17.50 including 5-ft. cord and plug.

Powerful Magnets are essential to sensitiveness, volume, and pure tone quality. The massive construction and power of Stromberg-Carlson magnets give these qualities pre-eminently.

Laboratory tests of the magnets used in the new No. 2-A Loud Speaker show a "pick-up" of 2½ pounds.

Reliable operation is further assured by use of Layer Wound and Layer Insulated Coils, which stand up under high plate voltages.



The new 3A Head Set contains new features that you should know about.

Ask your Dealer

Stromberg-Carlson Telephone Mfg. Co.
1060 University Ave., Rochester, N. Y.

No. 3A
Head Set.

Stromberg-Carlson

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS

Federal Factory Facts

THE plug is the key that unlocks the full possibilities of your receiver. No matter what you are getting off the air, you hear only what the plug lets through.

Buy a No. 15 Federal Plug for your radio phones or loud speaker if you want to know what your radio set can give you.

Buy a Federal Plug today—also take advantage of the other 130 standard radio parts sold under the same Federal iron-clad performance guarantee.

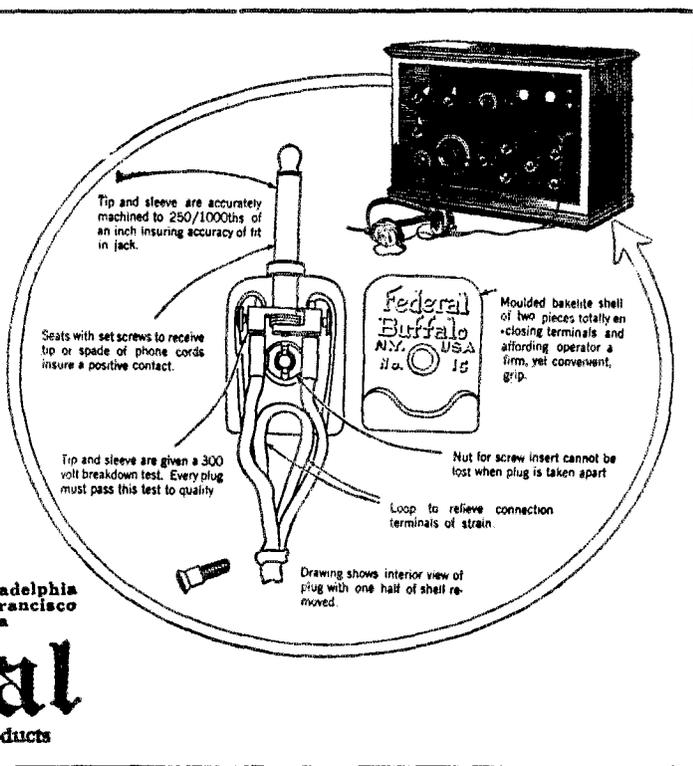
FEDERAL TELEPHONE MFG. CORP.
BUFFALO, N. Y.

Boston New York Philadelphia
Pittsburg Chicago San Francisco
Bridgeburg, Canada



Federal

Standard RADIO Products



We have *specialized*
in the manufacture of

Low Loss Radio Components

The most prominent amateur records in Sweden are accomplished by using our

Low Loss Coils

SMYY near Stockholm heard in Mosul,
Mesopotamia, 2000 miles with
an input of only 15 watts

AGENTS WANTED. Write for particulars.

BALTIC COMPANY, Ltd.
Stockholm, Sweden

Bound Volume VIII, QST

In order to make the volumes of QST conform with the calendar year, we are issuing Bound Volume VIII, August—December 1924, inclusive.

We don't have to tell you of the great worth of this handy volume as a storehouse of the latest and best developments and achievements in Radio.

We do need to tell you that only 50 volumes have been bound—uniform with preceding ones, red cloth and gold imprint. We sold out Volume VII quickly—if you want Volume VIII—and you need it whether you want it or not), send \$2.50 today and we'll mail it postpaid, promptly.

QST

1045 Main St.

Hartford, Conn.

They say-

(continued from last month)

5

THEY SAY OF THE ULTRADYNE L-2:

"Selectivity is so high and amplification so strong that distant stations can be tuned in through local stations and put on the loud speaker."

Ultradyn e amplifies with Thordarsons!

6

THEY SAY OF THE PFANSTIEHL MODEL 7:

"People now want trouble-proof service and purity of tone. The new Pfanstiehl . . . gives a clear, natural tone at any distance . . . There is no distortion, however great the amplification . . . It comes in like velvet . . . Two stages of audio amplification—low ratio, of course, to give perfect quality, with all the volume desired."

Pfanstiehl amplifies with Thordarsons!

7

THEY SAY OF THE HOWARD NEUTRODYNE:

"It brings in distant stations distinctly. It has natural tone qualities. It has remarkable volume."

Howard amplifies with Thordarsons!

8

THEY SAY OF THE RADIODYNE:

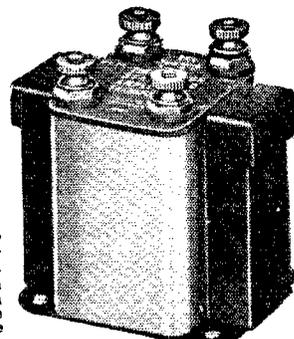
"When you own a Radiodyne you can hear singers' voices and orchestral harmonics faithfully reproduced through the loud speaker . . . so clear and distinct that you lose nothing."

Radiodyne amplifies with Thordarsons!

ZENITH
KENNEDY
RADIODYNE
THERMIODYNE
ULTRADYNE
MURDOCK
QZARKA
Pfanstiehl
MICHIGAN
Deresnadyne
MALONE LEMON
MASTER RADIO
ROYAL
Howard
Pathe
HARMONY
AUDIOLA
GLOBE
SAAL AND
MANY OTHERS

Super-Het Builders!

"RADIO" and other leading publications recommend in highest terms the Thordarson 2:1 ratio transformers for the Best Super-Heterodyne. Take no others!



When Better Transformers Can Be Bought- They Will Be Thordarsons!

Tone quality! Clear, natural reception! Even volume over the entire musical range! That is what the public demands today. And is getting in the finer sets—equipped with Thordarsons for musical amplification.

Leading set makers continually test and compare transformers. They use **more** Thordarsons than all competitive makes combined—which answers the transformer question. If you want the best amplification, simply follow their lead; **build or replace with Thordarsons!** All stores can now supply you. Accept no substitutes. If your dealer is sold out, you may order from us by mentioning his name. Interesting bulletins on amplification mailed free. Write.

THORDARSON ELECTRIC MANUFACTURING CO.
Transformer specialists since 1895
WORLD'S OLDEST AND LARGEST EXCLUSIVE TRANSFORMER MAKERS
Chicago, U.S.A.

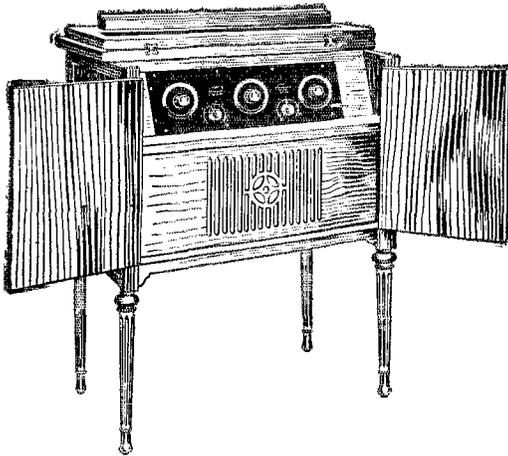
Unconditionally Guaranteed

THORDARSON

Super
AMPLIFYING TRANSFORMERS
Standard on the majority of quality sets

TYPES AND PRICES: Thordarson "Super" Audio Frequency Transformers are now to be had in three ratios: 2-1, \$5. 3½-1, \$4. 6-1, \$4.50. Thordarson Power Amplifying Transformers are \$13 the pair. Thordarson Interstate Power Amplifying Transformer, \$8.00. Write for latest look-up bulletins—free!

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



The man who said, "A prophet (or product) is not without honor save in his own country." did not know about the Radiodyne. We quote from a letter sent out by Julius Andrae & Sons Co., Wisconsin's leading radio jobber, "There were more Radiodynes sold in this state last year than of any other model." A product that is the leader in its own town or country is a good product, indeed. The Radiodyne is popular because it will bring in the program you select clear and distinct no matter where radiocast or where you live.

Some RADIODYNE

Type WC-12 Features

Has an Amazing Degree of Selectivity
Uses 6 Dry Cell Tubes
Receives from Great Distances

Has Wonderful Volume
Exceptional Clarity
Self Enclosed in Beautiful Two-Tone Mahogany Cabinet

Models Range in Price from \$65.00 to \$250.00

Write for Our Free Booklet

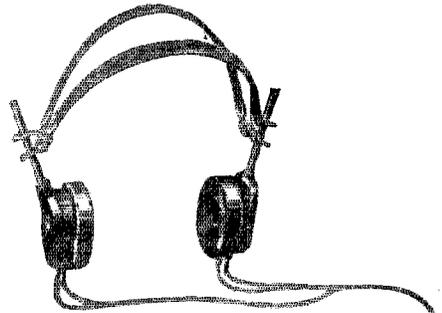
WESTERN COIL and ELECTRICAL CO,

311 Fifth Street, Racine, Wisconsin

If you can get it with any set you can get it Better with the

RADIODYNE

"The Voice of the Nation"



Murdock Phones

are backed by 20 years of successful experience. There are over 1,000,000 in use today. Murdocks are famous for distinct reproduction and for their light weight. With the Murdock Multiple Plug you can use from one to four phones at the same time

WM. J. MURDOCK CO.
343 Washington Ave., Chelsea, Mass.

(Free Booklet)

Write for our free booklet "The Ears of Radio". It contains important data on headphones.



MURDOCK RADIO PHONES

Standard since 1904

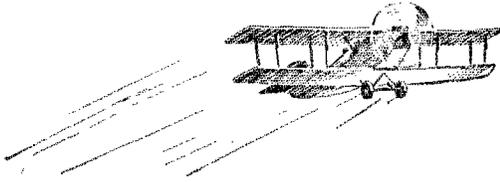
from Coast to Coast
from Gulf to Hudson Bay

BRACH
vacuum arresters
have protected
principal Railway Signal
Systems, Police and
Fire Circuits, and
RADIO
for 18 years

Approved by National Board
Fire Underwriters
No. 2082

SAFETY
demands the
BRACH
vacuum radio arrester

L. S. BRACH-MFG. CO., NEWARK, N. J.



Bringing to earth the airplane type receiver

RADIO frequency transformers as designed by Jackson H. Pressley, Chief Engineer, Radio Laboratories, U. S. Signal Corps, Camp Vail, New Jersey, and manufactured by the Sangamo Electric Company, assure you of precision instruments.



The essential needs for airplane use are:

- First—Extreme compactness with maximum amplification per transformer stage;
- Second—A transformer so designed that there is negligible coupling between stages no matter how they are spaced;
- Third—Stability without the aid of manual controls.

It was only after months of experimenting that Mr. Pressley was able to attain these results, and the adoption of his transformers as standard for airplane use speaks for itself.

A set of these radio frequency transformers and coupler coil will be delivered anywhere in the United States for \$22.50. (Introductory price)



ASSOCIATED SANGAMO ELECTRIC COMPANIES CAPACITY 3500 METERS PER DAY

SANGAMO ELECTRIC COMPANY
Springfield, Illinois

BRITISH SANGAMO COMPANY LIMITED
Pondersend, Middlesex, England

SANGAMO ELECTRIC COMPANY
OF CANADA LIMITED *Toronto, Ontario*

ASHIDA ENGINEERING COMPANY
Osaka, Japan

8820-2

Domestic Offices—New York, Chicago, Birmingham, San Francisco, Los Angeles. Radio Division—50 Church Street, New York



PRICES

PZ indicates panel type with switches.
 GZ is plain type without switches.

| Voltage | M. A. H. | Type PZ | Type GZ |
|---------|----------|---------|---------|
| 130 | 2500 | \$36.00 | \$33.00 |
| 100 | 2500 | 27.50 | 24.50 |
| 70 | 2500 | 21.50 | 18.50 |
| 45 | 2500 | 16.00 | 14.50 |
| 22½ | 2500 | | 7.50 |

KIC-O CHARGERS

| | |
|--|--------|
| Type K-1 Single un-mounted | \$1.50 |
| Type K-2 Single mounted | 3.50 |
| Type K-3 Multi-Polar mounted | 5.00 |
| KIC-O Special Charger Chemicals (one cell) | .50 |

Each unit bears a printed guarantee of protection against electrical and mechanical defects. Write for further information or see a KIC-O dealer.

You Take No Chances With KIC-O Batteries

This storage battery supreme is now serving radio fans all over the country. It is giving clearer reception, and avoiding the annoying difficulties so often met with in the use of inferior batteries. KIC-O "B" Storage Batteries give an even, dependable discharge over long periods of service. They are not harmed by standing idle or by over-charging. Nickel-zinc elements, including in their composition liberal proportions of iron and nickel, preserved by a special alkaline solution, give KIC-O "B" Batteries practically unlimited life.

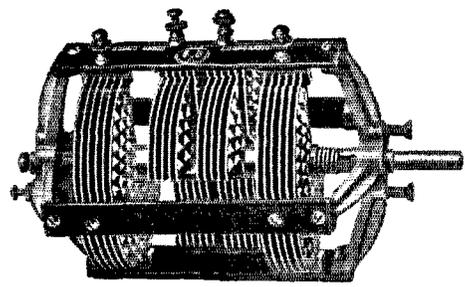
With KIC-O Double and Single cell Chargers you recharge your "B" Batteries at a small cost from any regular 110-volt A. C. lighting line. Let KIC-O Equipment end your radio "B" battery troubles NOW.

KIMLEY ELECTRIC COMPANY, Inc.

2666 Main Street, Buffalo, New York

See your dealer or CLIP THE COUPON

Kimley Electric Co. Inc.
 2666 Main St., Buffalo, N. Y.
 Gentlemen:
 Please send items checked below to the undesignated address:
 KIC-O "B" Battery Type.....
 Voltage..... Price.....
 KIC-O Charger (specify which)
 Full information regarding KIC-O equipment.
 Send C. O. D. subject to guarantee of satisfaction or money back to



LIST PRICE
 \$7.50

"Bruno"
 Ultra-Vario Condenser

Pats. Pend.


8 in 1

A balanced precision instrument scientifically designed, having minutely small losses.

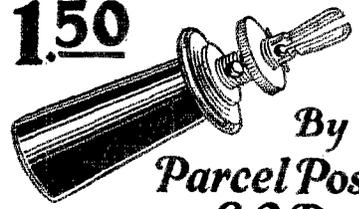
Can be used in 8 separate capacities from .001 to .000125 mf.

And can tune several stages of R. F. with a single control.

Bruno Radio Corp.
 300 Water Street
 NEW YORK CITY

A SET OF FIVE HELIX CLIPS

\$ 1.50



By
Parcel Post
C.O.D

All metal parts brass, nickled.

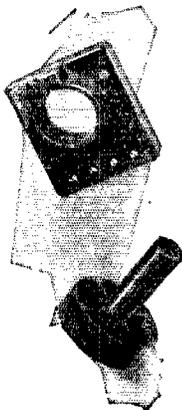
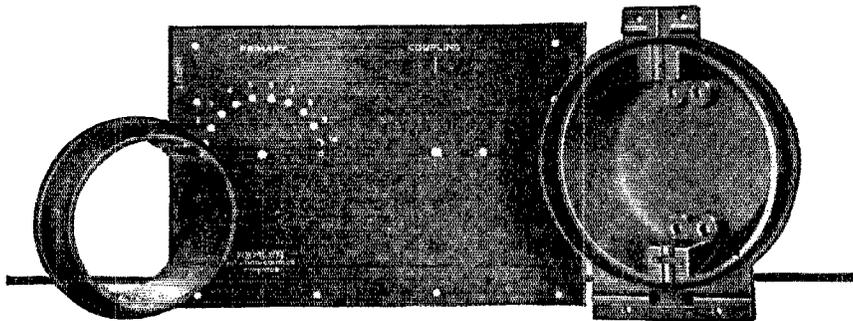
1 3/8 in. Solid Rubber grip piece, 3/4 in. in diameter.

A real German product. A fortunate purchase abroad allows this exceptional offer. If made for this present market and in this country, these Clips could not sell for less than \$7.50 per set. Limited number—act quickly before supply is exhausted.

Sole American Distributor
TOBE C. DEUTSCHMANN
 46C Cornhill-Boston, Mass.

BAKELITE

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



Endorsed by Remler, Too—

Manufacturers know from experience that radio parts must be constructed with the best materials, if satisfactory service is to be obtained. That is why the Remler Radio Mfg. Co. of San Francisco uses Bakelite for tube sockets, variometers and many other parts.

As an insulation, Bakelite is in a class by itself. It possesses high dielectric strength, is unaffected by atmospheric changes, and its properties are not impaired with age.

Insist on genuine Bakelite radio parts, and you can rest assured that your equipment is of the highest quality.

Send for Our Booklet C

BAKELITE CORPORATION

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



THE MATERIAL OF A THOUSAND USES



Price
\$1
Postage
Paid

OUTFIT BUILDERS

Here is wrench convenience.

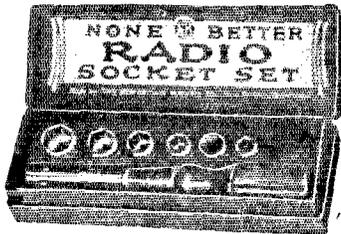
You can set the nut anywhere on your Radio Set with this set of sockets just as easy as you can set your dials.

Six sockets of different sizes that are the most useful, one of them for round battery nuts, and a screwdriver type handle, packed in an attractive box with hinged cover.

The sockets fit because they are machined and hardened, not stamped. The socket end on the shank of handle is hollow to allow bolt to enter when making a nut tight.

The set is high class and is yours for one dollar, delivered.

You can make real money selling them to your friends. Write us.

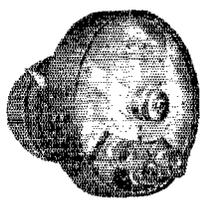


The New Britain Machine Co.
New Britain, Conn.

I need this set. Enclosed find \$1.00

Name.....
Street.....
City..... State.....

The Centralab RADIOHM



—a new non-inductive variable resistance

The Centralab Radiohm is an entirely new non-inductive variable resistance. It may be used wherever a high-resistance is used in a radio circuit, as for resistance-coupled amplification. Its most frequent use is as a resistance in the plate circuit to control the oscillation of radio frequency tubes. The Super-Zenith and Andrews Deresnadyns are two well-known sets which use it for this purpose.

The construction of the Centralab Radiohm is similar to that of the well-known Centralab Non-inductive Potentiometer, except that the ohmic value is different and that it has only two binding posts. Bakelite base and knob. One hole mounting.

No. 2M, 0 to 2,000 ohms. No. 50M, 0 to 50,000 ohms. No. 100M, 0 to 100,000 ohms. No. 200M, 0 to 200,000 ohms. **Price \$2**

Centralab

CENTRAL RADIO LABORATORIES
291 Sixteenth Street Milwaukee, Wis.

National Electric TRANSMISSION CONDENSERS

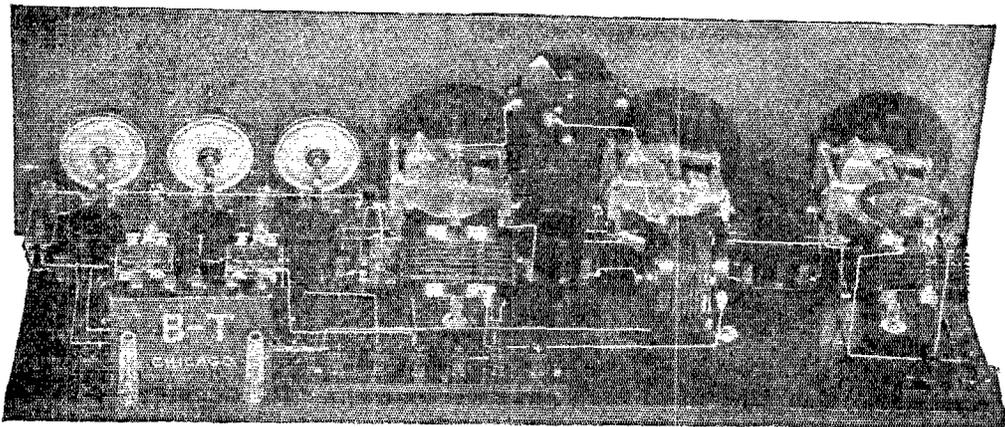
*For Radio Filter Circuits
Less QRM More DX
No More "Break-Downs"*

Are you tired of "break-downs"? Here is a special, high-dielectric, low-loss condenser that will end your troubles. Under tests at double their rated voltage, their phase angle does not exceed 20 minutes—which means a loss of not over 1/2 of 1%—or an efficiency so close to 100% as to be negligible. With National Electric Condensers you send out less QRM and gain the good will of every BCL around you. And you get more DX because a properly designed filter circuit gives a clearer, more understandable note.

- No. 1. 1000 V. DC Service, per 2.5 mfd. condenser \$7.00
 - No. 2. 2000 V. DC Service per 2. mfd. condenser \$8.00
- Order direct by letter

We will ship C. O. D. or on receipt of your remittance.

National Electric Condenser Company
New Haven, Connecticut



The New B-T Low Loss NAMELESS!

Hams and B. C. L's, you get more radio miles for every dollar that you invest in the B-T Nameless than you do in any other five tube receiver on the market today.

This regenerative, R. F. circuit is unusually responsive over the entire new broadcast spectrum as the amplifiers are held constantly near the point of oscillation by one, panel-controlled, three plate condenser.

The 200 to 565 meter wave band is covered by using only 250 M.M.F., straight-line wave length, B-T Laboratory Condensers in conjunction with the skeleton insulation, bank wound, B-T 3-Circuit Transformers.

Low dielectric losses and low distributed capacity, plus the high ratio of inductance to capacity, make this a very sensitive, selective receiver. The simplicity of the circuit makes it easy and inexpensive to construct. Touch control, hair-line separation and perfect tone and volume qualities make operation a real joy. See the new B-T Nameless Kits at your dealers. Write us for circular RF-32 containing more detailed information on this remarkable circuit.



\$26⁵⁰

B-T Low Loss Nameless Kit No. 3
Contains three B-T 3-Circuit Transformers, three 250 M.M.F. B-T Laboratory Condensers, one 40 M.M.F. Control Condenser with 2" dial and a complete set of full size blue prints, instructions and list of other necessary parts.

\$10.50

B-T Low Loss Nameless Kit No. 1
Contains three B-T 3-Circuit Transformers only. Blue prints for Nameless Circuit can be purchased separately for \$1.00.

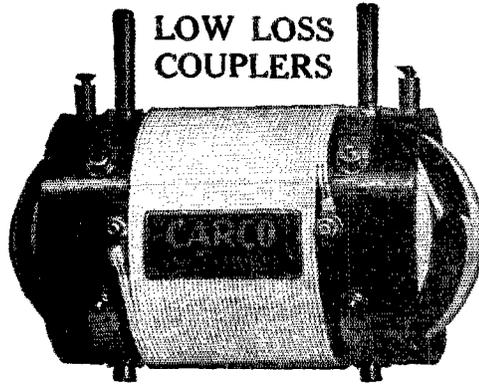
BREMER-TULLY MFG. CO.

"Pioneers of Better Tuning"

532 S. CANAL ST.

CHICAGO, ILLINOIS

175 to 600
METERS
No. 3
P. S. T.
BROADCAST
COUPLER
\$6.75



50 to 150
70 to 200
METERS
HAM
SPECIAL
SHORTWAVE
COUPLERS
\$6.00

This original two rotor coupler, on market for three years.

With a wave trap tunes as sharp as a superhet. For selectivity far superior to a five tube set with two stages R.F.

This coupler consists of a single unit in which is contained a "low loss" Stator or secondary winding and two rotors, one of which is the antenna inductance and wound with "low loss" coarse wire.

The coupler is strongly recommended for use in congested districts where interference is bad.

At your dealers or sent C. O. D.
Send for "Carco" Catalog

DESIGNED BY A HAM FOR HAMS

Government specifications for short wave low loss tuner are No. 10 D.C.C. wire wound single layer.

The "CARCO" Ham Special using two No. 18 D.C.C. wires in parallel (equal to a No. 12) is the nearest approach to these specifications of any on the market. A compact unit in a space of only 3" x 5 1/2".

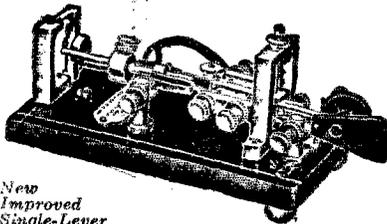
Antenna Rotor and secondary Stator designed for "Low Loss" and "Low Resistance."

Our special single layer, multiple wound inductance does the trick. Low loss tubing used.

THE CARTER MANUFACTURING CO.
1728 Coit Ave., East Cleveland, O., U. S. A.

Martin's New and Improved VIBROPLEX

Reg. Trade Marks Vibroplex Bug Lightning Bug



New Improved Single-Lever

Japaned Base, \$17 Nickel-Plated, \$19

Transmits perfect signals at any desired speed. Easy to learn and operate. Send continuously for hours without fatigue. Used and recommended by more than 85,000 wireless and commercial operators.

Special Large Contacted Vibroplex

Equipped with 3-16 inch contact points to break high current without use of relay \$25.

Sent on receipt of price

THE VIBROPLEX CO. Inc.

325 Broadway, New York

Established 1890

OVERSTOCK BARGAINS in NEUTRODYNES and REGENERATIVES

BELOW COST
WRITE FOR LIST Q

J. H. BUNNELL & CO.
32 Park Place New York City

USE RESISTANCE!

DURHAM

Grid Leaks

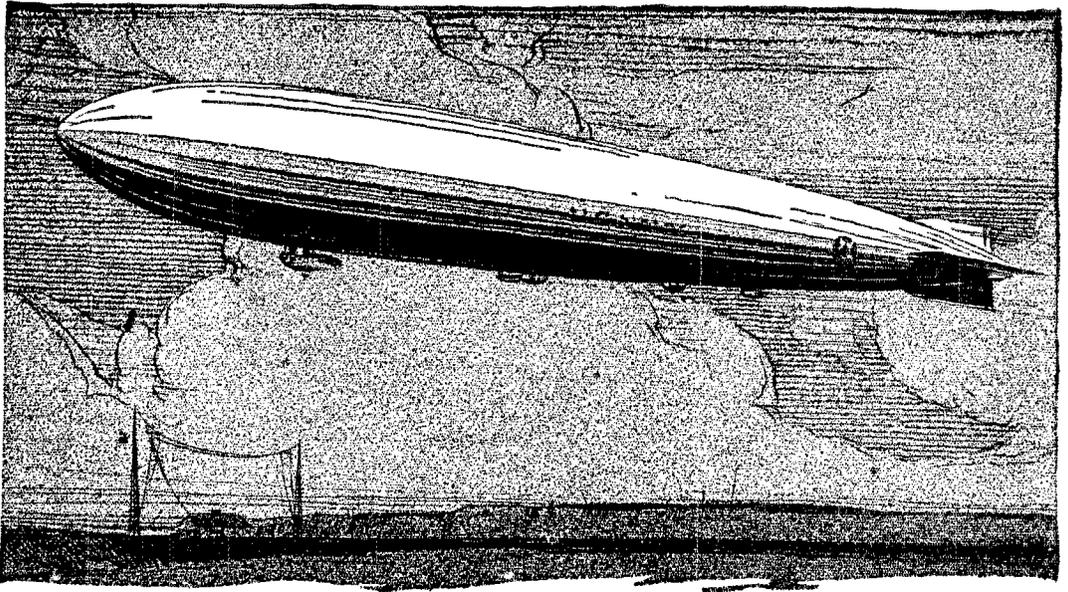
Variable:—
No. 101—140 to 5 meg. — soft tubes.
No. 201A—2 to 10 meg. — hard tubes.
No. 100—1000 to 100,000 ohms by pass.

Metalized Fixed:—
Over 50 meg. 50¢ under 75¢.

at dealers or postpaid

DURHAM & CO., Inc. 1936 Market Street, Philadelphia

75¢



Dubilier Condensers

Important Links between the Shenandoah and Land!

Communication with land—under all conditions—at all times—this was the imperative need of the Shenandoah on its experimental flight across the continent. Impressed with this need, army and navy engineers equipped both transmitting and receiving sets with Dubilier mica condensers—not specially designed condensers but the regular standard product. Only complete confidence in the supreme reliability and efficiency of Dubilier condensers can explain their use in the important and daring adventure.

Dubilier

CONDENSER AND RADIO CORPORATION

RADIO

holds a future for you



Radio Designing

The limitless field of radio—growing by leaps and bounds—daily opens up new opportunities for success. And here is your opportunity to qualify for a good position—with substantial pay—and a future.

STUDY RADIO AT HOME

You do not have to give up your present employment. The Radio Institute of America—the world's oldest radio school—with 7,000 graduates—now offers a *new and completely revised HOME STUDY COURSE* in radio that will prepare you to successfully pass the U. S. Government examination for a Commercial Radio License.

Radiola III Free with Course

An omnigraph, a buzzer set, up-to-date text-books, and Radiola III with two tubes and Brandes Headset come free with course—the best materials obtainable.

The Radio Corporation of America conducts the school. The largest radio companies give employment preference to our graduates because of their superior training. Mail coupon now for information!

Radio Institute of America

(Formerly Marconi Institute)

Established in 1909

326A Broadway, New York City

RADIO INSTITUTE OF AMERICA
326A Broadway, New York City

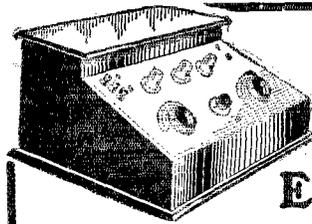
Please send me full information about your Home Study Course of radio instruction.

I am interested in the complete course including code instruction.

I am interested in the technical course without code instruction.

Name.....

Address.....



The

EAGLET

3 Tube Dry Cell

NEUTRODYNE

\$75

The World's
Greatest Popular
Priced Set

Manufactured and Guaranteed by

EAGLE RADIO COMPANY

Makers of

The Famous Models A and B

EAGLE NEUTRODYNE RECEIVERS



Your protection for
quality and unparalleled

VALUE

Ask the Dealer—He Knows



EAGLE RADIO COMPANY

23 Boyden Place

Newark, N. J.

Globe Low-Loss Tuners

Make the
Perfect
Radio Set

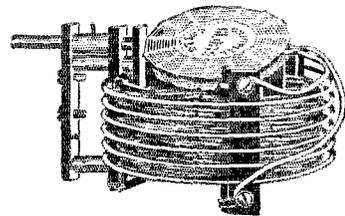
QUALITY—VOLUME—DISTANCE

No Metal
No Eddy Current
Losses

Little Insulation
Low Distributed
Capacity

Large Wire
Self Supporting

Anti-Capacity
Windings
Low R F Resistance



Patented Dec. 9, 1924

GET ORIGINAL GLOBE COILS

PRICES:

Standard Tuner (Broadcast Range).....\$7.00

Short Wave (35-135 Meters).....\$7.00

For Superdyne Circuit.....\$8.50

R F Transformers.....\$6.00

Circular on Request. Dealers and Jobbers Write.

Globe Radio Equipment Co.

217 West 125th St., N. Y. C.

Case, Cells and Handles moulded in one piece

THERE are no separate jars in the new Exide 6-Volt "A" Battery. Compartments holding the plates are moulded in one piece with the composition case.

Not only is this battery simple and sturdy, but it is handsome enough to take its place openly in any room. The surface is beautifully stippled and finished in glossy black.

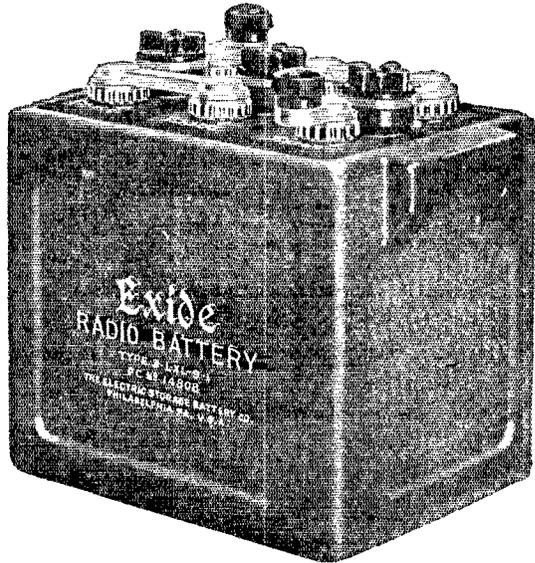
You will find many other refinements in this new battery, but one thing has not been changed—it has the same old dependable power that made the former Exide "A" Battery famous. The flow of current is uniform through a long period of discharge. The life is notably long.

This new 6-volt battery is made in five sizes—50, 75, 100, 125, and 150 ampere hours capacity.

Two other "A's" and new "B"

For low-voltage tubes there are the Exide 2-volt and 4-volt "A" batteries, weighing only five and six pounds. They are midgets in size but giants in power.

The new "B" battery has 6000 milli-



The New Exide 6-volt "A" Battery

ampere hours capacity. It is assembled in glass jars, thus adding visibility to capacity. You will find this splendid battery full of silent, rugged, long-lasting power. It can be recharged at home most economically with the new Exide Rectifier.

Ask to see the complete Exide line at any Exide Service Station or Radio Dealer's. We shall be glad to mail you descriptive booklets on request.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

In Canada: Exide Batteries of Canada, Limited, 153 Dufferin St., Toronto

Exide

RADIO BATTERIES

For better radio reception use storage batteries

Thermo-Galvanometer or Current Squared Meter

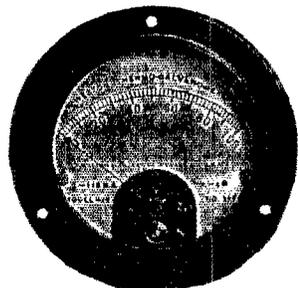
THE design, construction and performance of the Weston MODEL 425 Thermo-Galvanometer or Current Squared Meter is all that can be demanded of an instrument of this type, for the detection and measurement of small currents.

It is a sensitive Thermo-couple type of instrument and will measure A.C. of either high or low frequency with equal accuracy.

It has a high over load capacity, which is greater than any other instrument of this type,—a very desirable feature because of the added protection against "burn-outs."

This instrument has a resistance of 4.5 ohms and required only 115 MA to give full scale deflection.

It is the highest type of instrument made for use as a resonance indicator in wave meters, or other resonance circuits; for the resistance and reactance variation method for the measurement of radio frequency resistance of antenna, coils, etc. For this purpose the scale is calibrated in terms of the square of the current.



WESTON ELECTRICAL INSTRUMENT CORP.
158 Weston Avenue, Newark, N. J.

Branch Offices in All Principal Cities

Electrical
Indicating
Instrument
Authorities
Since 1888

WESTON

STANDARD - The World Over

Morse Handy Radio Set No. 3

Morse for Quality & Service

MACHINE SCREW TAPS STRAIGHT SHANK DRILLS

4 6 8 10 12 14 16 18 20 24 36 45

MORSE
NEW BEDFORD, MASS. U.S.A.

Like these tools, don't forget that we make larger Taps and Drills, also Reamers, Chucks, Arbors, Gauges, Endmills, Milling Cutters, etc.

MORSE MEANS THE BEST

"If you desire a more complete assortment ask for our No. 4 Radio Set. This has 20 pieces, and will better meet your requirements. 1 Straight shank drill each No. 10, 16, 20, 29, 36, and 45. 1 Plug Tap and Round Die each, 4-36, 6-32, 8-32, 10-32, 12-24 and 14-20. 1 Die Stock No. 22 and 1 Tap Wrench No. 0.

Genuine MORSE Carbon & High Speed Drills, Cutters, Reamers, Taps and Dies Sold by Reliable Dealers Everywhere.

MORSE

TWIST DRILL & MACHINE CO.
NEW BEDFORD, MASS. U.S.A.

EBY

BINDING POSTS

Twenty-five They Don't
Different Lose
Engraved Tops Their Heads

C
BAT
—

B
DET
+

H. H. EBY MFG. CO.
Philadelphia

HERCULES

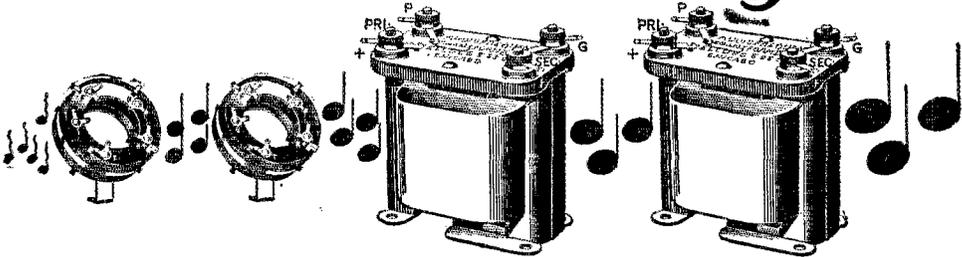
Aerial Mast

All Steel Construction

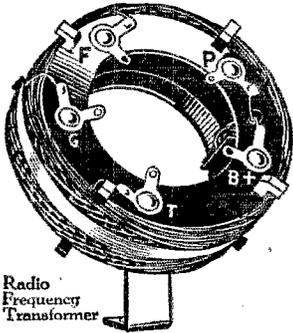
Today, anyone may have an aerial mast of sufficient height to get coast to coast reception. A mast that is ideal for both receiving or transmitting. This mast is painted black and is furnished complete with galvanized steel guy wires and galvanized masthead pulley. You have no extra to buy. We pay the freight. 20' mast \$10. 40' mast \$25. 60' mast \$45. Write for literature and

FREE BLUEPRINT
S. W. HULL & CO. Dept. C3
2048 E. 79th St., Cleveland, Ohio

Volume and Clarity



with Kellogg Transformers



Radio
Frequency
Transformer

A Radio Frequency Transformer of the aperiodic type suitable for all sets with which tuned radio frequency is desired. Also used for one stage of radio frequency amplification ahead of regenerative sets to prevent re-radiation.

Consider these points of superiority:

- No dope to hold windings in place.
- Soldered connections.
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- Minimum rubber used in form.
- Lowest possible loss, with greatest transfer of energy.
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This transformer makes the construction of a radio frequency set an easy matter, assuring best possible reception with widely varying types of circuits, including reflex.

Built and guaranteed by Kellogg Switchboard and Supply Co.

No. 602 Radio Frequency Transformer
at your dealers for \$2.35 each.

Kellogg Audio Frequency Transformers are the "stepping stones" of modern amplification.

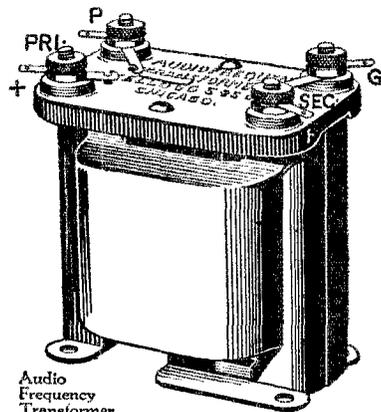
Clear, accurate reproduction assured over the entire range of the musical scale.

Plainly marked, accessible terminals.

It is acclaimed by test to be the best.

No. 501 Audio Frequency Transformer
Ratio $4\frac{1}{2}$ to 1—

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Ratio 3 to 1—
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Frequency
Transformer

KELLOGG SWITCHBOARD & SUPPLY CO.

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Receiving Set TRF-5 with
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EXPERIENCED radio users have stated that this Magnavox equipment represents the highest standard of real value and usefulness ever offered in the radio field.

The Magnavox 5-tube circuit is a special development of tuned radio frequency in which a splendid balance of selectivity, range and volume have been attained. The one dial Station Selector eliminates all tuning adjustments; while the Magnavox Reproducer insures sonorous, pleasing tone for all programs.

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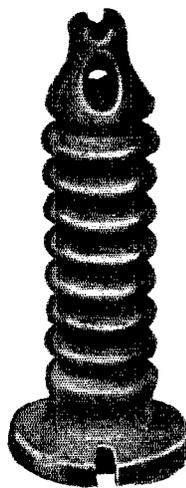
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2R

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All types of porcelain radio insulators and insulated screw hooks. Send for circular.

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4200 MIL. AMP. CAPACITY

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are neat, powerful, noiseless and will harmonize with any Radio Set. Separate cells and patented rubber cork prevent current leakage and clear glass ridges give vision of the condition of battery. Steady duty plates 3-16" x 1" x .25" with staggered ribbed grid form the backbone of this sturdy battery. Shipped completely charged ready for instant use. And you can save \$6.10 by ordering now.

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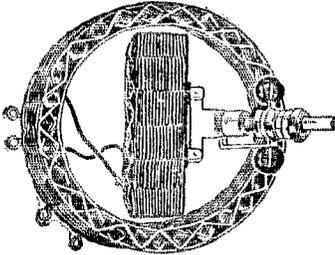
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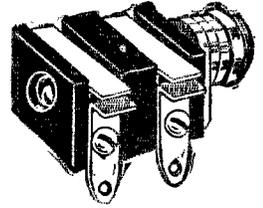
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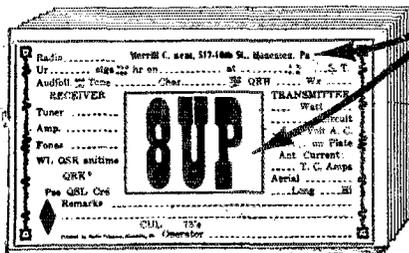
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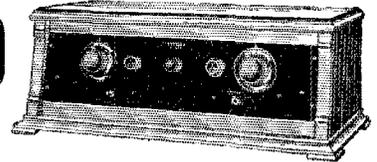
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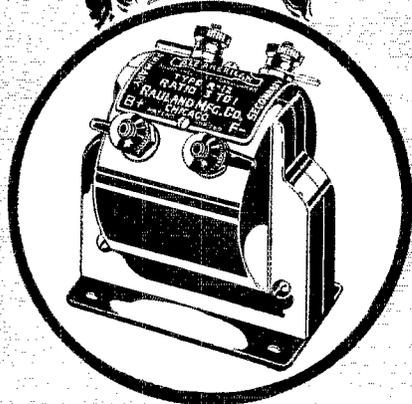
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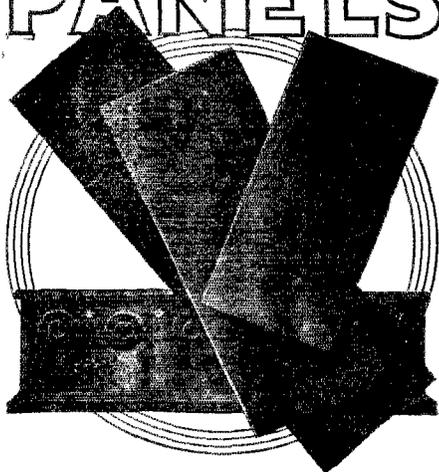
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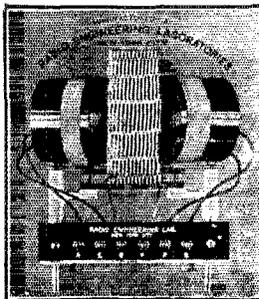
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Circuit diagrams, panel drilling template and instructions with each tuner.

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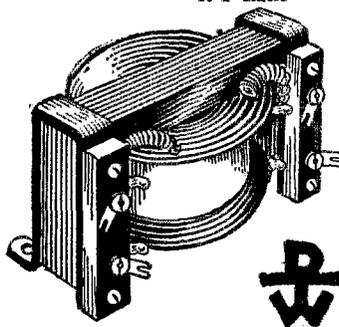
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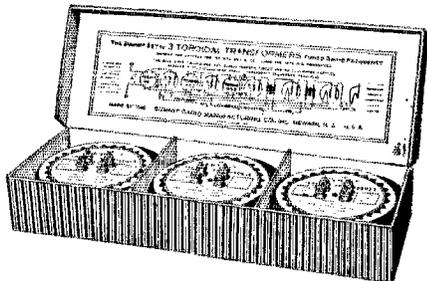
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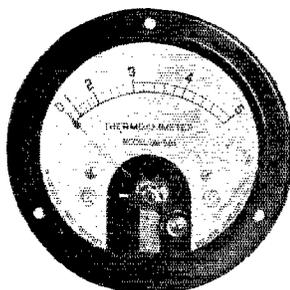
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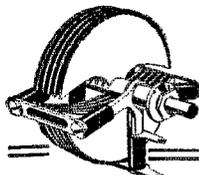
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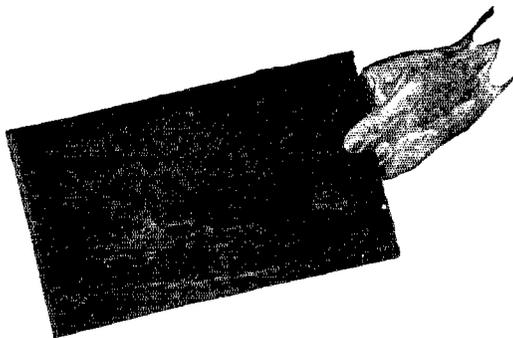


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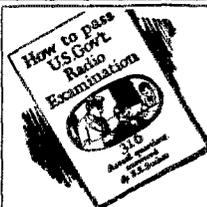
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Practically Unbreakable



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by E. E. Bucher

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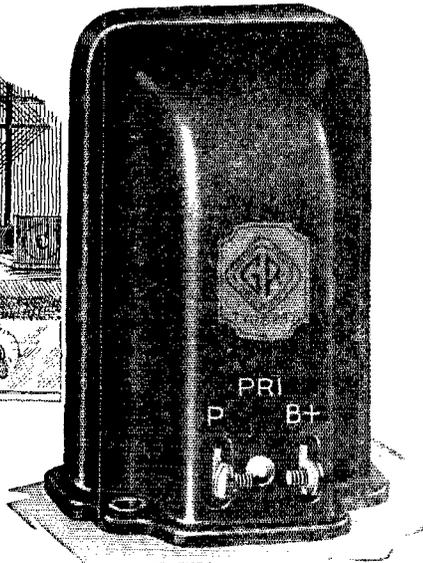
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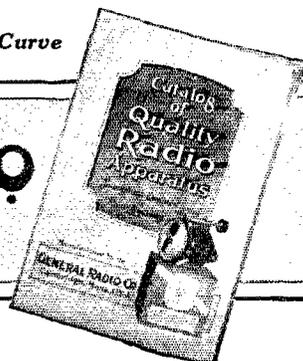
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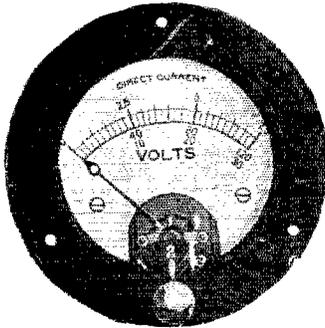
GENERAL RADIO CO.

Cambridge, Mass.





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MULTIPLE SWITCH

¶ The new Thoriated Filament Tubes have a very short life when Filament Voltage is higher than the rated values. Use a Jewell W.53 for definite control.

¶ WATCH YOUR BATTERIES.

¶ Mount a Jewell No. 55 Voltmeter on the panel of your set and keep constant check on your "A" and "B" Batteries.

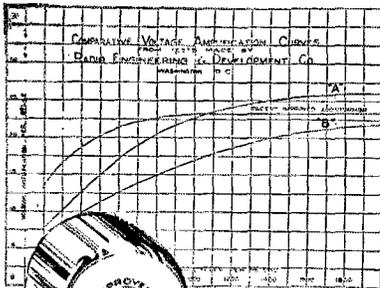
¶ Write for our 15-A Radio Instrument Catalog.

Order from Dealer.

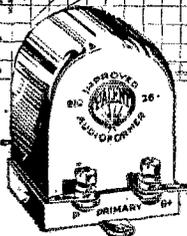
Jewell Electrical Instrument Co.

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Comparative voltage amplification curves from tests made by the Radio Engineering and Development Company of Washington, D. C.



The Chart tells the story

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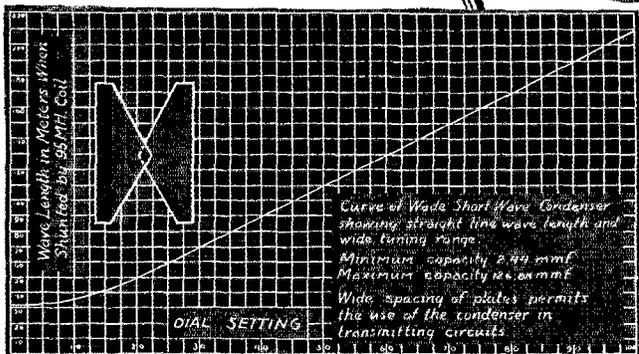
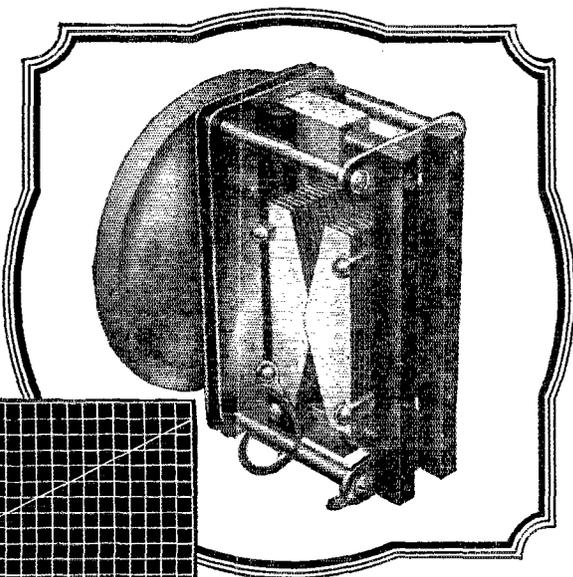
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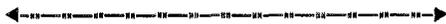
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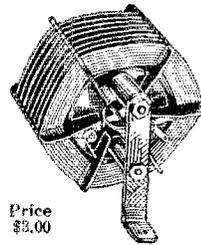


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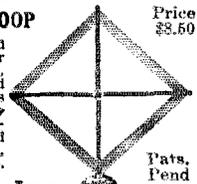
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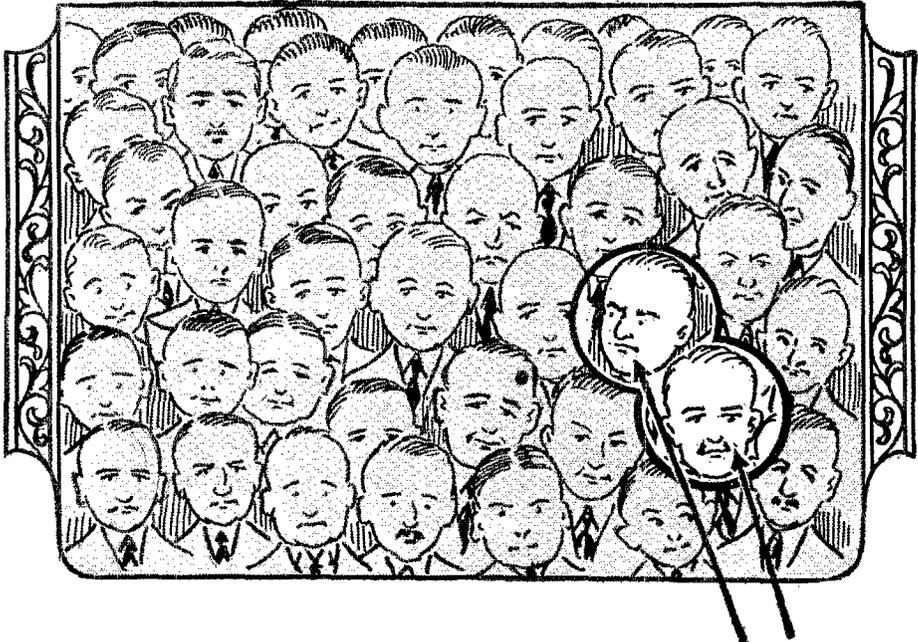
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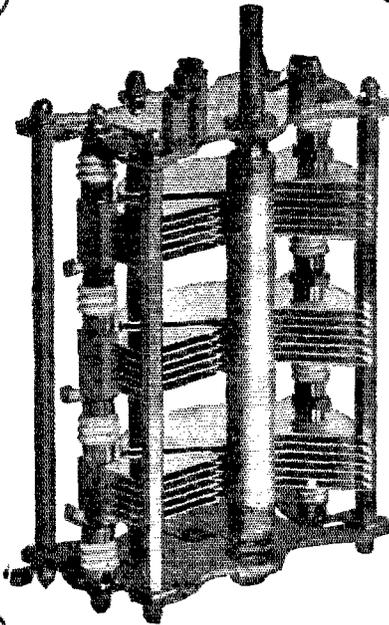
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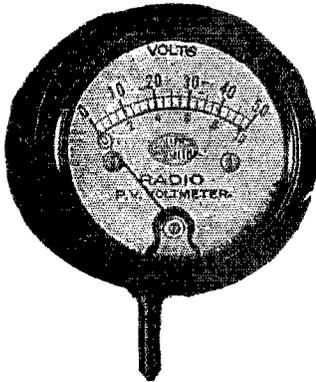
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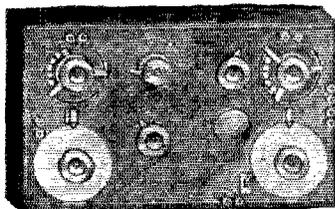
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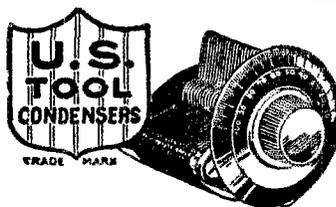
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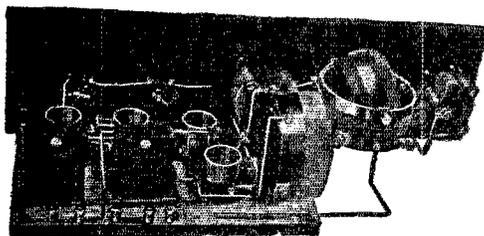
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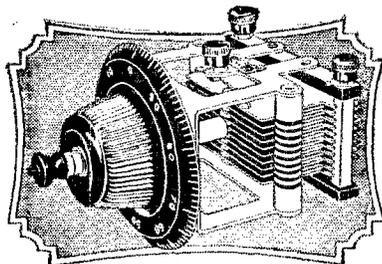
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EROUS TO MENTION. IF YOU HAVEN'T OUR
PRICE LIST. IT'S UR FAULT. WE'RE REARING TO
MAIL IT TO YOU. JUST DROP A CARD TO THE
ONLY HAM STORE IN THE FIFTH DISTRICT. AD-
DRESS TO FORT WORTH RADIO SUPPLY CO., 104
EAST TENTH ST., FORT WORTH, TEXAS.

SEND me your burned out or broken Power tubes—50
watt or over. Will pay liberally. W. Baker, 36 W.
20th St., New York City.

HERE'S A REAL FIND. OM. DENSE WHITE PORCE-
LAIN LOLOSS BROWN GLAZED X INSULATORS
THAT YOU CAN AFFORD TO USE. 5" \$2.50 FOR 10.
7 1/2" PAIR. 9" \$4 FOR 10. \$1 PAIR. 13" \$3 FOR 10.
\$2 PAIR. GUY EGGS LOCAPACITY \$2 FOR 25. 8ML
4837 Rockwood Rd. CLEVELAND, OHIO.

Hi Mr. Fan! DON'T LET THIS REAL BUY GET BY—
Brand New U.V.202 Radiotrons (5 watt tubes) regular
price \$8.00; MY PRICE \$6.00; only post office or ex-
press MONEY ORDERS accepted. Charles Beach, 184
Congress St., Buffalo, N. Y.

TELEGRAPHY—Morse and Wireless—taught at home
in half usual time and at trifling cost. Omnigraph Auto-
matic Transmitter will send, on Soudier or Buzzer, un-
limited messages, any speed, just as expert operator
would. Adopted by U. S. Govt. and used by leading
Universities, Colleges, Technical and Telegraph Schools
throughout U. S. Catalog free. Omnigraph Mfg. Co.,
16M Hudson St., New York.

ENVELOPES—100 good white envelopes with name and
address printed, 50c. postpaid. Emblem or call in red
\$.25 extra. Guy Sherman, Clinton, Ia.

158 GENUINE Foreign Stamps. Mexico War Issues,
Venezuela, Salvador and India Service Guatemala, China,
etc., only 5c. Finest approval sheets 50 to 60%. Agents
wanted. Big 72p. Lists Free. We Buy Stamps. Es-
tablished 20 years. Hussman Stamps Co., Dept. 151, St.
Louis, Mo.

STORAGE "B" batteries at dry cell prices. Purchase
a rechargeable "HAWLEY" storage "B" battery. Non-
sulphating or buckling of plates, which means clearer
enjoyable reception with unlimited life. Sold in com-
plete knock-down units which requires no former ex-
perience to put together. These units contain every-
thing for the actual construction of battery such as
large size tested Edison elements, special molded flat
bottom glass cells (not ordinary test tubes), punched
insulating fibre board for support of cells, pure an-
nealed solid nickel wire Rubber stoppers, perforated hard
rubber separators, full strength chemical electrolyte.
With all orders there is included free an 8 page illus-
trated folder showing simple putting together making
of charger and charging. Prices of units as above—22
volt \$2.95; 45 volt \$5.75; 90 volt \$8.95; 100 volt \$9.95;
120 volt \$11.60; 135 volt \$12.75; 150 volt \$13.90; 200
volt 17.50. Special voltage units put up at no increase
in price. Complete sample cell, 35c prepaid. Complete
non-heating "B" battery charger \$2.75. Extra special
100 volt whitewood cabinet at \$2.75 only. Also "A"
batteries at attractive prices. Order direct or write for
my literature, 30 days' trial offer and guarantee. Orders
ship same day received. No waiting. B. Q. Smith, 31
Washington Ave., Danbury, Conn.

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS

LOOKING FOR BARGAINS—Here they are—Kennedy type 281 with amplifier, \$75.00; Jewell 0-500 M.A. \$5.00; Grebe CR-5, \$40.00; Jewell O-10 D.C. voltmeter, \$5.00; Grebe CR-14 new \$70.00; type A-1R, Magnavox new, \$40.00; type R-3 Magnavox, \$15.00; Magnavox 2-stage power amplifier, \$35.00; RCA, UT-1357 Magnetic modulator, \$6.00; RCA, Chopper disc, \$5.00; Jewell 0-5 T.C. Ammeter, \$3.00; all items in excellent condition, cash with order. 9BZL, Theike Bros. 9AAQ.

GREBE CR-12 four tube broadcast receiver, new condition less than half list at eighty dollars. Lieut. Wenstrom, Fort Bliss, Texas.

GREASE THE WAYS FOR THOSE SHORT WAVES. A BRIGHT NEW AERIAL OF NO. 12 SOLID COPPER FOR LOW RESISTANCE AND CORROSION PROOFED WITH NON-FLAKING BAKED ENAMEL, QST'S RECOMMENDATION FOR THE IDEAL AERIAL. ONE PIECE BURLAP WRAPPED COILS PREPAID TO 3rd ZONE, 1c FOOT. THE PRIDE OF A REAL STATION—AN O B PORCELAIN INSULATED AERIAL. STRONGER THAN GLASS, 3000 lbs. WON'T PULL EM OUT. OHIO BRASS CO. 5s 75c. 10" FOR HIPOWER \$1.50 PREPAID. FLUX DISTRIBUTING SHIELDS ATTACHED. ELIMINATE ALL CORONA. LOLOSS TUNER WIRE NO. 12 \$1.25 100 FT PREPAID. No. 16 60c. SILICON STEEL CORE LAMINATIONS 2 1/4 x 10" STRIPS, L and U SHAPES 1 1/2" AND WIDER, 20c lb. LET'S HEAR WHAT YOU WANT, OM, AND QSL 8ML'S SIGS. 73. RADIO 8ML 4337 ROCKWOOD ROAD CLEVELAND, OHIO.

20 watt for sale. 75 to 200 meters. Heard in England and New Zealand. F. L. Wilcox, 9AAL, 4602a Delmar, St. Louis, Mo.

"RADIO CALL PINS" 49FZ (see p. 60)

RADIO SALESMEN and SET BUILDERS—We need you and you need us. If you are reliable and well known in your community, we will appoint you our representative and furnish you with standard well advertised sets and parts at prices that will enable you to sell at a handsome profit. Write at once for catalogue and sales plan. Waveland Radio Co., Div. 45, 1027 N. State St., Chicago, Ill.

RADIO Join our Sales organization and make big money. We want a man in every county to sell well advertised sets and parts made by the leading manufacturers. Widener of Kansas City makes \$150.00 weekly. You can do as well or better. Write today for catalogue and discounts. Name your county. Waveland Radio Company, Division 45, 1027 N. State St., Chicago, Ill.

SOMETHING ELSE NEW—If No. 12 comes high for your pocketbook, how about some No. 14 enameled solid copper antenna wire at \$5.00 for 1000 ft. or 55c per 100 ft. for less. No. 12 enameled, the old standby, don't remember how many TONS we've sold to hams at only \$6.90 per 1000 ft. or 75c per 100 ft. for less. Any length in one piece now, gang, and shipped in boxes, not just wrapped; Real guy and antenna insulators, 3/4 inches long 1 1/2 inches diameter, brown glazed porcelain, 30c each, 20 or more 25c; Sure Fire 20 inch porcelains don't leak precious energy, and they're only \$1.00 each in lots of four, \$1.15 for less; Those indispensable General Radio wavemeters, \$9.50, 75-250 meter coil or 37 1/2-125 meter coil \$2.35 additional; General Radio condensers, .0025 \$2.85, .0005 \$3.10, with gear vernier, \$4.50 and \$4.75; Allen-Bradley Radiostats for the filament transformer primary \$6.50; E-210 Bradleystat \$4.00; Just a few Kenotrons at half price, UV216 \$3.75, UV217 \$13.25; Very few RCA meters left, no more to be had, O-2.5 thermo-ammeter \$3.00, O-5 thermo-ammeter \$9.00, O-1500 DC Voltmeters \$19.50, O-5 hot wire ammeters \$2.00; 5 watt grid leaks \$1.10, 50 watt leaks \$1.65; UC-1806 .002 mfd 6000 volt grid, plate, or by-pass condensers, a \$7.00 value at only \$1.50. These will soon be unobtainable, get yours now: UC-490 1 mfd 1750 volt filter condensers \$2.50, 1 mfd 1000 volt filter condensers \$1.90, 1/2 mfd 750 volts \$3.85; Put in a real filter choke, UP-1654 50 henry 300 mills, \$9.00, UP-1653 40 henry 160 mills \$7.50, UP-1627 300 mills \$6.00 UP-1626 160 mills \$5.00; UP-1358 power transformers \$13.50, UP-1016 transformers, for 2 fittings \$15.00; UC-1831 variable antenna series condensers, hard to get now, while they last \$2.25; UC-1015 antenna series condenser \$2.00; UC-1866 filament by-pass condenser \$1.00; More big values in our HAMALOG, drop a card for it. We ship C.O.D. If you send cash in advance, please INCLUDE POSTAGE. E. F. JOHNSON, 9ALD, Waseca, Minn.

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS

WANTED—to trade for transmitting apparatus—what have you and what do you want? E. N. Ebling, Atwood Kansas.

100 Generators 275v \$10 each; Kenotrons \$2.00; UC1831 condensers \$2.00; 900 cycle generator airplane spark set complete \$20.00; 1/4 high speed motors, dynamotors 220 v DC drive output 9v. amp. 5 suitable for charging \$15. R. Wood, 38 Way Ave., Corona, New York.

ANTENNA RIBBON 3/8" WIDE, COMPOSED OF NICKEL AND SILVER. WILL NOT CORRODE OR STRETCH. HIGH TENSILE STRENGTH. 3c PER FT. PREPAID. J. ZIED, 630 CALLOWHILL ST., PHILA., PA.

\$5.00 New United States Government Aviators leather helmet with headphones and microphones cost \$25.00, postage free; send at once, limited supply; other government radio bargains, send stamp for list. Weil's Curiosity Shop, 20 South 2nd St., Philadelphia, Pa.

EDISON A BATTERIES FOR SALE—BATTERY CONSIST OF 5 A-8 CELLS WITH NEW CASE, SOLUTION AND CONNECTORS. IN PERFECT ELECTRICAL AND MECHANICAL CONDITION. CAPACITY 325 AMPERES AT 3 to 8 VOLTS. MANUFACTURERS' PRICE NEW \$190. MY PRICE ON A FEW SETS \$58 F.O.B. DETROIT. COMPLETE BATTERY WEIGHS 150 lbs. BERNARD STOTT, 60 PALLISTER AVE., DETROIT, MICH.

POWER TUBES—Repaired any size or power. All work guaranteed. Morsemere Engineering & Research Laboratories, Grantwood, N. J.

HEARD 3 AUSTRALIANS IN FIRST NIGHT OF OUR TESTS WITH OUR "N-Z" TUNER. ALSO HEARD ENGLISH AND FRENCH STATIONS. NUFF SED. REREAD JANUARY HAM ADS. AMES RADIO SHOP, FRANCESVILLE, IND.

Discounts to Hams, 20% on Cardwell and General Radio condensers, Federal, Branges and Frost phones, Celoron panels, Bradleystats, Crosley and Kennedy sets, Magnavoxes, Burgess batteries, Universal storage A and B batteries, Federal, Jefferson, Thordarson, Acme and Kellogg transformers, 15% on Jewell and Weston meters and genuine Cunningham receiving tubes. Edward Bromley, Jr., Whitewater, Wis.

NEW RADIO SUPPLIES—JEWELL METERS O-15 AC VOLTMETERS \$6.50, O-500 MILLIAMMETERS \$6.50, O-5 THERMOCOUPLED AMMETERS \$10.50, UP414 MODULATION TRANSFORMER \$6.00, UP1658 150 WATT FILAMENT TRANSFORMER \$6.00, UP1719 GRIDLEAK .90, ROICE 5 WATT TRANSMITTING TUBES \$3.00, No. 4000-1 "S" TUBES PAIR \$20.00.—USED STUFF—JEWELL O-10 THERMOCOUPLED AMMETER \$6.00, UV203 50 WATT TUBES \$15.00, 600 WATT THORDARSON POWER TRANSFORMER \$15.00, RCA TYPE INDUCTANCE \$2.50, PR535 POWER RHOESTATS \$1.00, 12 x 18 TRANSMITTING PANEL \$2.00, UC1014 BLOCKING CONDENSER \$1.00, UP7541 50 WATT SOCKETS \$2.00, UR542 5 WATT SOCKETS .75, UP490 FILTER CONDENSERS \$1.50, ACME CHOKES —3 HENRY \$2.50, 1 1/2 HENRY \$1.00, FEDERAL MICROPHONE \$1.50, BUZZER \$1.00, KEY \$2.00. NO TRADES—NO CODS IMMEDIATE DELIVERY. CURTIS, KFRO-5AQC, 1109 EIGHTH AVENUE, FORT WORTH, TEXAS.

MILLIAMMETERS, brand new Radio Corp. O-500 DC milliammeters, for plate and microphone circuits, 3-1/2" diameter, projecting panel mounting. Only a few left at \$5.00 each. Utility Radio Company, 58 North 6th Street, Newark, N. J.

For Sale—3000 Volt 2000 Watt 1750 R.P.M. double commutator Generator only with coupling and field rheostat \$165.00. Also 2500 Volt 2000 Watt 1750 R.P.M. motor generator set, Motor direct current 110 Volt \$150. Queen City Electric Co. 1734 W. Grand Av., Chicago, Ill.

WEST COAST HAMS: You save money and don't have to wait ten thousand years when you get your ham supplies from us. Write today for list. Seattle Radio Laboratory, 3335 33rd Avenue South, Seattle, Washington.

MAGNET WIRE. ALL KINDS AND SIZES. No. 10 DCC 50c lb., add 2c per lb. for each size up to No. 20, 100 ft No. 12 enamel aerial wire 85c. Best grade Silicon Transformer Steel cut to size 22c lb. Cash with order postage extra. MORTON ELECTRIC CO. 4832 RICE ST., CHICAGO, ILL.

RADIOLA AA 1520 3 stage Radio Frequency Amplifier like new, list \$80.00, sell for \$30.00, \$5.00 deposit, balance C. O. D., subject examination. Geo. Schulz, Calumet, Mich.

GET CLEAR RECEPTION ALL THE TIME. See page 99.

FIVE WATERS—Filament $7\frac{1}{2}$ volt- $2\frac{1}{4}$ amp—Plate up to 350 volts. This tube is new and will get out better with 350 volts on plate (and last longer) than the old tubes with higher voltages. Every one actually tested on a ham transmitter. Your money back if you are not absolutely satisfied. \$3.50 and postal charges. RADIO VACUUM TUBE CO., 55 Halsey St., Newark, N. J.

U.S. Navy Dynamotors built by General Electric 24/1500 volt 233 ampere 6000 RPM 750 volt tap. Triple commutator. Ball bearings. Little filtering required 672,000 breaks per minute. Original boxes \$45. Limited number slightly used \$25. Guaranteed perfect. Adapted for belt drive making a double current generator \$3.00 additional. IDEAL FOR 32 VOLT PLANTS. Give very satisfactory results belt driven. Operate on 6 volts generating 300-400 volts. 8/450-550, 10/575-675, 12/700-800 volts, etc. Holtzer-Cabot 12/500 volt .07 machines \$18.00. Crocker-Wheeler $\frac{1}{2}$ KW 500 cycle generators with exciters \$20. Heavy ship models motor generators rated at $\frac{1}{2}$ KW but good for 1 to 2 KW \$65. Navy Flame Proof Key with Blinker Light. COD \$1.50. Henry Kienzie, 501 East 84 Street, New York.

"GANG" IF YOU'RE LOOKING FOR THE BEST, YOU CAN GET IT HERE. WE SPECIALIZE ON "REAL HAM" STUFF. PYREX INSULATORS PANEL MOUNTING D.P.D.T. SWITCHES, METERS, ANY TYPE AND MAKE, POWER TUBES, SOCKETS, CARDWELL TRANSMITTING CONDENSERS, POWER TRANSFORMERS, MOTOR GENERATOR SETS, ESCO, MANY OTHER ITEMS THAT ARE "FIRST", NO "SECONDS". ALL OF THE HIGHER GRADE MAKE. WE ALSO BUILD TO ORDER ANYTHING THAT IS IN THE LINE OF INDUCTANCES, WAVEMETERS, etc. WE BUILD SUPERHETS OF NEARLY EVERY MAKE, FROM \$65.00 UP FOR BROADCAST OR AMATEUR USE. USE ALL THE BEST STUFF. "S" TUBE POWER OUTPUTS FOR PRACTICALLY ANY VOLTAGE. THESE UNITS COMPLETE WITH TUBES, ALSO WITHOUT TUBES. PANEL MOUNTED WITH ALL NECESSARY CONTROLS. ALSO CAN SUPPLY "S" TUBES, AND PARTS FOR THE ABOVE UNITS. A SPEECH AMPLIFIER WILL HELP TO GET OUT WITH THAT FONE. WE BUILD EM, AND IF YOU WANT TO SAVE TIME IN CHANGING FROM THE OLD WAVELENGTH TO THE SHORT ONES, WHY NOT USE TWO TRANSMITTERS. WE BUILD THEM AT PRACTICALLY YOUR OWN PRICE. 5 WATTER OR 100 WATTER. GET THE LIST, IF YOU HAVE A SET TO BE WIRED, SEND IT IN AND WE'LL GUARANTEE THE PRICE FOR THE JOB IS O.K. WE WILL CHANGE OVER THAT "AIRCRAFT OUTFIT" FOR AMATEUR'S WAVES. YOU FELLOWS THAT HAVE THEM. GET DOWN FROM THE 300 METER WAVES AND HELP KEEP PEACE ON THE AIR. IF YOU HAVE ANY SPECIAL WORK, OM, LET'S HAVE THE DOPE. MANY OF THE GANG USE OUR STUFF, WAVEMETERS, RECEIVERS, COILS, ETC. FOR FB ON HAM STUFF—LET'S HAVE THE DOPE. WE SPECIALIZE IN THE AMATEUR LINE, THAT IS WHY WE ARE FB WITH THE GANG. SEND US YOUR INQUIRIES. ESTIMATES GLADLY GIVEN. QSO. THOS. ENSALL (ENSALL RADIO LAB.) 1208 GRANDVIEW AVE., WARREN, O.

HERE IS THE BEST SHORT WAVE SET YET. GETS DOWN TO THE LOWER WAVES AND "PERKS" QSA. IT'S A REAL SHORT WAVE SET WITH BUT TWO CONTROLS. THE SAME SET THAT COPIED SIXES WITHOUT ANTENNA, ONE, TWO OR THREE TUBE. BUILT IN A WALNUT OR MAHOGANY CABINET. USES GENERAL RADIO CONDENSERS, CUTLER HAMMER SOCKETS, ALL LOWLOSS STUFF. THE PRICE IS FOR AMATEURS. GET THE DOPE. WE ALSO CHANGE OVER NEARLY EVERY TYPE AND MAKE OF RECEIVER FOR THE SHORT WAVES. SEND NAME AND TYPE OF SET FOR PRICES. THOS. ENSALL (ENSALL RADIO LAB.), 1208 GRANDVIEW AVE., WARREN, O.

GREBE "13" first money order for \$42.00 will get my brand new Grebe 13, William Thomson, 2 Miller St., Springdale, Conn.

"RADIO CALL PINS" 49FZ (see p. 60)

FOR SALE—10A LOUD SPEAKER COMPLETE. \$75.00, C.O.D. Grebe CR8 and RORR both \$65.00, C.O.D. Geo. L. Bidwell, 1245 Evarts St., N.E., Washington, D.C.

MOTOR GENERATOR—550 v. 200 w. A-i condition, \$25, E. L. Moldenhauer, 15 West Hill Lane, Wyoming, Ohio.

HAMS TWO COLOR QSL cards with name and address, 75c per hundred. Write for free samples, Theodore Parker, 23 East St., Fitchburg, Mass.

SELL OR TRADE—back issues "QST" from 1916 to 1923—53C.

CEDAR RADIO CABINETS—manufacturers of Radio Cabinets built from cedar wood. We sell direct to the consumer which gives you the profit enjoyed by the dealer. These cabinets are remarkably low priced considering quality, construction, etc. All cabinets are built to suit your requirements. Send panel sizes for prices. All cabinets shipped on approval. Manheim Woodworking Co., Manheim, Pa.

WIDELY EXPERIENCED MAN DESIRES POSITION WITH MEDIUM SIZED RADIO MANUFACTURER IN EAST. CAN FURNISH COMPLETE REFERENCES. Box D, c/o QST.

FOR SALE—GREBE CR-13—4 tube regenerative and 4 tube radio frequency set. Roy Conbear, Lee Center, Ill.

FOR SALE—Vibroplex \$15.00, 6CBW.

RCA 50 WATTERS, \$18.00, Navy U 50 watters, \$18.00. DeForest 500 watters (great for C.W.) \$45.00, immediate shipment, guaranteed to oscillate, Geo. Voigt, 56 Maiden Lane, Maspeth, N.Y.

SELL OR RENT ME THAT NO. 2 Omnigraph. Orin Sanborn, 41 Oxford St., Worcester, Mass.

AMRAD DIRECT READING wavemeter; two basketball variometers; General Radio variocoupler and four UV-199 sockets; two six ohm rheostats and parts from a twenty-watter. Best offer takes them. F. E. Hodgdon, Arlington, Mass.

SELL CHEAP—airway motor—generator, 350 volts, 25 watts, Acme choke coil—Acme 200 watt power transformer mounted. Thomas Wildman, 9DIB, Nichols, Ia.

SELL—Highest offer takes Z-nith three circuit reg. and homemade detector and two step, Oscar Rosel, St. Ansgar, Ia.

RADIO BUILDERS—Order a set of Nine Standard Radio Drills in Canvas Tool Roll for One Dollar. Postage prepaid. South Bend Sales Company, South Bend, Ind.

SUPERHETS—everything for the superhet. RCA 1716's 50% discount. These best I.F. amplifiers peak 7000. EIS, Ultradyne, other parts at discount. Write for quotation anything. R. P. Barrows, Columbia Rd., Portland, Me.

5ALV'S TRANSMITTER FOR SALE—20 watter used only three months, with good record—Nova Scotia, Porto Rico, Hawaii, New Zealand, etc. Always reported strong and steady. Separate Acme filament and plate transformers, Jewell trio, rest R.C. parts, all neatly mounted on panel. Write for detailed information.

SACRIFICE—brand new "Grebe Rorn" complete with output coils, \$20.00; H. Paul Claus, Lehighton, Pa.

WOW! 66,000 volt XRay transformer \$20.00, worth \$75.00, several 50 watters, excellent condition \$14.00; Brand new UV-203-A, \$21.00, high voltage variable condenser, \$3.00, Inductance, \$1.80, B. T. Vail, 1761 State St., Schenectady, N. Y.

FOR SALE—alternating generators for plate excitation, 500 to 900 cycle, U.S. Army Airplane units 200 watts, Price \$10.00 each. Robert R. Bridge, 5EL, Bartlett, Tex.

QST—NEW GREBE RORN \$25.00; CR13 \$40.00; RORR \$5.00; Radiola V list \$142-\$12.50 less transformers and sockets; brand new Federal fones with plug \$3.00; 2 brand new French tubes—both for \$5.00; "N" tubes \$5.50, great detectors sockets .35; UDR24 plugs, list \$1.75—75c, commercial phosphor bronze aerial wire 2 ft., aerial

with same—6 wire cage, 4 lead-in, new bicycle rims and brass hoops 28 ft. by 65 ft. lead-in, \$19.00; more stuff—write 2EN, E. Alexander, 308 Huguenot St., New Rochelle, N. Y.

Did you read that FIVE WATER ad? Do you believe all it says? Especially the money back statement. All sorts of things (as well as tubes) have been advertised with that "MONEY BACK" statement. Sometimes it was really so, sometimes not. We really mean just that. That is just how good we know the tubes are. You perhaps have heard a HAM in Norfolk, Va., working 9BIO, 1BUB and Canadian 3FU. He used just ONE of our FIVE WATERS. Bear in mind that 350 plate voltage is plenty. You'll get out better than you do now with 500 or 700. We built some tubes at first to use up to 750 plate volts and they simply wouldn't stand up. Put some more chokes in the plate supply, get a smoother note, just the same or greater distance and a cool tube. A plate that is red hot doesn't mean a thing out in the air. It shows that a grand lot of energy is being converted into heat at the PLATE. That will warm your hands and that's all. Read the JAN. Q.S.T. article on the low input of the "AUSSIES" and the "New Zealanders." Its all true and they reach here with a fraction of the plate voltage that we use. RADIO VACUUM TUBE COMPANY, 55 Halsey Street, Newark, N. J.

QSL Cards—Send for samples and price list. Large red call letters. 2AOT, 2748 Fulton St., Brooklyn, N. Y.

BAKELITE STRIPS—for sub panels and antenna insulation to 5" wide any length 3/16 inches thick 100 square inches \$1.25 prepaid. Geo. Schulz, Calumet, Mich.

200-20,000 METER receiver, including radiotron \$25.00; two step amplifier \$18.00. Smith, 4416 Market, Philadelphia, Pa.

SHORT WAVE SUPER-HETS WAVEMETERS. WE BUILD ANY TYPE RECEIVER, WAVEMETER OR TRANSMITTER. GET THE DOPE. ENSALL RADIO LAB., 1208 GRANDVIEW AVE., WARREN, OHIO. "FB" on HAM STUFF.

A REPORT ON THE character of my sigs will be appreciated, 9COS, Carl Frank, Rochester, Minn.

IVORY RADIO PANEL—Grained white "IVORYLITE" makes most beautiful set of all. Guaranteed satisfactory. Any size 3/16" thick sent prepaid 3c per square inch. Sample free. E. P. Halton, Dept. T, 814 Main St., Fort Worth, Texas.

CROSLY THREE TUBE model 52, \$22.50, 3-201A tubes, \$3.15 each, 1 Brandes Loud Speaker, \$7.50, John A. Garriott, Little Fork, Ind.

FOR SALE—Four UV-203 tubes slightly used, guaranteed hard, never overloaded, \$12.50 each; PT-537 rheostat \$4.00;—helix 38 turns copper tubing \$3.00; UP-414 microphone transformer \$3.00; Kellogg signal corps type hand microphone \$3.50; everything first class. 6WI.

Motor Generator Bargains. Robbins & Myers Motor 110 Volt 60 cycles single phase Generator 750 Volt 400 Watt \$60.00 Robbins & Myers Motor 110 Volt 60 cycles single phase generator 500 Volts 200 Watts \$45.00. G. E. Motor 220 Volt 60 cycles 3 phase 1750 R.P.M. Generator 400 Volts 150 Watts \$35.00. Esco Motor 220 Volt Direct Current Generator 500 Volt 200 Watts, \$35.00. Esco Motor 220 Volt 60 cycles single phase A.C. Generator 500 Volt 200 Watts \$40.00. 1000 V. 400 Watt 1750 R.P.M. Generator only \$60.00. Esco B. Battery charging motor generator sets, generator 175 Volts Direct current 1 1/2 Amp. motor end Alternating current \$37.50 each. 750 Volt 200 Watt 3400 R.P.M. Generator only \$30.00. All above machines are ring oiled and prices include field rheostat. Queen City Electric Co., 1734 W. Grand Av., Chicago, Ill.

GREBE CR-8, \$40.00, absolutely new, positively guaranteed. Never used, perfect condition. Latest model with shipping carton. 8WY.

HALF HORSE CROCKER-WHEELER 220 motor, three phase, ring-oiled, new. Baldies, large Jewell AC voltmeter, write for list. WANT cash, S tubes and filter, offers. Herb Walleze, Milton, Pa.

FOR SALE—complete 50-watt, panel mounted CW transmitter, with Jewell antenna and plate ammeters, filament and DC voltmeters, back mounted control switches, vac-

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tum tube, grid leak, relay key, Cardwell primary condenser, 50-watt tube, with top plate lead, M.G. set, inductive Hartley circuit, complete ready to use. \$235.00. Further information on request: H. F. Keiso, Dravosburg, Pa.

WANT OMNIGRAPH—must be in good condition and cheap. P. C. Lackey, Blanchard, Okla.

MOTOR GENERATORS. New Rob. & Myers 500 V DC 150 watts with 110 V AC motor drive \$36.00; generators without meters \$25.00, use 100 watts 375 V 3400 RPM DC Generators \$11.00, l.o.b. Chicago. cash with order. Morton Elec. Co., 4832 Rice St., Chicago, Ill.

BEST OFFER TAKES my Grebe CR9 receiver, good working order, in appearance like new, no accessories, Charles J. Pilquist, 2380 Grand Ave., Fordham, N. Y.

TRANSMITTERS. Designed, built, installed. Broadcast ship and amateur, any wave band. Morsemer Eng. & Re. Lab. Grantwood, N. J.

GET CLEAR RECEPTION FOR YOUR DX WORK. See page 99.

"RADIO CALL PINS" 99FZ (see p. 60)

Marconi Tuner designed for War Department range 50-225 meters Type 120 Brand new with instructions. Special \$75. Radio 2 TU.

15% OFF LIST. STANDARD PARTS AND SETS. SEND FOR LISTS. BIRCH PRODUCTS, Box 96, READING, MASS.

SUPERHETERODYNES Carefully made by old timers of BEST MATERIAL tested and guaranteed. Seven tube \$75.00, eight tube eighty dollars. ANY wave length to 40 meters. Tubes to match at two dollars and twenty-five cents each, type 201A. RADIO LABORATORIES, BOX 474, SAN BENITO, TEX.

Canadian 9AD, Selkirk Mine, of the American Development Company, Limited, located in central Manitoba, Canada. Post Office address via Riverton, Manitoba. One hundred and fifty miles north from Winnipeg and a hundred miles from railroad. Radio only constant communication other than weekly mail by dog team. All correspondence answered as quickly as mail service permits. Operated by former Canadian 4EA, Best 73's.

FOR SALE—CW 936 transmitter-receiver, consists of transmitter, receiver, power amplifier, 2 dynamotors, switchboard, loud speaker, 2 microphones, 2 headsets, 3 tubes, aerial switch, extension box, push button, extra fuses, resistances, and brushes. Operates on 30-32 v. All Western Electric apparatus, excellent condition. Price \$150.00. Richard Greter, Box 50-A, Madison, Conn. or 3200 Third Ave., Bronx, N. Y. 1ACC.

JEWELL Thermo-0-10 \$7.00; Federal Hand Microphone \$3.00, both fine condition. 2CEL.

\$80.00 takes complete 10 wattter with Westinghouse 500 volt 100 watt motor-generator. 9DXT.

8BCA is selling out, every article guaranteed A No. 1; motorgenerator 2000 v. 1500 watts \$200.00, ten watt CW and fone set complete with three 202's Acme power transformer 750 and 550, also U.P.1654 filter to use with fone, Colpitts circuit. All mounted in cabinet with two Jewell meters 0 to 5 amps. 0 to 10 volts, also complete parts for 20 jar rectifier, parts list at \$115.90; will take \$50.00; Acme 300 watt fl. heating transformer \$15.00. RCA UP-1016 transformer \$15.00, magnetic modulator. UT1367, \$5.00; three 50 watt sockets, \$1.00 each, two UP 415 reactors \$2.50 each, two UC 489 condensers \$1.25 each, UC 1015 condensers UC 1803 W.E. 21U, UV203A never used, \$30.00; Brandes table talker \$5.00. Whittlesey 75 ft. tower \$100.00, photo of tower on request. Radio 8BCA, Galion, O.

EDGEWISE WOUND copper ribbon the only really satisfactory antenna inductance 5/16 inch wide, 4 inch diameter 12 cents, 5 inch diameter 18 cents, 6 inch diameter 16 cents. 7 1/4 inch diameter 18 cents per turn, prepaid any number turns in one piece. Geo. Schulz, Calumet, Mich.

PUREST VIRGIN ALUMINUM FOR SALE. PARTICULARS UPON REQUEST. 2EM.

HERE THEY ARE. DRILLED PYREX custard cups, for leadin bushings, complete with 10" threaded brass rod and rubber washers. A perfect leadin bushing for only \$2.50, John B. Gray, Jr., Wilson, N.C.

STORAGE "B"s—2350 MILLIAMPERES. 24 VOLT UNITS, \$4.25. 4 OR MORE \$3.75. DIRECT FROM FACTORY. WIRE—12 ENAMELED 1000 FT. \$6.25 16DCC ENAMELED 60c LB. QUOTATIONS ON ANY KIND OF WIRE. C. CHAMBERLAIN, BEREA, OHIO.

ESPERANTO! LEARN! ESPERANTO! The easiest and most successful method ever published for studying the International auxiliary and Radio Language Esperanto. Booklet of sample pages illustrated by 141 illustrations sent free to every reader of QST. Esperanto is endorsed by the A.R.R.L. Benson School of Esperanto, Inc., 20 Mercer St., Newark, N. J.

NEW APPARATUS FOR SALE—GREBE CR9's \$30.00 EACH. General Radio wavemeters \$8.00 each, separate extension coils \$2.50 each. Cardwell condensers at 25% off list price. P. Van Dusen, Kent, Ohio.

RENT ME UR NO. 2 Omnigraph long enough to learn cuds. Thomas McDuffee, Hamilton, Ohio.

TAP SELLING OUT. Write for list.

NOTICE—THE FOLLOWING CORRESPONDENCE IS HELD UP BECAUSE THE ADDRESS OR NAME HAVE NOT BEEN SUPPLIED OR BECAUSE THE CORRESPONDENT HAS MOVED. PLEASE ADVISE HEAD-QUARTERS INDICATING THAT THIS IS FOR THE "DEAD LETTER FILE".

P. Edward Welch, 135 W. 79th St., New York City; N. J. Buckeye, no address at all; Robert Heuberger, no address; E. L. Dye, Lexington, Ky.; F. T. Holmes, 161 Hillside Ave., Waterbury, Conn.; William Schroeder, 1825 Spaulding Ave., Chicago, Ill.; Otis Fitchett, Bloomfield, N. J.; E. Fralic, 312 Nebraska Ave., Toledo, O.; Raymond Reeves, Montgomery, Ala.; Duncan, Merriweather, Montgomery, Ala.

SELL—ACME 200 WATT \$11 9CU1.

FILTER CONDENSERS—I HAVE SOME MORE OF THOSE GOOD WESTERN ELECTRIC 21AA TESTED AT 1000 V IMPF for \$1.00 EACH POSTPAID. W. L. Holst, 4042 N. Bernard St., Chicago, Ill.

SPECIAL CLEARANCE SALE!! Acme 1½ by chokes \$4.50 Thordarson filament transformers \$5.50, 6 ohm rheostats with gun metal dials, \$29, 23 & 43 plate condensers, \$.59 Workrite 3½" dials \$1.10, 4" dials \$1.15, Socostats \$3.49, everything NEW, except condensers which are slightly used. George Voigt, Maspeth, N. Y.

New General Electric ½ H.P. 110-220 Volt 60 cycle 1750 R.P.M. Single phase repulsion induction motors. These are late type 40 degree continuous duty motors all in original boxes. Price \$29.50 each f.o.b. Chicago. 25% with order, balance C.O.D. Quantity limited. Also other sizes. Queen City Electric Co., 1734 W. Grand Ave., Chicago, Ill.

41 RADIO NEWS 25c copy; others single circuit with WD-11, Rmlier coupler, Bakelite Panel, etc. \$8.00 prepaid. Herald Beckjorden, Forest City, Ia.

FOR THAT 3-5 Watt 500 Airway Motor Generator 110 volt 60 cycle motor 300 volt .7 amp. DC generator, hardly used, \$30.00 prepaid, Wolf, Clarksville, Tenn.

FOR SALE New R-3 MAGNAVOX \$20. TEN JAR CHEMICAL RECTIFIER \$5.00, J. P. Hyde, Bristow, Va.

REMLER TYPE 630-631 condenser complete with dial \$4.15. (See January QST) Acme loloss Condenser \$5.25 Brandes superior fones \$4.90, any type receiving radio-tron \$3.40, Coakley & Brown, 113 E. Jefferson, Ottawa, Illinois.

RADIO CARDS—8 SPECIAL FAVORITES. LARGE RED call letters 60c per hundred and up. RADIOGRAMS 3 forms, 20c per 100, letter heads and envelopes. Send for our set of samples free. LOWEST PRICES. BEST QUALITY. THE ARTHUR PRESS, 1453 Arthur Ave., LAKEWOOD, Ohio. C.O.D. Orders to 8BOQ Branch office, C. M. Rush, 855 S. Broad St., Mobile, Ala. 5QP.

STOP! LOOK! READ!—A few New complete 5, 10, & 20 Watt Sets left including GE, Jewell, Westinghouse, etc. hi-est grade Apparatus. Prices fm \$30-\$125., Wave Length 40-200 M. New 2 & 3 Tube Receivers getting them fm 25-325 M., others Hi as 600—all LOW LOSS Coils, Cardwells, Porcelain Sockets, complete with Tubes fm \$30-\$75. In appearance & that DX go get these Sets Rank 1st. Low Wave Tuners correspond with Transmitters on all Short Waves. Send in that equipment lying around the house for Low Wave construction with our Low Loss Coils giving gd Satisfaction. Estimates furnished on this work. Best of WORKMANSHIP with CONSTRUCTION GUARANTEED. Write—3BOV. S. Strobel, 3923 N. 6th St., Phila., Pa.

WESTERN ELECTRIC 7A amplifier for sale. Complete with three 216 A tubes. Perfect condition, wonderful bargain, \$10.00; Austin Kerr, 653 Barry Ave., Chicago, Ill.

ARRL SWEATER EMBLEM, YELLOW AND BLACK FELT, 5x8" \$1. FULL PARTICULARS ON ARRL PENNANTS GIVEN ON PAGE 124 DECEMBER QST. 9ASX.

AT LAST! Real Ham wavemeters, range 75 to 225 meters. Solidly built, accuracy guaranteed within 1%, \$7.00 postpaid. Edward Bromley, Jr., Whitewater, Wisc.

SOME REAL BARGAINS FOR CASH: 2 tube ultradyn. \$75.00; Roberts 2 tube knockout set \$50.00; Carco 2 tube regenerative \$25.00; all sets in cabinets without accessories. 3 Ballantine variotransformers \$5.00 each. Cardwell .0005 condenser, \$3.75. Thordarson Vernier Condensers \$3.00; Duratron Transformer \$3.00. Lopez Low Loss Tuner \$6.50. Sodium Tube with adaptor \$4.00. W. B. Butcher, Waynesfield, O.

RADIO SETS—Our prices save you money on sets, loudspeakers, etc. Lists free. The Radio Shoppe, Box 645 East Liverpool, Ohio.

GREBS IN ORIGINAL FACTORY CARTONS: last offering of high grade new apparatus at dirt cheap prices—CR3, \$30.00; CR8, \$40.00; BORN, \$20.00. BORD, \$35.00; Also ½ doz. Baldwin type "C" headers, \$7.00 each; following demonstrators guaranteed o.k. in every respect. Grebe, CR9, \$45.00; Crosley XJ, \$25.00; Pads "160", \$70.00—closing out these lines, cash talks. 29% cash, balance C.O.D., The Radio Shop, Dubuque, Ia.

WAVEMETERS—ANY RANGE, ANY TYPE, \$6.50 UP. WRITE FOR PRICES. ALSO ACCURATE CALIBRATIONS MADE FOR \$2.00. AMES RADIO SHOP, FRANCESVILLE, INDIANA.

WANTED—I P 501 receiver with or without loading coils. Albert J. Higson, River Edge, N. J.

FOR SALE—CW 936 TRANSMITTER AND RECEIVER, \$30.00; 2 MG 30/350 volts D.C. \$25.00 pair; 1 Omnigraph 5 dial \$15.00; 1 UV202, \$5.50; 2-VT2s, \$4.50 each. Western Electric Navy Power amplifiers and loud speaker, \$50.00, all new stuff, Ernest Roy, Funderne, N. J.

TWENTY WATT TRANSMITTER. We have a used Westinghouse TF transmitter only, no power supply, no tubes or accessories. The cabinet and panel are in good shape. Has filament transformer, OT, sockets, grid leak and condenser, microphone transformer and keying relay, all wired ready for plate supply. Price \$42.50. Utility Radio Company, 58 North 6th Street, Newark, N. J.

"RADIO CALL PINS" 69FZ (see p. 60)

Before buying CW parts elsewhere write for advance information on our new line of transmitting equipment out soon. Seattle Radio Laboratory, 3335 33rd Avenue South, Seattle, Washington.

RADIOLA V detector and 2 stages—audio and crystal detector like new list complete \$142.50; all for \$55.00; less tubes and batteries; but with 3000 ohm Frost Phone, \$5.00 deposit with express agent, balance C.O.D. subject examination. Geo. Schulz, Calumet, Mich.

FOR SALE:—Westinghouse 220 volt D.C. motor. When used as generator will give 500 V. D.C., just the thing for plate supply \$15.00; Alfred Dougherty, 14 Foreman St., Bradford, Pa.

MODEL C, super het. receiver in oak cabinet E.I.S. parts with blue prints and instruction manual. Never been used: will sell for \$90.00 or trade for transmitter. Write Wm. Gwillam, Birch St., Marshall, Mich.

—PEPPO—*Non plus ultra*—PEPPO puts a lasting and tremendous "Kick" in ur Edison "A" and "B" Batts. A can of "PEPPO" makes five pounds of Edison solution, enough for ur 80 cell one hundred volt "B batt". Price per can (1 1/4 lbs.) \$1.25. Be sure and get "PEPPO" and refuse all weak and worthless substitutes. RADIO-TEST-TUBES especially strong constructed 3/4 x 6", 5c each; SUPERIOR ELEMENTS 5c per pair, drilled 6c, wired 8c; RUBBER SEPARATORS 1/3c each; PURE NICKEL WIRE 1 1/4c per foot. Everything pre-paid, attach remittance to order. Prices on all other Radio Sets and Equipment upon request. Northwestern Radio Laboratories, Radio Station 8BLR—Sole manufacturers and distributors of "PEPPO". 1695 Taylor Ave., Detroit, Mich.

WANTED. BUYER FOR two Westinghouse dynamotors 30-350 volts \$15.00; one \$10.00, rotary converter, D.C.-A.C. \$15.00; Amrad short wave receiver \$5.00—2CYU, F. Mann, 35 2nd St., West New York, N. J.

GET MY PRICES ON JEWELL meters before you buy. Bargain price 1st of other apparatus sent on application. J. M. Smith, 8BO, Station B, Toledo, O.

BARGAINS—several used receiving parts. HOWARD SEVEREID, HUXLEY, IOWA.

THE OLD MAN SIZ: "PYREX YOUR AERIAL AND ANNEX THAT DX". PYREX GLASS TRANSMITTING INSULATORS \$1.50; RECEIVING INSULATORS 45c; LEAD-IN INSULATORS \$1.50; No. 12 SOLID COPPER ENAMELED WIRE 1c FT.; 500 FT. \$4.75; 1000 FT. \$9.75; No. 10 SOLID COPPER ENAMELED WIRE 1 1/2c FT. (FOR HEAVY DUTY); No. 16 D.C.C. MAGNET WIRE 75c LB.; OHIO BRASS PORCELAIN INSULATORS, 10" \$1.50, 5" 75c; CHEMICALLY PURE ALUMINUM, 1/16" 90c SQ. FT., 1/8" \$1.80 SQ. FT., LEAD, 1/16" 90c SQ. FT., 1/8" \$1.80 SQ. FT.; CARDWELL TRANSMITTING CONDENSERS \$15.00; RCA INDUCTANCES \$11.00; GREBE CR-3 TUNER \$45; WESTINGHOUSE 250 WATT, 1000 VOLT MOTOR-GENERATOR \$125; WESTINGHOUSE 100 WATT, 500 VOLT MOTOR-GENERATOR \$50. REMEMBER, IF YOU CANNOT GET HAM STUFF IN YOUR HOME TOWN THAT YOU CAN GET IT FROM US. E. J. NICHOLSON, 8BIN, 1407 FIRST NORTH ST., SYRACUSE, N. Y.

RENT ME YOUR OMNIGRAPH FOR THIS MONTH. C. FINGAR, HUDSON, N. Y.

TRADE COMO push-pull transformers for Omnigraph or transmitting transformer. Henry Garsombke, 778-28 Ave., Milwaukee, Wis.

SELL one 5 amp bulb charger fifteen dollars, Albert Krug, Gardner, Ill.

FOR SALE—1 Jewell O-1000 volts D.C. flush mounting voltmeter, \$15.50; 1 Thordarson 300 watt mounted filament transformer, 12 volts, center tap, 60 cycles, \$10.00. Address Box 456, c/o QST

PARAGON 10 w transmitter; new 1KW Acme transformer; Goodell-Pratt lathe with milling attachment; moving picture camera with tripod and case; five reel feature film. Make offers, prefer cash, or Westinghouse 20 w. transmitter. Verner Hicks, Spring Valley, Ill.

REMLER, GIBLIN and DeForest coils, new mounted only few left as follows:—100-150-200-300-400-500-750 turns half list price. Postage extra. Geo. Schulz, Calumet, Mich.

HAM TUNERS—70 to 220 meters, low loss coils, condensers and Pyrex sockets complete with one step audio and mahogany cabinet, \$50. All U.S. districts, all Canadian Provinces, Mexico, Cuba, Porto Rico, Hawaii, England, France, Algeria, Argentina, etc., have been copied on these tuners. Write for photos, description and special offer. 5ALZ.

TO MAKE ROOM FOR NEW TRANSMITTER AT 1AW the following is offered for sale:—1 G. E. Mercury arc rectifier tube, 7500 volt, 2KW, new, never used, \$35.00; 1 G E starting transformer and choke, combined, for above Mercury tube, new, \$35.00; 1 120 cell home made electrolytic rectifier in mahogany

box, ready to run, 12" x 20" x 14" high, \$20.00; 1 G.E. Hotwire ammeter, 0 to 3 amps, 8" dial, \$10.00; 1 G.E. filament transformer, 30 volts secondary, 110 volt primary, 500 watt normal rating, new, never used, \$25.00. Hiram Percy Maxim, 1AW, 276 No. Whitney St., Hartford, Conn.

HAMS: Get our Samples and Prices on Printed Call Cards made to order AS YOU WANT THEM. Radiograms 25 cents per 100. Hinds & Edgerton, 19 S. Wells St., Chicago, Ill.

Sa Gang—Have you held tt mob of sixes using sine rectifiers? Some sock eh? And tt note, Oh Boy! You can have the same thing—And listen! No voltage drop as in ur old chemical rectifier and it won't freeze nor nothin! Hi! We sell new type Stahl, 100 percent efficient, rectifiers at \$60. F.O.B. Wheaton, Ill. Ask 6XAD. He uses one. 9-BUK, 9-BRX.

WESTINGHOUSE 30-350 volt motor-generator in vibrationless rack for two with choke coils \$18.00; U. C1846 R.C.A. antenna series condenser, \$2.00; 23 turn pancake coil \$52.00; I. Megeff, 1 East 113th St., New York City.

For Sale: One ten watt fone twenty watt CW transmitter with Heising modulation and built in speech amplifier mounted on bakelite panel and brass angle frame. Seventy-five dollars. Emerson five hundred volt motor generator, forty dollars. Grebe Thirteen receiver, fifty dollars. Paragon RD5 receiver and two step, sixty-five dollars. Magnavox R3, fifteen dollars. Eighty to two hundred meter receiver, fifteen dollars. All above in good condition, don't have time to use it. W. E. Lott, Jr., Mincola, Texas.

MASTER CODE IN FIFTEEN MINUTES—10 WORD SPEED in three hours. These world records made by our students. New 1924 Honor Roll tells code learning story as reported by two hundred students all now licensed; some in each radio district; copy free on request; method \$2.50; kills hesitation; Dodge Radio Shortkut, Mamaroneck, N. Y.

STOP! LOOK! LISTEN! \$115 DeForest 15 panel unit set for \$50.00; 150 to 25,000 meters, \$25.00 takes the following honeycomb coils: one each of DL-25, 75, 100, 600; two each of DL-50, 150, 250, 500, 1000, 1250, 1500. Coil rack included. NEW, NEVER USED. WIRELESS SHOP Variable trans. condenser .0011 mfd. 10.00; Wireless Shop Variable trans. condensers .0006 mfd. \$7.00; 5 watt Radiotron UV-202, 4.00; Audiotron 2 filament detector tube (never used) \$6.00; 2 Marconi VTs at \$4.00; Murdock Oscillation transformer, \$4.00; transmitting inductance, \$6.00; pancake transmitting inductance, \$2.00; 2 Murdock transmitting condenser .0017 mfd. at \$2.50; 2" spark coil \$8.00; Navy wireless key \$3.00; potentiometer G.R. 5000 ohms \$1.50; Murdock changeover switch \$4.00; zinc spark gap \$1.00; crystal detectors at \$1.50, Chelsea .001 variable condenser 3.00—Alfred Dougherty, 14 Foreman St., Bradford, Pa.

ARE YOU ANCHORED AT 10-15 PER—REPORTS FROM OTHER HAMS WHO BY BRIEF STUDY AND LIMITED PRACTICE INCREASED AND IN SOME CASES DOUBLED SPEED MAILED ON REQUEST METHOD \$2.50. KILLS HESITATION, Dodge Radio Shortkut, Mamaroneck, N. Y.

DID YOU KNOW THE CODE BUT SOMEHOW FAIL TO PASS? Many Previous Failures (thanking us for License have told story of QUICK SUCCESS, which will mail on request. Method \$2.50, Kills Hesitation. Dodge Radio Shortkut, Mamaroneck, N. Y.

KNOW THE CODE OUR WAY—KILL HESITATION. Ask for list many students who won appointment as O. R. S. AM. RADIO RELAY LEAGUE and have reported made rapid progress to quick success—mailed on request. Method \$2.50, Kills Hesitation. Dodge Radio Shortkut, Mamaroneck, N. Y.

INTENSIVE SPEED PRACTICE—Something new. When properly used enables hams to quickly develop. Code Speed for Commercial First or Extra. Supplement to and sold only in connection with Dodge Radio Shortkut. FREE COPY TO FIRST FIFTY HAMS who have already purchased D. R. S., state are trying to reach 30-35 per. will give fair trial and report results. C. K. Dodge, Mamaroneck, N. Y.

"RADIO CALL PINS" uSFZ (see p. 60)

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS

WANTED—1000 to 1500 volt generator cheap. 1CRY.

SEND TWENTY-FIVE cents silver for simple formula that easily removes green deposit from storage battery terminals. Theisen, 3415 Meade, Denver, Colo.

MUST SELL IMMEDIATELY—Grebe RORN, CR8, RORK, \$30.00; this combination cost \$195.00, is new and guaranteed. EX 8QG. George H. Smith, Charleroi, Pa.

SELLING OUT dealer's stock. Few new Grebe CR-13's at 45% discount; complete new standard "DeLuxe" 5 tube neodyne with tubes, loud-speaker and phones; list \$200.00; going at \$95.00; no trades. Sent C.O.D. guaranteed, Craig & Loughborough, 3401 Glenmore Av., Cincinnati, O.

WHILE THEY LAST—Reinartz's original short wave articles in September, October and November numbers of Amateur Radio. Sent postpaid for 50 cents or free with a subscription \$2.00. Executive Radio Council, 136 Liberty St., New York, N. Y.

SELL—Acme CW inductance \$4.00; Paragon 10-R radio frequency \$25.00; Acme 200 watt CW transformer \$15.00; 1/2 H.P. Holtzer Cabot motor 1750 rpm, 110 volt 60 cycle, \$12.00; honeycomb set with 3 coils \$20.00—8AVJ.

GENUINE SILICON Transformer steel cut to order 25 cents lb. 10 lbs. and over, 4 cubic inches, weight 1 lb. postage extra. Geo. Schulz, Calumet, Mich.

GREAT REVIVAL! Audio transformer revived. Your burnt out transformer brought back to normal activity. The charge is only \$1.50. Satisfaction guaranteed or money refunded. Standard makes only. The Radio Research Laboratories, Box 507, New Bedford, Mass.

FREE WITH EVERY WESTINGHOUSE battery, one rubber battery tray FREE. See add on page 99.

DEALERS—write or wire for special prices. George Vogt, Maspeth, N. Y.

Silver has the lowest resistance. Silverplate your Aerial, Condenser, Bus bars, etc.; also parts of sending sets, with "SILVOPLETE" and reduce your losses. A guaranteed pure Silver Solution. Three sizes; 35c, 60c, and \$1.00. If your dealer cannot supply you, send direct to: Silvoplate Co., 125 Church Street, New York.

FOR SALE—RCA UP1368—325 watt transformer \$9.00; two U.V.216, \$3.50 each; lot of receiving parts, send for list. Delgado, Box 23, Angola, Ind.

SELL—200 watt, 500 volt, motor generator, use 220 D.C., \$40.00; Paragon 10 watt transmitter, \$30.00; Radio 9SW, Benson, Minn.

RADIOTRON TUBES \$3.80; Magnavox R-3, \$30.00, R-2, \$45.00 Brandes Tabletalker, \$9.00; 100 Amp. storage "A", \$15.00; 45 volt Ray-O-Vac "B" \$4.25, cash with order; No C.O.D., Bernard C. Fulton, Yatesboro, Pa.

HAMS! Tuska 100 watt never used. CW power transformer only \$12.00! Clapp-Eastham H.Z. amplifier, \$25.00, also 2 Murdock transmitting condenser sections at \$7.75, two U. V. 301's at \$2.50; *CIG.

BRAND NEW MUSIC MASTER SPEAKER model VI \$25.00; model VII \$23.00; send money order; Paul Klayder, 617 Indiana St., Neodesha, Kansas.

SELLING OUT—Honeycomb two step receiver with coils \$45.00; New Emerson 500 V.-100 W. Generator \$35.00; Acme 200 W. plate transformer \$10.00; R.C. Inductance \$7.00; Filament trans. \$3.00; 2 sockets \$1.00; 2 large grid leaks @ 75c; 7-1 mid. filter condensers @ \$1.00; 2 chokes @ \$2.00; O-3 New Jewell TC Ammeter \$1.00; O-7 1/2 Jewell Voltmeter new \$4.50; O-600 New Jewell MA \$4.50; O-500 New D.C. Voltmeter \$9.00; O-1 Gen'l Rdo. Ammeter \$2.00; O-150 Gen'l Rdo. MA \$1.50; Paragon Mica Condenser \$1.00; 2 Rheostats @ 50c; Mesco Heavy key \$2.00; 1 pair W.E. Phones \$6.00; 2-5 Watters @ \$3.00. CASH WITH ORDER. F. E. NORWINE, JR., 7401 Clayton Rd., St. Louis, Mo.

NOW IS THE TIME FOR ALL GOOD MEN TO hook up their A and B storage batteries and charger to convenient switches and have a charging arrangement that is simple (even the O W can operate this) and fool-proof. Complete set of switches etc., including diagrams

and instructions for \$2.00. Diagrams and instructions only for \$.50. Leo A. Price, 386 Euclid Ave., Akron, Ohio.

FOR SALE—Omnigraph \$5.00; Herbert Lasselle, 1561 5th St., Alameda, Calif.

5th POST INVENTORY PRICES, GOOD ONLY DURING FEBRUARY. WIRE UP YOUR SENDING OR RECEIVING SETS WITH REAL WIRE. No. 12 HARD DRAWN TIN COPPER WIRE SUPPORTS MORE WEIGHT AND STANDS HIGHER CURRENT THAN ANY OTHER HOOKUP WIRE. 1c FT. No. 12 ENAMEL SOLID COPPER WIRE 85c HUNDRED FEET, \$7.50 PER THOUSAND FEET. No. 16 ENAMEL SOLID COPPER WIRE 1/2c FT. No. 16 DCC 65c LB. No. 16 ENAMEL DCC 85c LB. No. 112 DCC 55c. LB. LOW LOSS COILS MADE TO ORDER. WRITE FOR QUOTATIONS. 8AGO, BIDDLE ARTHURS, JR., 3046 CENTRE AVE., PITTSBURGH, PA.

REPAIRING, rewiring and rebuilding anything in radio. All work guaranteed. Radio Service Shop, Atwood, Kansas.

DYNAMOTORS 30 v input 300 v output \$8.00; WATERMOTOR and Generator outfit will charge A and B batteries, \$14.00; Wood, 151 E. 108th St., New York.

SELL or TRADE New Jewelers Lathe with all tools in original carton worth hundred dollars, want CW transmitter. 9CA.

FOR \$1.75 and your old Audio Frequency transformer we will ship you a new transformer. FOR SALE—Cleartone four tubes receiving set, Merchant Radio Co., three tube set, 10A amplifier with tubes, 550 volt Generator, will trade the above for Grebe 13 or Jewell test set. What have you to trade? Radio Supply Co., Sedan, Kansas.

EDISON B BATTERIES SUPPLIES. LARGEST SIZE TYPE A ELEMENTS 4c A PAIR, DRILLED 5c A PAIR, WIRED IN PAIRS 8c, PURE NICKEL WIRE 1c A FOOT, PERFORATED RUBBER SEPARATORS FOR BATTERIES 1/3c EACH. PERFORATED RUBBER SHEETS 5 1/2 x 5 3/16 3c EACH. ALL ARTICLES POSTPAID. SEND REMITTANCE WITH ORDER. CHEMICALS FOR 5 lbs. BATTERY SOLUTION 75c. BERNARD T. STOTT, 60 Pallister Ave., Detroit, Mich. CHEMICALLY PURE ALUMINUM 1/2 inch \$1.80, 1/16 inch 90 cents; sheet lead \$.95 per sq. foot, postage paid. Geo. Schulz, Calumet, Mich.

MAGNETIC MODULATORS, brand new and dirt cheap. Good for loop modulation, keeping hi-frequency off the microphone. UT1643 1 1/2 ampere size, weight 2 lbs, price 25c; UT 1357 3 1/2 ampere size, weight 4 lbs, price 50c; and UT 1367 5 ampere size, weight 8 lbs, price 75c. Utility Radio Company, 58 North 6th St., Newark, N. J.

WAVEMETERS—designed, built and calibrated. Calibration consists of five points within range of wavemeter. Fifty cents per additional point. Any wave length, 2 meters up. Morsemer Eng. & Re. Lab., Grantwood, N. J.

WE BOUGHT \$1000 worth United States Government Aircraft Department Radio Transmitting, Receiving Sets and Parts, get our new and latest reduced price list. Send Stamp 2c for list. Mail orders answered all over the world. WEI'S CURIOSITY SHOP, 20 South 2nd St., Philadelphia, Pa.

EDISON ELEMENT STORAGE B BATTERIES FULLY ASSEMBLED AND WIRED WILL SAVE YOU TIME AND TROUBLE. LIMITED QUANTITY 50 VOLT UNITS, ENTIRELY ENCLOSED IN MAHOGANY FINISHED CABINET. 7 TAPS MOUNTED ON ENGRAVED HARD RUBBER PANEL, COMPLETE WITH POTASSIUM AND SEALING OIL, \$5.25 while they last. 100 VOLT TYPE A UNIT IN OAK CABINET WITH TAPS MOUNTED ON HARD RUBBER PANEL, \$12.00. PRICES ARE F.O.B. PHILA. SAMPLE CELL 20c PREPAID. YOUR MONEY BACK IF NOT SATISFIED. SEND FOR COMPLETE LIST OF PARTS AND PRICES. J. ZIED, 530 CALLOWHILL ST., PHILA, PA.

9ALD has magnet wire in all sizes from 14 to 28 for the low loss tinner, 14DCC 60c per pound, 16DCC 65c, 18DCC .70; pure aluminum 75c, lead 90c per square ft.; 60 strand wire, not Litz, for Goldberg's 40-200 meter transmitter, 50 ft. for 50c; Nother Ham-ad elsewhere. Send your next order here—we'll give it good service.

By the way, hope to have 3ALD on the air steady. Shoot in the orders by radio E. F. JOHNSON, Waseca, Minn.

PRINTED BY LIGHTNING! 100 real QSL cards, latest style, standard form, for only \$1.00; 500 for \$4.00, postpaid; wording in blue, large red call. Sample for a stamp. Satisfaction guaranteed 9-AM; Lightning Printers, 6670 Scanlan, St. Louis, Mo.

EDISON BATTERY FOR SALE. FIVE A-4 CELLS WITH NEW SOLUTION AND CONNECTORS. PERFECT CONDITION, CAPACITY 150 AMPERE HOURS, \$25.00 PREPAID. ALFRED DOUGHERTY, 14 FOREMAN ST., BRADFORD, PA.

"RADIO CALL PINS" u9FZ (see p. 60)

THERE ARE MANY AMONG THE HAM AD READERS WHO DO NOT OWN CALL BOOKS AND ARE UNABLE TO IDENTIFY ADS THAT ARE SIGNED SIMPLY WITH CALL LETTERS; CONSEQUENTLY WE WILL APPRECIATE HAM AD ADVERTISERS SIGNING FULL NAMES AND ADDRESSES.

WANTED—Will trade all kinds of radio goods for good typewriter. C. C. Endly, 22 Sturges Ave., Mansfield, Ohio.

Q R A SECTION

50c straight, with copy in following form only: CALL — NAME — ADDRESS. Any other form takes regular HAM-AD rates.

1AAO—H. Hewitt Cooley, 460 Ward St., Newton Centre, Mass.

1ADG—H. M. Towne, 45 Livingston Ave., Pittsfield, Mass.

1ALP—Frank L. Baker, Jr., 30 Minot St., Neponset, Mass.

1ARX—Glenn Aiken, 52 N. Prospect St., Burlington, Vermont.

1AUQ—Clarence E. Hinchley, 217 Park Avenue, Worcester, Mass.

1AWB—Edgar L. Deslauriers, 12 Lafayette St., Attleboro, Mass.

1BHD—Melvin H. Dunbrack, 7 Russell St., Everett, Mass.

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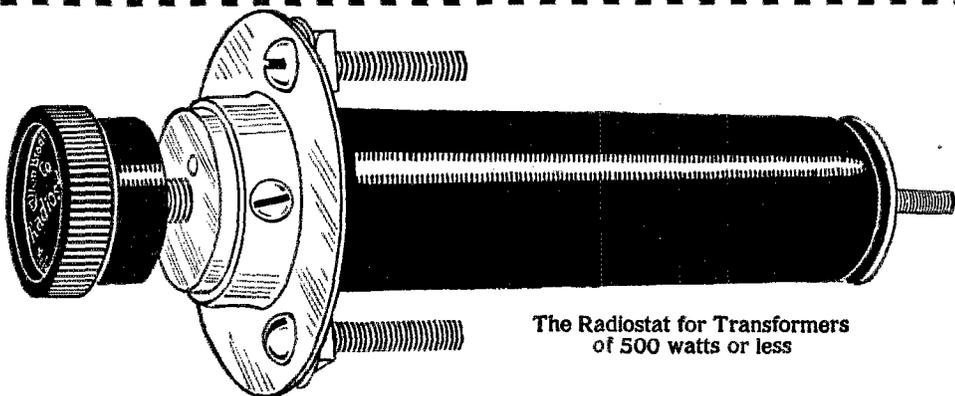
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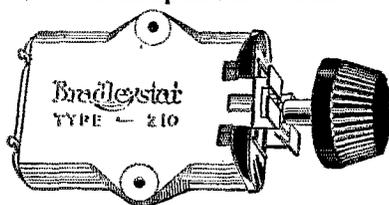
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Megohms
Condenser
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- .0005 M-f.

UV-201A or C-301A

Volts - 5
Amps. - .25
Grid Leak
2-9
Megohms
Condenser
.00025 M-f.



WD-12 or C-12



Volts - 1.1
Amps. - .25
Grid Leak
2-3
Megohms
Condenser
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WD-11 or C-11

Volts - 1.1
Amps. - .25
Grid Leak
2-3
Megohms
Condenser
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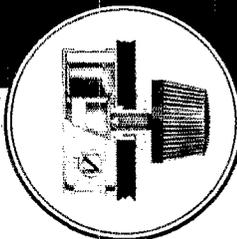
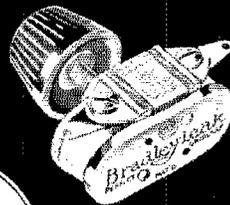
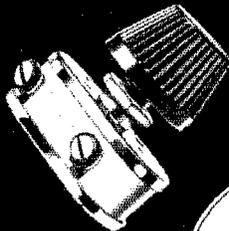
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Amps. - .06
Grid Leak
2-9 Megohms
Condenser
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without changing rheostats or grid leaks ?*

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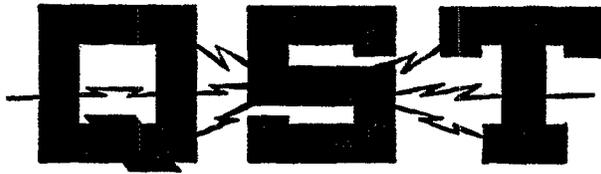
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A Magazine Devoted Exclusively to the Radio Amateur

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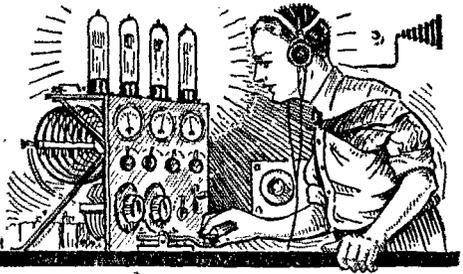
Additional copies of this index may be purchased from our Circulation Department for 4c each.

Suggestions for improvement will be welcome. If errors in indexing or subject matter are found, please advise us.

The Traffic Department

F. H. Schnell, Traffic Manager
1045 Main St., Hartford, Conn.

QST



While this is being written, two elections for new Division Managers are being held. One in the Northwestern Division, which we had hoped to announce at this writing, and another in the Atlantic Division. Probably because of slow mails the ballots have not been coming back as quickly as we had estimated, but the new managers will be announced in next QST.

To meet the great request for the return of the Brass Pounders' League, we are showing the traffic leaders for the past month. Ralph Barnett, 9ACI, of St. Louis and of the Midwest Division just sneaked through as the top-knotcher, with 1KV right on his heels. We recall when 300 messages was the lower limit on the Brass Pounders' League, but as a starter we are showing those with 150 messages or better. Incidentally, we venture a guess that it won't be long before a station will have to handle 200 messages to stay with the leaders since the Traffic Department Trophy enters the field and will make for keener competition. What division and what station will cop the leadership glory next month? Look at the nice little prize position we are giving 9ACI this time.

Ralph Barnett—9ACI
St. Louis, Mo.
Midwest Division
335 Messages.

Now, why are these men traffic leaders? Just listen to them some night and note that they are not wasting their time calling CQ or asking about their notes or signal strength. Listen to the good fist and their clean-cut methods of moving traffic. They are too busy to be wasting their time on "rubber stamp Q signals." They cannot waste time and handle the totals they turn in. In handling 335 messages in a month, 9ACI had to average more than 10 a night—that means he was busy all the time because traffic

BRASS POUNDERS' LEAGUE

| Call | Messages | Call | Messages |
|------|----------|------|----------|
| 1KV | 333 | 2CGH | 183 |
| 6CGO | 217 | 9CLD | 175 |
| 1MY | 208 | 9DUN | 175 |
| 9BGF | 191 | 5XA | 174 |
| 9DFH | 191 | 8KS | 150 |

was scarce. However, we look for bigger totals next month because every report indicates that the fellows have settled down now on the short waves and are ready for messages and they will find them. Just listen to 1KV, 6CGO, 1MY, 9BGF and 9DFH and see how little time they waste in moving traffic. It will do you good to follow them once in a while.

Notice the additional space the Traffic Department has this month. Four more pages to take care of reports from all amateur stations, and to provide space for a timely traffic article each month. So, traffic articles are welcome from any of the fellows. If you have a good idea for the improvement of handling messages or other constructive ideas don't hesitate to send them in. Of course, this does not mean that everything sent in will be printed, but those articles that meet the needs will be printed with full credit to the writer. These articles must be of interest to the traffic man.

Some of the division reports are missing this month. What is the trouble, Gang? Maybe some of the fellows need a little "peppin up" out in the field. Look at this:

QST FOR FEBRUARY, 1925

Here is how "Billy" King, C.M. of Berkeley keeps his men on their toes. "Billy" is under 15 years of age, but read this letter.

"Dear Fellow Member,

The next monthly meeting of the A.R.R.L. will be held at the Alden Branch Library, 52nd and Telegraph Avenue, Oakland, at 8:00 P. M. on Thursday, January 29, 1925. Try to be there as bring a friend. There are plenty of non-members, so let's get them into the League."

For Division Manager of the Northwestern Division, Howard F. Mason, former manager, received the greatest number of votes. Mason could not accept because he has to get squared around after getting back home. The second choice and one who had a good many votes is Everett Kick, 7ABB, 3802 Hoyt Ave., Everett, Wash. 7ABB has accepted and he will make a good man for the job. Now, you fellows of the Northwestern Division, there is your new DM—lend him your best efforts and he will put you out in front. Report regularly and promptly and leave the rest to Kick, especially if you have anything to "kick" about.

OFFICIAL RELAY STATIONS—ATTENTION

Don't forget to report to me not later than the 15th of each month. Reports in my hands later than this will NOT be printed in QST as will be counted as ONE MONTH WITHOUT A REPORT. After two months without a report YOUR ORS WILL BE CANCELLED, so watch your step, lest your Certificate be cancelled.

You ORS's be careful. Reports have come to me that some of the fellows are not abiding by the rules of the operating department. This is one way to lose your ORS, so if you get tired of seeing that certificate up on the wall, just call 20 times as sign once.

I have plenty of certificates for Official Relay Stations, so if you want one send to me for one.

Remember the SHORT WAVE TESTS this winter. See QST for dope.

Kicks, suggestions and recommendations always receive my full attention, so write to me if you have anything on your mind.

Sincerely yours,

(Signed) Wm. B. King,
City Mgr. A.R.R.L."

OFFICIAL A.R.R.L. BROADCASTING STATIONS

Every Saturday and Sunday night, Official A.R.R.L. Broadcasting Messages are transmitted. These messages contain the latest information from Headquarters. At 7:30 P. M., your local standard time, the following stations transmit in the band of wavelengths between 75 and 80 meters:

1GY, 1ARY, 1EF, 1CK, 1CKP, 1BEP, 1FD, 1GL, 1KX, 2WR, 2AQR, 2CQZ, 3AIS, 3LI, 4JE, 4TJ, 5ZAV, 5UO, 5AJT, 5AGN, 5MB, 5XA, 6ZH, 6PL, 6AJF, 7BJ, 7JF, 8VQ, 8ZH, 8BYN, 8BSU, 8ATP, 8DAA, 8BVR, 8BNH, 9MC, 9BAV, 9QW, 9BMX, 9EGU, 9XI, 9ZY, 9AWA, 9DXV, 9ZB, 9CFI, 9AHQ, 9CAA and Canadians 1DD, 2CG, 3VH, 3AFP, 3XN, 4DQ.

At 10:30 P. M., the following stations transmit the broadcast on waves between 150 and 200 meters:

1GL, 1KX, 2CWR, 2CQZ, 4JZ, 5GJ, 5AJT, 5AGN, 5AJP, 5KR, 5AMF, 5AW, 6ZH, 6ABX, 6BBH, 7BJ, 7HX, 7CO, 7JF, 8ASE, 8ZH, 8DAA, 8BVR, 9BAV, 9EGU, 9CFI, 9ZAY, 9AWA, 9DXV, 9AYD, 9AZA, 9AIM, 9AUU, 9CAA, 9CGG and the following Canadians on 125 meters; 1DD, 3AFP, 3XN, 4HF, 4DQ, 5CT.

(Concluded on Page XY)

ATLANTIC DIVISION

C. H. Stewart, Mgr.

EASTERN PENNSYLVANIA—Most all traffic stations have had experience with the shorter waves and are getting busy making permanent installations for better DX. All the good work reported this month was performed on short waves, which are proving their worth more and more every day in every way. 3ADP was the only reporter for Chester. Come across, gang! 3AVL is working the short waves. 3BNU is on 5 watts, temporarily, 170 meters. 3CTZ is doing some traffic on short waves after a period of silence. 3CJN has worked 8 Britishers. 3TP, with new 50 watt, worked a six station. 3MQ and 3 UE are sticking to the game fine. 3BPN is on consistently with four 5 watters. 3BMI is doing good work. 3HOL is QSO all districts, also Canada and Europe. 3BDN is putting up a new tower. For exceptional work, 3CHG sure is a star station, he has worked Z4AA, Z4AG, Z2AC, Z2AP, A3BQ, France, England, Mexico, Cuba, Porto Rico, all Canadian and U. S. districts. That is some record, and hard to beat. 3BVA and college are so closely connected there is not much time for traffic. 3AAO and 3BGG are coming on the air with some strong sigs. The 6th district hams won a recent battle with the local BCL's; with the assistance of the R. I. they advanced from second to first grade ops. 3AHU of noted spark fame will be with us again, but it will be C.W. this time. (More power to you, OM.) Bucknell College will soon be on the air with a new 200 watt C.W. transmitter. 3BCT is still looking for traffic on 80 meters. Would like to have more reports from Philadelphia stations. Traffic officers have been very lax in their reports.

Traffic: 3QV, 8; 3ZM, 18; 3BNU, 29; 3AVL, 13; 3CTZ, 9; 3BLC, 4; 3CDN, 86; 3BPL, 15; 3CJN, 12; 3MQ, 7; 3TP, 18; 3BPN, 12; 3BMI, 15; 3AOL, 10; 3AUV, 12; 3CHG, 44; 3ZO, 90; 3HD, 15; 3FS, 9; 3BTU, 28; 3BCT, 3.

MARYLAND—3AJD is working England and French stations regularly and reports having connected with Dutch PCL. 3LG, 3MF and 3SF have worked across the pond often this month on 80 meters. 3TE-3XAQ is on again and going strong on 30. has received a card from CBS. 3AHA has been doing excellent work on both 160 and 80, being reported in Italy on the short wave. 3LL is working west coast on 80 and has connected with a Belgian, FB. 9BMO is the latest convert to the 80 meter band, and is doing good DX. 3ZD, using 100 watts at his new location, is getting out FB on 150, having worked all districts and P.R. 3DQ is pounding in on the west coast with only 20 watts. 3WF, 3PE, 3BU, 3AOJ, 3DU, 3FB, 3UZ, 3CDU, and 3DX are all getting out in fine style on the higher band. 3AAM, using the 15 watt set made famous by old 3AHK, is reaching out on 180. 3QL, a new station at Ten Hills, is getting out nicely with two 201's with 750 on the pans. He will substitute a couple of 5 watters shortly. 3FF and 3SP are keeping things moving at Crisfield. 3KU is on over the week-ends, working good DX with a 5 watt. 3APV, now using UV-203A tube, is on 40 meters every Sunday afternoon. 3DW at Mt. Rainier is still going on 10 watts and has at last succumbed to 80 meters. He has a schedule with 3EG in Baltimore.

Traffic: 3ZD, 117; 3LG, 97; 3DU, 27; 3SF, 20; 3LL, 6; 3HG, 93; 3KU, 15; 3APV, 16; 3DW, 8.

DISTRICT OF COLUMBIA—Great activity has been shown in the district for establishing frequent transatlantic and transpacific communication, and several stations have done a good deal along this line. While the number of messages being handled is very small compared with the old days, it is to be noted that the quality of transmission and type of traffic handled have greatly improved. Relative to the use of the various wave bands; perhaps ninety percent of all stations are operating in the 80-meter belt, which speaks for itself.

3BHV still holds the distance worked record for the District—Washington to New Zealand. Who will beat this? Just to show what radio will do to a fellow, 3BWT, the most consistent station until recently, received orders from the Doc to keep away from wireless for awhile. Now he works everything with telegraph relays. Incidentally, Ep shot a couple more fifties this month and thought no more of it. 3LR, of old time DX, reports a 100-watt transmitter operating on 78 meters as a permanent installation. Glad to hear it as we've missed him. 3CEJ has been comparatively quiet due to school

work. He regards with suspicion the legend "if radio interferes with business, give up business." 3HS still has the old 100-watt set with a sink rectifier. Everything is fine up there except the sink. 3AB is on in full blast now using a single 50 with a kenotron rectifier.
Traffic: 3BWT, 17; 3LR, 9; 3AB, 4; 3BPP, 1.

DELAWARE—There are but two active stations in this state, 3BSS and 3AIS. Dr. Robert Tomlinson of 3AUN & Barkley of 3SL are both staying off the air until time will permit their operation. 3SL has moved to the country but has not had time to rig up an antenna. 3WJ is pounding the brass on the S.S. Eaglesworth. 3BSS has been very successful in transatlantic work during the past month, having worked England several times. 3AIS has had very little success with DX due to business which will not permit this station to work other than afternoons.

We have been cooperating with the B.C.L.'s here with the assistance of Mr. Cadmus, our radio supervisor, in clearing up quite a bit of power QRM, which were traced to several bad transformers around town.

Traffic: 3BSS, 5; 3AIS, 7.

CENTRAL DIVISION

R. H. G. Mathews, Mgr.

In the Central division, clubs are being handled by the operating department, a Club Report Manager being appointed in each state, whose first duty it is to check up on all clubs and obtain any changes in address, etc., as well as recommend the cancellation of the affiliation of any clubs which have passed out of existence. Monthly club reports are rendered by each Club Report Manager to each Assistant Division Manager, and these are sent in each month for publication with the regular traffic department report.

After being tried out in Wisconsin and found successful, the policy of appointing certain emergency traffic stations in each state is being followed out. These stations are equipped without charge by the Burgess Battery Co., with complete battery plate supply and are required to have as a part of their equipment, spare tubes, condensers, and battery filament supply, to insure continuous emergency operation.

Each O.R.S., C.M., D.S., and A.D.M., has been furnished by the Division Manager with a button in bronze, silver or gold, indicating the rank of the holder. It is hoped that these buttons will serve as an attractive means of identification at conventions and meetings and will serve to distinguish all members of the Central division operating department.

OHIO—The C.M. of Toledo, 8UQ, is moving to Florida where he again will be on the air, but he will be sadly missed in Ohio. 3BQI lost his pole twice in a week but is still going. He can't get set to perk on 80 meters so is on 150 meters. 3ARO on 75 meters is doing great work, working 13 sixes and sevens in two weeks. 3DFF almost has his set rebuilt so watch his smoke. 3FU and 3ZY on several nights per week. Both stations are using high waves but 3FU will soon be on low waves. 3CHY, Leipzig, sends in a nice report but says he is having trouble with 60 cycle plate supply. 3PU, Holgate, is on some, but no traffic. 3DND is coming up stronger each month, and has a 50 watt tube ready to go. (Wt mean "go"?—D.M.) 3ZY's 75 foot pole blew down, but will fix it temporarily for the winter.

Dist. No. 2: 3ZE handled the largest message total, the majority of the messages with the West Coast. 3RY is back on the air doing good work and has a schedule with a number of stations but wants more especially first and fifth districts. 3ZE says the old 3 coil Meissner with W.E. 50 hooked to her smashes through to west coast regularly. 3s sixes and sevens in a month. While trying to remove the base from the W.E. 50 he broke one of the leads off but put a five watt in and worked 7NX-7BJ and 6AME. 3DBM has tried the waves below 100 meters but thinks that 163 meters is the best wave. (Better get down on low waves OM, and some real DX.—D.S.)

Dist. No. 3: Now that the season is well under way, the boys are stepping on things. Many of the stations in this district are doing fine DX, but the messages are scarce. However, 3BOQ, Lakewood, O., put 80 to his credit in less than three weeks actual work. Cleveland and Akron are raking lots of noise lately and some of the boys have been suc-

cessful in getting QSO with British and French stations. 8DPG worked F8GO and 8ADA hooked up with G2OD. 8BYR is hearing England, France, and New Zealand but so far has not been successful in raising any of them. He also took a trip to Washington, D. C., where he visited many ham stations. 8CYT, new D.M. of Akron, started his work off this month with a bang by putting over 40 messages. Our friend, 8HN, worked G2OD and then blew his 50 watter. Must have been an awful strain on it. Eh! After a long "leave of absence" from the air, 8AWX finally got his junk pile to perking again and was able to work G2JF, the first night on the air. He worked G2JF for over half an hour but without a QTA. Hwa tt. 8TT blew his 50 watter but got out his spare and is still perking on 80 meters. 8ACY and 8BWB are back from the Lakes and want schedules. 50 Watters seem to be migrating "west" for 8ACY also had the misfortune of losing his "one and only." First night on, 8BWB worked all districts.

Dist. No. 5: D.S. Storck says no report. No mention in QST and also cancellation of certificates from now on, account of such poor support. 8BBH is not on much and 8BYN had some though luck but has rebuilt his receiver and now works sixes and sevens again regularly, although weather is rather bad for DX, also power leads so bad in Columbus that little foreign reception is possible.

Dist. No. 6: 8DFO, with 100 watts, is working both coasts and reports traffic very good about 8.30 in the morning. He handled 114 messages (FB—D.S.) 8AJD has hard time getting traffic as everybody is passing the buck. The Ohio emergency traffic stations are 8BYN of Columbus and 8AA of Lima. Both will be equipped with battery plate supply for emergency work by the Burgess Battery Co. Traffic: 8BYN, 23; 8DFO, 114; 8BOQ, 80; 8DPN, 68; 8ZE, 45; 8CYT, 40; 8TT, 33; 8DAE, 36; 8CCI, 35; 8BWK, 32; 8DBM, 30; 8ADA, 24; 8BQT, 21; 8ZY, 20; 8BYV, 20; 8KC, 20; 8BBH, 19; 8ACY, 19; 8CCY, 16; 8FI, 12; 8HN, 12; 8UQ, 11; 8DMX, 11; 8BCB, 10; 8DGP, 10; 8RY, 9; 8DND, 8; 8ARO, 8; 8DCE, 8; 8WV, 7; 8AWX, 6; 8BNH, 6; 8AA, 5; 8PU, 4; 8AJD, 1.

INDIANA—The dividing line between Northern and Southern Indiana has been eliminated and D. J. Angus, former A.D.M. of the Southern Section, has been given charge of the entire state, as A.D.M. of Indiana. A. S. Burns of Indianapolis has been appointed Club Report Manager and is linking up all Indiana Clubs and getting monthly club reports. No reports are in from the northern part of the state due to the fact that there has been no time to get organized since the northern part was turned over to A.D.M. Angus. Traffic is picking up in the sections reporting and there are a number of new stations on short waves, namely, 9EJI, 9UR and OPB. They seem to be uniformly successful with them. 9TC has increased his plate voltage to 1700 and put in a new 203A. 9TG and 9BIW are using zone to supplement the code and are getting about 1000 miles consistent operation. The bulk of the traffic at Indianapolis is going through 9VC, 9BIW, 9BVZ and 9BP. 9DUC is blowing a lot of tubes but is still handling traffic on 150 meters. 9CSG is going down on 80 meters. 9BBW is off on account of a blown transformer. 9BVI is on with 100 volts on a 5 and is getting out to the eights and nines. 9BJL on 80 meters is handling plenty of traffic.

Traffic: 9BDB, 50; 9PB, 44; 9CJA, 24; 9BJL, 19; 9BK, 18; 9EJI, 16; 9CSC, 12; 9DUC, 10; 9BVZ, 10; 9ESC, 16; 9UT, 4.

KENTUCKY—Activities this month in general have been slow. 9ELL, 9WU and 9DTT have been most active stations and are operating on 80 meters. 9BPB has a new 100 watt set going and is getting out in fine shape. O.R.S. appointment of W. N. Smith, 9DYC, has been restored as he is now ok with the R.I.'s office. E. G. Hill, 9WU, has been appointed Kentucky Emergency Station and will be equipped with Burgess Battery plate supply.

Traffic: 9ELL, 45; 9WU, 27; 9DTT, 26; 9HP, 25; 9MN, 8.

MICHIGAN—Dist. No. 1: Totals look good this month. Most of the men claim lack of traffic, others at times show by their reports that their traffic ooms up most like the "peak days." High totals, while desirable, are not the first requirement. Honest to goodness messages that mean something is what we want, never mind the number. One real message delivered is worth a hundred foolish ones. Most O.R.S. in this district are now down on the lower waves, and Pontiac reports four stations as active. 8DBO at Adrian says messages are scarce, especially on the 150-200 meter band, also the Michigan QST FOR FEBRUARY, 1925

stations are hard to work. 8DOO on 76 meters (why everyone on 76 meters?) with 100 watts and soon 50 watts on 40 meters. Any X stations desiring to make some tests with 8ZH please advise. 8ZH will be signing WGF on 135 meters; this will be test for special Police business and cooperating will be appreciated. Please advise schedules any time from noon on. This month seems to see most stations on the lower waves with good reports of SX but few messages, the cry being "messages are scarce." We are still looking for reports from every station no matter if you have handled messages or not.

Dist. No. 2: 8CED leads in dist. No. 2 this month. The district is especially busy preparing for the big 4th Michigan A.E.R.L. Convention to be held in Lansing, Feb. 13th and 14th.

Dist. No. 3: Kalamazoo has a regular radio club going now and they have been meeting every Tuesday at 7.00 P.M., but now have changed their meeting night to Wednesday nights at 7.30 P.M. at 8CPY's station. Visitors are welcome. SAUB of Grand Rapids is the star station in this district this month. (FB, OM.) He seems also to be the only active station on up there in Grand Rapids. We need more good stations in GR. 8DSE of Kalamazoo is a new station who has been getting real DX out of a pair of "Bootee" 5 watters, on the short waves. He is QRV every noon. The Benton Harbor gang have begun in earnest for the winter with 8AAL and 8BDY as leading stations. 8AQA, C.M. of Benton Harbor, is in Chicago for a short time operating 9NV. 8BKC tried to quit the game but couldn't do it. HI. 8CPY of Kalamazoo has been laid up from work on account of nervous breakdown, but has been able to work the old set day and night on short waves. 8CGM is a new BENEDEICT and has purchased new equipment for a real DX station and will be on soon. 8CQG is waiting for some one to hand 'em a couple of S tubes. 8DKF says the B.C.L.'s don't call him up as often when using short waves so he has gone back to 150-200 so as to not lose touch with the B.C.L.'s. He sees the French 50 watters won't stand the full plate voltage on the filaments. He knows! 8DDT seems to be handling traffic in fine shape, with the new set. 8BGQ is now a portable station out of Grand Rapids owned by the C.M. He also has a new station, 8JG. FB. No reports from the South Haven gang this month. Smatter? The amateurs of the cities of the northern part of the district seem to be afraid to hand in reports of the activities to their D.S. (8CPY.) We need more good stations in this district and all stations in western half of Michigan are requested to notify 8CPY that they are on the air and what they are using.

Everyone is planning on going to the Michigan State Convention in the spring at Lansing. Kalamazoo is going to put on a REAL STUNT at the convention. Start saving your rotten eggs, etc. (Ok, there are lots here in Chicago.—D.M.)

Everyone in this district seems to be getting down on the short waves. Let's have your reports on the success or failures you have. KEEP IN TOUCH WITH UR DISTRICT SUPT., 8CPY.

Dist. No. 4: Very little traffic coming this way. Would like more. 9CWI says he expects to be on the air soon.

Traffic: 8CED, 92; 8DGT, 82; 8BNC, 56; 8AUB, 44; 8DCW, 37; 8DSE, 36; 8CPY, 34; 9DOO, 34; 8DOK, 30; 8CEP, 27; 8DDT, 26; 9CE, 26; 8ZZ, 24; 8DAT, 22; 8AAL, 20; 8BDY, 18; 8CQG, 17; 8DBO, 15; 8CWX, 14; 8CAP, 14; 8NX, 10; 8DGO, 9; 8ZH, 9; 8ZF, 8; 8AII, 6; 8BBI, 5; 8AMS, 5; 8JG, 5; 8BD, 4; 9AEN, 4; 8AQA, 1; 8BUL, 5.

ILLINOIS—Dist. No. 1: D.S. Powers of Princeton, is not very well organized as yet. Full details are going forward in a few days. The message reports are confined to his own city.

Dist. No. 2: 9CTF is getting things QRV, getting more schedules, using single wire antenna. 9BRX reports working sixes and sevens regularly. Not very much traffic on the low waves. He was heard by French aFJ having heard Z4AC often. 9ELR is a good route north and south and has a schedule to the 4th district. He has a license for 80 meters but no results. 9DLO had his license cancelled. 9RQ, Lisle College, is trying to get on the low waves but having battery troubles. 9DXL has put in a coupled set which promises to be very F.B. 9BVK reports messages are hard to get on 80 meters, he is working all districts regularly. 9BKG has heavy QRM from school. 9BTA is working in the credit depart-

ment of Marshall Fields. 9DRU is inactive. 9DJR is handling traffic and working 500 miles consistently on UV201A. 9BTA and 9BGK are combining and expect to be on 80 meters. 9CA has been heard in New Zealand. 9DZR wants messages for Joliet and says they will be delivered. He has been recommended for C.M. of Joliet. 9ARM wants a good station south to handle traffic. 9AHQ reports no traffic.

Dist. No. 3: 9AWQ does not find much traffic on 152 meters. 9CLZ is on 80 meters and thinks it F.B. 9AFQ is getting active. 9DJG reports DX FB in Granite City. 9MC's house burned up, but no radio equipment was lost, as all junk was in the shack some distance away. But just now there is a very bad sleet storm on here that has taken all wires down. However, at this writing, all poles are still standing. The storm is growing worse all the time. There is no power or any communication of any kind out of the town. 9AHJ is off the air now on account of a M.G. 9ATW is working on 76 meters and getting out great, although the antenna current will not shake the hand. 9CMN has nothing to say in regard to himself. 9CSW has the power tube ordered and hopes to be on soon on both 80 and 160 meters.

Dist. No. 4: 9DCR is snowed under with outside work but expects to be in operation soon again. 9BGC's mother threw a rug out of the second story window of the BGC domicile. Result—9BGC has no cpe. He will have a new one in its place right away. 9CZL has been sick and his traffic has suffered. 9CZL has a 50 going on 150 meters. 9DHZ reports C.W. on 150. 9CLJ lost both his antenna and cpe during the storm. A tree fell on the antenna on account of the heavy coating of ice. 9BXD works DX but says messages are hard to find. 9BHX handles some traffic and does good work on 80 meters. He has worked Z2AC and gets reports from England and France. 9DUQ worked A2CM and Z4AG, Z2AC G2NM, also F8SM during December on 80 meters, and handled a message going to Japan. He gave it to Z2AC. (Congrats—A.D.M. Check—D.M.) 9DQU helped out during the emergency caused by ice storm, he handled 84 P.R.S. messages and 2000 words of press between St. Louis and Decatur. 9DMJ was at the St. Louis end. 9DMJ deserves much credit for snappy QSR and constant QSO. Decatur-Wabash officials are greatly impressed with amateur radio due to service given through recent ice storms.

Dist. No. 5: D.S. Tate has been out of town but forwards the only available report, which is from 9EBQ.

Dist. No. 6: The A.D.M. is very glad to announce the new D.S., Wm. Andersen of Rockford, 9DVW. All amateur in northern Illinois are asked to cooperate with Mr. Andersen. All reports must be mailed on the 15th of every month. A convention of the 6th district is being arranged. 9DVW has resigned as C.M. of Rockford. Wm. Lindberg, 8018 14th Ave., Rockford, is recommended for the position. After having spent considerable time in remodeling their stations, the Rockford hams are now getting on the air for permanent work. 9DQR has started up with their "jug" putting 2½ amps. into the antenna. Both coasts were worked the first few days. 9KD started out F.B. building a good DX every night, but now has lost his location. He was located on the third floor of a local furniture store, together with the owner's son. Even though three coil Meissner was used with 50 watts, the nearest B.C.L. complained of GRM. At present 9KD's transmitter is being used at 9DVW. Two new 64 foot lattice towers now grace the backyard at 9DVW. Temporary cpe is being used. 50 and 100 watt comprises the transmitter, both coasts being worked. 9AKU reports being on and QSO both coasts with 100 watts but no messages handled. 9CEC reports having trouble with the B.C.L.'s and is getting ready to change over to a loose coupled circuit; is also arranging schedules with O.R.S. 9ALW is waiting for new transmitting equipment. 9CEB reports traffic small and complains of rotten QSRing, and refusal of many stations to take his traffic. 9EHQ is just starting up again and reports few messages handled.

Dist. No. 7—Chicago: Traffic through Chicago has gone through the cycle and is now picking up again. 9BE is with us again. He is in the battery business, but he has not decided to use them on the plates as yet. 9CEJ is going good and will, in the future, be one of our reliable stations. 9CCJ is getting out in fine style and is on regularly. 9DWH is on in the early morning hours. (FB, OM, we are glad to see that some, at least, go to bed when it is dark—

A.D.M.) 9DWK is down on 79 meters. He worked all Canadian and American districts and Mexican IB. 9AWW-9ZW is now really working at school this year. The station is also being remodeled so that the high and low waves can be used simultaneously. 9AAW was on the air working with 9CA, the A.D.M. during the recent storm. A fine schedule was maintained, but due to the fact that the railroad operators had little faith in amateur radio, a small amount of traffic resulted. 9CA engaged another man to fill his position while he operated the ham set for emergency work. 9AAW deserves a great deal of credit. 9BRE had mast number 18 blow down in a recent storm, taking part of the chimney and roof with it. Mast No. 19 is up again, however. 9EEG finally summed up enough courage to put up his mast again. 9APK is doing his stuff on C.W. He recently made a new chemical rectifier. We wonder if it is bark. Sounds as sweet to him as the roar of the old sine spark. 9BWE and 9CFS have been rather inactive the last month but promise to make up for lost time in the near future. 9BNA is back on the air on 75 meters, and reports 24 msgs. 9EAS, 9BGA and 9BNA are all working on low waves now. (How about dropping down real low?—A.D.M.) 9NV, the station at the Armour Institute, is now working on 40 meters. The former call was 9YL. Regular watches are kept every night by the staff of hams attending the institute. British 2KU reports that he is receiving 9EFZ, 9CJC, 9DQU and 9BCO, and wants schedules with these and other Central division stations. Write him at the address shown below. He is on the air every morning with 500 watts on 100 meters from 0600 to 0800, G.M.T. QRA British 2KW: W. R. Bourne, Springfield, Thorold Grove, Sale, Creshire, England.

CLUB REPORT

OHIO—The Norwalk Radio Assn. have their station, 8DDQ, going every night. They are working on 75 meters and several new ops. due to their classes in code practice. Continuing their lectures on Ballantine. Always ready for practice. The Union Central Radio Assn., 8ARS, is going fine with lectures on theory and classes in code practice every week. Station is on the air every night for traffic. The Toledo Radio Club will be on the air at their new location with a 50 watter.

MICHIGAN—the Albion Radio Club has been allowed to expire, so to speak, due to lack of any genuine amateurs among its members. They are trying to reorganize. The City of Straits Radio Club is more active than ever before. The Secretary is R. P. Thetreau. The Flint Radio Assn. is still an active "going" outfit with Guy R. Cowing as Secretary. The Central Michigan Wireless Assn., Joseph Barnwell, Pres., Island Ave., Lansing, is a live outfit and is handling the 4th Michigan A.R.R.L. Convention, Feb. 13th and 14th. Write them for the dope.

DAKOTA DIVISION

D. C. Wallace, Mgr.

NORTH DAKOTA—Several of the stations in this part of the country are getting out unusually well.

Win C. Hilgedick, Railroad Emergency Manager, has just completed a trip throughout the greater portion of North Dakota, lining up stations at strategic points for railroad emergency work. He is giving preference in the arrangement to stations having "B" battery supply, in case of a total break-down of the power lines as well as the telegraph lines. His work in our state has been appreciated, and we feel that it is taken in hand in an excellent manner.

Several of the prominent amateurs of the state are actively engaged in the radio business—too active in fact during the two or three months around Christmas time to operate all the time they would like to on their sets. This condition will automatically right itself in another thirty days or so.

SOUTH DAKOTA—Come on gang, let's get that report in next month, we are falling behind in our work. Remember what you signed in your ORS application. The convention put some of us on the job but there are a lot more who ought to do better. With traffic at low ebb, now is a good time to chat around and get really acquainted with each other.

Dist. No. 1: 9CKT changed over to coupled circuit, worked every district and then blew his fiver. See he'll be back.

Dist. No. 2: 9CBR has applied for ORS. The Milbank gang are making friends with the BCL'S by

using the low waves. 9CBF was reported in N.Z. 9BDW is putting in a fifty but is having trouble with it and says he may go back up until he loses another pole. 9TI has a fine set of storage batts for plate supply. 9DID blew his generator but will be back on again with another. 9CKD was worried about the change from D.C. to A.C. but is all set now with a new motor for his generators. 9AGL lost his battery charger and had to let his A batts go down so was QRW for awhile. The new enameled antenna is F.B. The Huron gang have announced the state convention for Feb. 20-21. Big Convention. 9DBZ has been on the shorter waves for awhile. Traffic: 9CGA, 3; 9ABY, 22; 9DBZ, 31; 9AGL, 11; 9CKT, 14; 9CJS, 36; 9BDW, 5; 9CKD, 18.

MINNESOTA—The state is being well organized for R.R. emergency due to Hilgedick, chief of 9XI, cooperating with Mr. C. C. Dimock of the C. M. & St. P. R.R.

Dist. No. 1: Our new D. S. is C. L. Barker of Henning, 9EGU. Now for some real peppy reports from northern Minnesota. 9AYQ is on steadily. 9COF is clearing traffic regularly thru St. Cloud with 9MF helping when home from school. 9EGF and 9DXT are ready for any traffic coming their way. 9BAV reports college QRM. 9EGU has a new mast and is ready for quick QSY to any wave. 9ADF reports good work on lower waves. 9AEI has been appointed C. M. of Duluth and with 9AND reports some activity for Duluth. Let's hear more from there.

Dist. No. 2: Schensted makes his usual good report. He is making a drive to get the stations in his district together. FB, get behind him. 9AXS is easily the star station of southern Minn., having worked Z2AC twice and exchanged signals and QRKs with 9ABD besides logging numerous foreign stations. He uses two fivers with 350 volts Edison batteries on the plate. 9BYU is back on the air after some inactivity. 9BTZ blew his transformer but is back on the air with replacement. 9EGG is QSO both coasts with spark coil plate supply and reports Z2AC. 9CAJ has a new 80-foot mast. 9BZJ is still experimenting with transmitter circuits. 9BFB and 9CPO are on the air after some changes. 9AWM is on occasionally with college QRM. 9EFD is a new O.R.S. and doing good work.

Dist. No. 3: Twin City stations are coming up in good shape. 9ZT leads, being the first American amateur in Dakota division to work both coasts with 5 watts. 9XI is QSO Porto Rico and is on every night looking for traffic. 9DAW has college QRM. 9BPN is high in traffic with 9DEV a close second. 9BPY, 9APE, 9BOB and 9DFZ are pushing traffic in good shape. 9DNV is rebuilding. 9BFI is doing good work, as is 9CPM. 9DQH, 9CVV, 9BQJ and 9BIS are all handling traffic regularly.

The Convention was a gigantic success!
Traffic—Dist. No. 1: 9AYQ, 68; 9COF, 23; 9EGU, 22; 9DXT, 6; 9EGF, 2; 9MF, 2; Dist. No. 2: 9DDF, 25; 9EBC, 18; 9CAJ, 15; 9AWM, 13; 9CPO, 15; 9EFD, 8; 9AXS, 7; 9BYU, 6; 9BZJ, 6; 9BFU, 4; 9MB, 4. Dist. No. 3: 9BMX, 19; 9DEV, 64; 9DPK, 12; 9BPN, 132; 9BPY, 23; 9APE, 23; 9BOB, 13; 9DFZ, 9; 9ZT, 27; 9DAW, 3; 9XI, 57; 9BFI, 42; 9DQH, 19; 9CPM, 32; 9CVV, 11; 9BQJ, 3; 9BIS, 6.

HUDSON DIVISION E. M. Glaser, Mgr.

QST to all Hudson Division Supporters: There is a serious lack of interest and cooperation being shown among many O.R.S. and officials. Without this vital interest, it is impossible to put our division at the head where it belongs, despite its territorial smallness. It is your duty to help in every way possible to keep up the interest of the members and officers. O.R.S. are being cancelled every month for showing a lack of support. Two or three officials will be removed if they don't wake up. If you don't like the way the division is being run, send in your suggestions and comments to the division manager. Conditions at the beginning of the New Year are not what they were expected to be. Wake up fellows and show your earnest support and cooperation! We want to have the best division of the A.R.R.L. It is up to YOU to make it so. Corrections to the A.R.R.L. list of O.R.S. follows: Change 2PE to 2PF. Cancel 2ADD, 2CEV, 2CJR, 2CPQ, 2GRQ and 2UA. Add 2BQC, 2BQU, 2BW, 2CRP, 2CSL, 2CYL, 2KU and 2LA.

Irving Gallagher, 2CRW, is C.M. of Elizabeth, N. J. Clifford Holman, 2AZY, is C.M. of New QST FOR FEBRUARY, 1925

Brunswick, N. J. Carl Koerner, 2CEP, is C.M. of Richmond Boro, N.Y.C. All A.R.R.L. business in these cities is to go through these men.

Marty, 2CYX, has the Bronx gang well under his control and is getting good support. 2CYX is parked on 76 meters to stay. The DX has been great. (We told him so.) He can work 6's to his heart's content. Hl. 2CVU is doing his usual fine work. He says traffic is improving greatly on 80 meters. 2CWR will be going on 75 shortly. 2BRX is handling a good bit of traffic and doing good work. He will be on the air more often as a second op has been added to the lone staff. 2CEI has been ill and has not been on the air. 2AAI needs a little stimulating.

Brooklyn activity has been slack. 2AAY blew a fifty which kept him off the air during the latter part of the month. He must miss the Zeders. 2BO was going strong and doing good work but has to leave for the west coast for a few months. 2WZ is making as much local disturbance as ever and his fist seems to be growing steadily worse. No wonder he can't work DX! 2CTY is heard regularly on 75 doing good work. 2KU is handling a good bit of traffic and is a very dependable station. 2EQ and 2ADC are still up high. 2WC hasn't been on much due to business pressure. 2ABN has been experimenting. 2PF is going a few nights a week but reports no Australians yet! 2BRB is still QSO Australia and N.Z., besides a few odd Hollanders, French and English. Over a dozen foreign messages have been handled. A five watter is perking steadily on 40 meters.

2CHX leads the busy boro with his continental DX work with Europe and the West Coast, and incidentally, Porto Rico and Bermuda, on a little Meissner with three fivers. Manhattan is fast showing the Bronx and Brooklyn what can be done amidst very poor conditions for low wave work. 2CZR is working the west coast daily. 2CPX has been very active. 2BNL is always there with a good kick. 2XNA is not going much due to many of the ops being warned that they were not very proficient in their studies. Who said College work and Radio mixed well? BT worked 8BRD with 3 watts input. (FB, OM!) 2BSL is the only active station in Queens. Two others had better guard their O.R.S. certificates! Congrats, BSL, don't let the boro go to pieces.

The one time dead boro of Richmond is coming to life with 2CEP at the head. 2BQU is a new O.R.S. and promises to add a good bit of activity to the Island. 2CEV is going once in a while.

Traffic: 2BBX, 57; —d5: 2CWR, 3; 2CVU, 68; 2CYX, 59; 2ABN, 6; 2AY, 2; 2WC, 3; 2ADC, 10; d4: 2EQ, 15; d3: 2APF, 17; d7: 2BO, 20; d4: 2WZ, 26; d4: 2CTY, 38; d5: 2KU, 60; 2BRB, 89; d2: 2BNL, 12; 2CHK, 17; 2XNA, 3; 2KR, 14; 2CSL, 7; 2CNK, 10; 2LD, 13; 2TT, 1; 2CIZ, 15; 2LA, 6; 2CPK, 19; 2AQL, 2; 2CZR, 29; 2BSL, 6; 2CEP, 51.

EASTERN NEW YORK—Dist. No. 1: O.R.S. are still scarce in this section, although 2CXB, the D.C., is doing all he can to make every available good station an O.R.S. 2AV does most of his work weekends, he and 2GU operating the station from Friday night to Sunday afternoon, working alternate tricks. 2KY is cooperating with the Coast Guard Service, testing and taking traffic from NRG at sea. 2BPB is on for a little while each night, working every district with ease. 2CXB and 2ABD are still building their joint station.

Dist. No. 3: Business is picking up. 2SZ and 2ACM are doing good work and have been recommended for O.R.S. and the D.S. has several other stations in view if they would be on the air more, namely: 2CUI and 2CPZ. (Snap into it, fellows—A.D.M.) 2CHD is continuing his fine work as usual 2ANM is working everything, his latest being several British and French and NOBQ.

Dist. No. 4: Taber, 2AGQ, the D.S., handed in his usual fine report. 2CXG is doing fine work with low power. 2AQR put in a rectifier and filter and the set started to step out better right away. 2CYM continues his good work, handling a nice little bunch of traffic. 2AGQ and ex-2BSE have their combined station working FB now. 2CHEZ has been very QRW with other work this month but found time to be on and handle a few. (A couple of new women must have moved to town, as that is what CHZ generally means when he is QRW—A.D.M.)

Dist. No. 5: Albany is coming to life. 2AWF is going strong and 2PV and 2BSB will be on the air before this appears in print. They are all on the 80 meter band. Schenectady is the liveliest town upstate, having about 6 stations QSO Europe at all times. 2BY went down to the low waves and worked half a dozen foreigners the first night. 2ACS also went

down and finds it FB, working a few English and French. 2CPA continues his good work and is also QSO Europe. 2AIF is still on the long waves and is getting a 250 ready to warm up. 2BXW will be on shortly with S tubes. 2CGH heads the traffic report and is working everything in the U.S. with one five watter. 2GK-2XAB has been QSO Europe a few times with a c on the set in lieu of a better plate supply.

Traffic: Dist No. 1: 2AV, 56; 2KX, 12; 2BPP, 7. Dist. No. 3: 2CDH, 86; 2ANM, 31. Dist. No. 4: 2CGX, 46; 2AQR, 37; 2CYM, 30; 2AGQ, 94; 2CHZ, 15. Dist. No. 5: 2CGH, 183; 2ACS, 72; 2CPA, 43; 2BY, 40; 2AIF, 22; 2BXW, 10; 2AWF, 11.

NORTHERN NEW JERSEY—Dist. No. 1: 2CJX leads this month with the largest traffic report which is very FB. 2AT will be satisfied if he can use 78 meters forever. 2ADU and 2AWT are at college but promise that they will handle plenty of traffic over the holidays. 2AJF is out with a burnt-out transformer. 2CTQ says he is going to have a traffic report of a million msgs next month. 2BMR handled a few msgs on spark but will now close down for a few months.

Dist. No. 2: 2WR is stepping out in all directions but can't seem to gather in very much traffic. 2AXP will soon increase power to 50 watts. 2CRF is also rebuilding his 50 watt set and expects to have it in operation by the time this reaches press. 2BW claims that to handle 1 msg, 70 stations must be worked.

MIDWEST DIVISION

P. H. Quinby, Mgr.

NEBRASKA—Dist. No. 1: Due to heavy sleet storms in this district many stations are not in operation because of damaged antenna systems. All Omaha stations deserve considerable credit for the manner in which they handled emergency messages during the storm period. Traffic is at a high peak this month, 9BFG deserving special credit for handling 191. This is one station that works them on 80 meters. 9NL, who also handled a large number, is standing by now with a crippled antenna. 9EGA is a new O.R.S.

Dist. No. 2: 9AKS blew his three five watters and is standing by hoping to get three more by some method and swears he will handle 100 messages next month if he has to make them all up himself. Hi. 9EEO is worried about the low waves and wonders why his wave is 60 meters no matter how he tunes his set and whether he should go up to 80 or down to 40 meters. 9AIB is back on the air teasing DX. 9CUC is getting his set going again and promises traffic. 9BPX is working regularly. Hastings College station is on with 100 watts with old 9AVC's set and is pushing a few across. 9BXT and 9CGQ are working with fair regularity. 9EHW also promises big increase. New O.R.S.'s in this district are: 9BXT, 9EHW, and 9CGQ.

Traffic: 9BFG, 191; 9CGS, 78; 9AWS, 55; 9NL, 54; 9BNU, 17; 9CIM, 12; 9EAK, 25; 9EHW, 10.

IOWA—D. S. Beck reports that with the exception of no reports from C.M. of Des Moines, the district is coming along in fine shape. 9AED has been minus a plate transformer most of this month. He is getting down on the 80 meter band. The Des Moines gang have been on the air quite consistently but as yet no report. What's the trouble? O.R.S. certificates are being called in from those stations who fail to report each time. Send your card in each month, even if you don't handle any traffic. 9DMS is the new C.M. of Council Bluffs. D.S. Bailey reports not much traffic handled, every one at college. 9EK had an accident at his station not long ago. He went away and left his oil stove burning and it ran out of oil—burned the wick and smoked the whole station up. Now he can't read his list of O.R.S. Hi! STOP, LOOK AND LISTEN! 9CS is putting in 50 watts I.C.W., using the Hartley circuit. (Hoosay—D.M.) He is going to keep on using a pk though, but he won't when he gets the I.C.W. going. 9CLQ and 9EFH have been having some kind of a contest. Rumors have it that 9CLQ bet 9EFH a pair of green silk socks that he could work New Zealand first. Well, 9CLQ won, but now they have a bet as to who can total up the most DX in miles.

A change in the counties of dists. No. 1 and 2 has been made. The counties of Worth, Cerragardo, Franklin and Hardin have been transferred from dist. No. 1 to dist. No. 2.

Traffic: 9HK, 42; 9AXD, 17; 9DJA, 12; 9CHN, 6; 9CS, 5; 9AED, 2; 9ATN, 12; 9BEW, 48; 9CTD, 9;

9CZO, 33; 9CWF, 24; 9CZE, 22; 9DRT, 50; 9DMS, 41.

MISSOURI—The traffic department in this state came to life in fine shape the past month. The recent severe storms that have covered the entire country and which visited some choice blizzards on this section found that the hams in this state were on the job. First honorable mention goes to 9DOJ and 9SS-ZD of K.C. and 9EKY of St. Louis. During the storm of Dec. 17 and 18, 9DOJ assisted by 9ZD handled 48 messages for the Rock Island Railroad and the Bell long distance lines, maintaining regular schedules with 9EKY for moving this traffic. Among the stunts was the transfer by radio of \$6000 emergency funds to the credit of the Kansas City office of the Telephone Co., which was used to get repair crews out from Kansas City. On December 23rd a second blizzard struck this section and in anticipation of more wire trouble, the service being just partly recovered from the previous storm, 9RR got busy at 2A. M. and established communication with 9ECL of Great Bend, Kans., and arranged for him to keep in touch with the local office there of the Missouri Pacific and Sante Fe Railroads, while 9RR attempted to do the same in Kansas City. Due to lack of telephone service at 9RR, it was necessary to get some other station in KC to do the phoning, and after some minutes, 9DMZ of K.C., Kans., was heard, but a call found that he too had no telephone. Both 9DMZ and 9RR then CQ'd vigorously to locate another station not so handicapped, and after long calling, raised 9BVN of K.C., Kans., who communicated with the various R.R. offices and was told there was no emergency at the time but it was expected shortly, and arrangements were made for him to handle this work. 9RR stood by and assisted 9BVN to get 9ECL directly and 9DMZ loyally QRX'd to see how matters came out. This emergency communication line was maintained for about three hours, and schedules made for resuming work during the day of Dec. 24th. The weather moderated though and no work was necessary on that date. Special honorable mention is due 9ECL for his regularity on the air and efficient tuning—he hears a call the first time and stays on the job. (FB, OM.)

9DIX reports trouble getting msgs on low waves. He says most of it is rag chewing down there. His 80 foot masts and plate glass insulators got by ok in the recent storm. 9DNO has had trouble in getting down to low waves. 9DAE, home for the holidays, has QSR's numerous messages on his Amrad Coil set and succeeded in working 9BYJ of Amherst, Wisconsin, at 7 a.m. the 22nd, which is pretty good DX for that equipment. 9DEU had the misfortune to have his roof catch on fire, burning his antenna rope in two and putting him out temporarily. The old saying, "Keep the antenna clear of the house" is hereby extended to include the rope and the chimney. 9DIX says there's a new O.W. expected in Macon. 9BVK, C.M. of Sedalia, says he and 9DOO are the only msg. stations active there, though 9AZL and 9DAD are heard at times. 9DZO has been working a 50 watt C.W. lone lately.

Dist. No. 1: Traffic has taken a spurt and the gang has seemingly taken a new interest in relay work. 9COV is doing some splendid work which is worth commenting on. During the sleet storm that swept the country recently, several stations carried on emergency work for P.R.R. and others. The C.M. does not know which stations did their work so well. The storm also took with some of the stations antenna systems. 9CAI is on the air with 500 watts and 600 cycle plate supply and is getting out FB as shown by his report. (Let us hope he remains a relay man and not a DX fiend.) (Go after that trophy, OM!—T.M.) 9DMJ is now working his 250 on 80 meters with much success. 9AAU also is doing good work on 80 meters; having put up a special antenna for the 80 meter transmission. 9DMJ lost a fire bottle and as a result his traffic took a slump. 9DVK is working on 100 watts now with 6.5 amps radiation. He always represents S.E. Missouri and is certainly a dyed-in-the-wool ham. 9AKH and 9CLY are two promising stations and will soon be in on traffic; they both come from Chaffee, Mo.

The following new appointments in district No. 2 are noted for the information of all concerned: C.M.'s Sedalia, 9BVK; Carthage, 9AOB; New O.R.S. 9AOB, 9BVK, 9CRM, 9AYK, 9CEE. Deleted O.R.S. 9AOJ.

Traffic: 9AYL, 17; 9FM, 12; 9BKO, 5; 9ZD, 2; 9ADR, 21; 9DEI, 10; 9ELZ, 6; 9BOZ, 10; 9DOJ, 48; 9RR, 12; 9CRM, 62; 9BVK, 34; 9DIX, 27; 9DOO, 16; 9AYK, 21; 9RR, 15; 9CRM, 35; 9DAE, 70; 9ACK, 1; 9ACI, 335; 9BHI, 21; 9DXN, 15; 9COV, 100; 9DVK, 12; 9DLR, 5; 9DMJ, 20.

KANSAS—The lower waves are finding new members each day with its DX possibilities. The gang are doing lots of experimenting and DX with less traffic. The Christmas messages brought up the local to some extent. More traffic is handled on the higher waves but less. 9AEY worked NZ and 9EHT was QSO NZ and Australia. Many NZ and Ausies are heard here. 9BXG with his key click is having a little trouble with the BCL's. 9CIF was the first on 80 and now he is on 20. 9AFP still blows tubes. 9DLM lost a sync disk. 9CKM lost two S tubes, and 9CFI lost a filament transformer but has rewound it good as new. 9AIM has a counterpoise above and below his aerial like 1ACD. 9BRD with a new MG and a DC QSB is doing some fine work. 9BIO QSR's traffic from the first to the sixth district. 9HN is another 80 meter DX'er as is 9RO and 9AOD. 9CCS has the 50 perkin' on 80 at last and manages to do a little DX along with some QSRs. 9CKM, 9ACQ and 9DHW are new O.R.S.

Traffic: 9BVN, 134; 9BXG, 83; 9BIO, 62; 9AEY, 14; 9CVL, 48; 9CFI, 68; 9AOD, 20; 9EHT, 12; 9DNG, 19; 9ACQ, 28; 9CCS, 25; 9AIM, 19; 9AFP, 18; 9HN, 14; 9BRD 6.

NEW ENGLAND DIVISION I. Vernilya, Mgr.

CONNECTICUT—Most everyone reports great DX, but traffic is still slow. It seems, however, hard to raise a first district station at night. This should not be as traffic cannot be relayed properly if local stations will not answer each other. Bad business, OMs. 1BM is going to get mad and put in a 50. Let's hope he doesn't get too mad and blow it. Hi. 1BGC has worked all districts and Mexican BX. He has logged Mexico, England, France, Germany and Brazil during the month. 1AVW is using a 5 watt and is reaching out FB. 1IV reports DX as FB. 1AJP is busy at college and hence his set is having a rest. 1CTI reported "nil" but did his bit as an O.R.S., and sent us a card. Non-reporters please note! 1AYR says cash is scarce and therefore his station is quiet. Let's hope someone fills the hat. 1CKP is hitting the high spots since he tuned his transmitter up. 1APC just returned from a trip to Texas. "Red" made the return trip in a rowboat. 1MY worked Danish 7EC during the month. Also many British and rench stations.

Traffic: 1AVJ, 10; 1CKP, 18; 1BHG, 66; 1AEA, 13; 1KV, 338; 1CDE, 15; 1V, 23; 1AVW, 16; 1BGC, 30; 1XV, 3; 1AEA, 18; 1MY, 208.

VERMONT—Last month 1ARY said it was just turning over and taking a few preliminary gasps. It is now wide awake on 79 meters and going FB. Averaged about four Europeans a night for a while. That is characteristic of some of the others, too. 1BDX has at last got out of the 150-200 band, and is reported in New Zealand. 1AJG is about the same. We are all agreed that short waves are, after all, something like what they are cracked up to be, to put it mildly. We have two ex-Vermonters in Florida, RS. of 1CPO and 1LA, now 4UP. 1FN has been out with scarlet fever. TL, OM. 1CQM is home from school now, for a little while, so is gg.

Traffic: 1AAM, 3; 1AJG, 32; 1ARY, 42; 1BDX, 29; 1CQM, 10; 1YD, 74.

MAINE—Dist. No. 1: 1ALK worked Porto Rico, UI, 2, 3, 4, 5, 8, 9, districts, and two Canadian districts in one-night with 10 watts. 1AUR worked France and England. 1PD has received a report from 1HT on his sigs 5000 miles.

Dist. No. 4: The O.R.S. certificates of 1CDO and 1BJS have been cancelled. We are sorry to lose these stations but as neither are active it is necessary to do so. 1ACO has been on during the past month.

Dist. No. 5: 1BDB has dismantled his set and is painting his shack. He will be back soon. 1CX is on 75 meters and getting out. 1EF reports trouble with the B.C.L.'s. His missing link is the 7th, others worked on a 5 watt. 1HB laid his first 5 watt to rest—cause of death he claims was hardening of the arteries. (Would suggest a dose of Digitalis on next—A.D.M.)

Dist. No. 6: 1BKK is rebuilding his transmitter. Traffic: 1ALK, 65; 1AUR, 20; 1PD, 15; 1KL, 62; 1BHR, 21; 1AUC, 14; 1BDB, 5; 1CX, 11; 1EF, 92; 1HB, 29; 1ACO, 5.

NEW HAMPSHIRE—The great trouble in this district seems to be the lack of messages. Tests and DX are all right in their places, but the main thing

that keeps up the interest in the game is the handling of messages. Any of the following stations are QSO Canada, Maine, Vermont, Massachusetts and would be very glad to have your messages.

Wake up, gang, and give us a lift. O.R.S. in this state are 1YB, 1ATJ, 1AVL, 1BTF, 1BJF, 1BZP, 1AUJ, 1CKK and 1AER.

We understand that 1YB is soon to open a broadcasting station. 1AVL had his 50 go west. (Hard luck, OM.)

Traffic: 1YB, 53; 1BNK, 20; 1AER, 7; 1BJF, 78; 1AVL, 16; 1ATJ, 31.

RHODE ISLAND—Providence: The Providence Radio Assn. is located in new quarters and are having lots of fun at the meetings. 1BHN is the proud possessor of a 75 foot tooth-pick. 1GV is filling the air with 6 amps of mush and is getting out very well, mainly by brute force. 1OW is doing excellent work both on the air and as C.M. 1AWE now has a 50 watt. Watch out for your "cans." 1BCC has contracted an alliance with ex-1BCR and is polluting the air with about 600 watts of sink rectified QRM. 1AEL is about the only station in this state that is still on 150 meters. Come on down, OM, the air is fine! 1CAB is going it full blast and gets out FB. 1AWV is off the air but on the job. He handled 7 MBSES WITH NO STATION. (How come, OM?) 1BIE takes the fur-lined storage battery for making the most feindish racket ever heard from a 5 watt. He also holds the record for having 8 waves all of the same strength. He sure ought to raise 'em. 1AKK spends most of his time experimenting. 1AID is still at the top of the list in traffic. 1II is another one of those efficiency birds. Thanks to 1XAM he gets an efficiency of 76%, using a self-excited set. Europe is worked regularly from this station. Route your European traffic through this station to insure prompt QSR. We are sorry to say that we have been forced to cancel the ORS certificate of 1APB. He has been warned about reporting but it seems to do no good. We hope that this is the only one we will have to cancel—but?? watch out. Newport: 1BQD is the only active station here and he has been too QRW at the Naval station to do any traffic work. Westerly: 1AAP is slamming away in great shape as his traffic report shows. Here is a real live-wire ham. 1BVB has had a load of trouble getting things going.

We installed a single wire antenna and counterpoise under the direction of 1MY and had some job getting the set tuned to it, but thanks to Comstock, we are "perking" great now. 1QV has been changing circuits and the result—no traffic.

Traffic: 1BHN, 12; 1GV, 6; 1OW, 60; 1AWE, 26; 1BCC, 62; 1AEL, 12; 1CAB, 31; 1AWV, 7; 1BIE, 9; 1AKK, 8; 1AID, 68; 1II-1ZS, 10; 1CQO, 1; 1BVB, 50; 1AAO, 41.

EASTERN MASSACHUSETTS—This has been the best month yet as far as traffic is concerned, 577 the total for this month. Not so bad, eh? Everyone seems to think that things are moving pretty smoothly. Easier to get and QSR traffic than it has been for a long time.

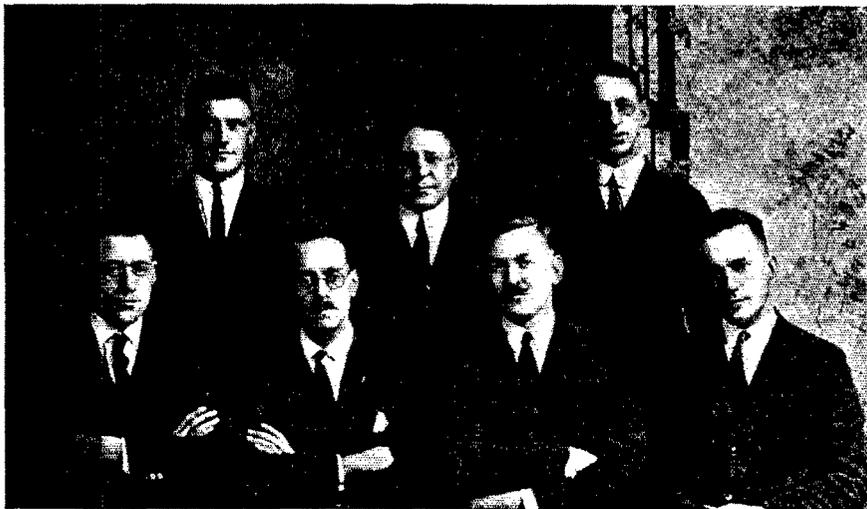
Now for the activities: 1AAC reports that he is still working the New Zealand stations on his 5 watt, and is QSO Europe nightly. 1CME works the west coast quite frequently and a good traffic month for him. 1CJR just got home from college. 1LM still battling them out in good shape. 1CIT reports things going ok at that station. 1ALL still waiting for a new tube. 1AYX maintains quite a few schedules nowadays. 1BMB is getting out in fine shape. 1GA, another that reports fine DX. 1AGS has 50 watts now. 1KY has QSY's to 76 meters. 1AIR is rather busy with business. 1SE turns in his usual good report. He has been in communication with Europe on a single 5 watt. 1AHL lost his 60' mast. 1ADM expects to be on during the holidays. 1AYN turns in a good report for a new station. 1ZW expects to do better work this next month.

Traffic: 1DA, 34; 1AIR, 15; 1GS, 40; 1NV, 2; 1KY, 41; 1AGS, 14; 1GA, 76; 1BMB, 12; 1AYX, 34; 1BBG, 45; 1AYN, 38; 1AHL, 5; 1NT, 24; 1UW, 3; 1SE, 10; 1ADM, 3; 1CME, 66; 1AAC, 20; 1AQY, 18; 1CIT, 8; 1ZW, 6; 1CJR, 10; 1LM, 52.

WESTERN MASSACHUSETTS—Dist. No. 3: Traffic is increasing in this district. 1CLN and 1VC have been appointed O.R.S. and will report their activities in the future. 1ARE believes he has made a new transcontinental record and his log for November shows the following: 2:35 A.M. worked 6BQU; 3:05 A.M. worked 6FY; 3:25 A.M. worked 6BQB; 3:35 A.M. worked 7AFN; 4:15 A.M. worked 6AIB; 4:20 A.M. worked 7IX; 4:30 A.M. worked 6FY; 4:45 A.M. worked C5GO; 5:00 A.M. worked 5CIX.

into the A.R.R.L. as a provincial organization affiliated with the League. On chatting the matter over with the Winnipeg amateurs it was decided however that there would be no advantage to doing this and it was decided that no further consideration should

The next motion of the division managers arose out of the figures shown by the League of membership in Canada. It was pointed out that only one-half of the copies of QST sold in Canada were sold on subscription, the balance being by news stands



THE CANADIAN MANAGERS MEETING AT WINNIPEG. Left to right, seated: J. V. Argyle, Quebec Div.; W. C. Borrett, Maritime Div.; A. H. K. Russell, Canadian General Manager; A. J. Ober, Vancouver Div. Standing: C. H. Langford, Ontario Div.; A. A. Hebert, field representative from Hartford headquarters; J. E. Brickett, Winnipeg Div.

be given to this separatist movement and that we would just let nature take its course.

It was also suggested that the two western divisions, the Winnipeg and the Vancouver divisions, both had names which were decidedly inappropriate to their vast size in so far as they only had the name of one City as their division name instead of having a broad name somewhat descriptive of the region which they cover. It was tentatively suggested subject to the approval of the divisions themselves that the Winnipeg division should have its name changed to the "prairie" division and the Vancouver division to the "Fraser" division. The Canadian General Manager will be pleased to hear from any member of the two divisions in question as to what the members think of this suggestion.

The next motion was one of great interest to all Canadians when it was proposed that the office of division manager in the Canadian divisions should be made an elective one and that elections should be held every two years in each division. It was arranged that votes should be called for a new division manager in the Quebec, Ontario and Winnipeg divisions at once, so that the new man might take office in 1925 and that in 1926 there should be beside the new Canadian General Manager new division managers elected for the Vancouver and the Maritime divisions. Circular letters have been sent by Headquarters to each member of the League in each three divisions above mentioned asking that a vote be sent in promptly to the C.G.M. of the member's choice for division manager.

Arising out of this motion was the next one which was that all division appointments were automatically suspended as soon as the new division manager took office and only on his renewal of the appointments would the station in question be considered to hold its former office.

It was also arranged that the division managers forward in for publication in a Canadian section of QST a certain amount of other material to go into a separate Canadian section of the League magazine. Plans are now going forward for a separate section for Canadian news and within the next few months Canadian amateurs will have their own section of their own magazine. The C.G.M. hereby requests any Canadian amateur who fancies himself a cartoonist or artist to send him a heading illustration for the Canadian section and it is hoped that a hearty response will be had to this appeal.

and all the division managers felt that something should be done to raise the membership numbers by some sort of a drive for membership and this will be done as soon as the new division managers take office.

Other matters taken up by the managers were in connection with the question of Canadian advertising



PACIFIC DIVISION
M. E. McCreery, Mgr.

SOUTHERN CALIFORNIA—Reports are low this month on account of Xmas mail making many reports come in too late to write up. At any rate, the number of messages has shown an increase. DX weather has been at a top notch and good distances have been covered. The fellows have kept in constant communication with New Zealand and also with South America at times. New Zealand stations are very consistently heard by many U.S. hams. Most of the work has been done on the band of 75-80 meters, while very little on 200. Most of the stations have moved their waves down. A few of the stations have moved down to 40 meters and are stepping out in good shape. Not enough stations down there yet to make it as exciting as 75-80 meters. A traffic map seems needless this month because of such good routes in all directions. Traffic is moving in all directions without any trouble at all. Schedules have been arranged with all parts of the country and stalling is almost nil with O.R.S.

Dist. No. 1: 6CGO has been doing fine work by working R9TC RCB8, besides working N.Z. very consistently. He is using a 250 watt bottle on 76 meters. 6BFW worked New Zealand with 35 watts actual input. 6AIB is only able to be on the air on Friday and Saturday nights. 6OP is busy with school. 6LA is rebuilding for short waves. CNK lost his antenna in a wind storm and has just restored it to its former position. 6VD is having a lot of trouble with his transmitter and is also putting up a new antenna. 6AVR is building his transmitter for 40 meters. 6BVK is on the air again using four 50 watt tubes. 6BAS is on with two 50 watters and QRV for San Diego traffic. 6ZH took his 9 wire antenna down and is now using one wire. The transmitters seem to get out as good if not better than before. 6CGC is reaching out a little better. 6CNX still holds good records. 6CDV is on again.

Dist. No. 2: Traffic through Los Angeles has held up fairly well in the past month, but moves spasmodically, and could be considerably increased in volume if stations had more definite operating hours and schedules arranged. Consistent communication with New Zealand has resulted in a good deal of traffic going that way. Practically all messages continue to be handled on low waves. Several stations have been done on 40 meters. 6BEG is now on 80 meters and steps out good. 6AFG was the last O.R.S. in Los Angeles to QSY down. 6BJK has been stepping out better than ever and handles traffic the way it should be. 6CTO is the new C.M. of Los Angeles. Send in your kicks, gang. 6IH has a new shack and pole. He is still using the tubes that the D.S. loaned him. 6CBB is putting in a 250 watt bottle for real work. 6CSW continues his good work as usual and is down on low waves also. 6AAO is QRV for all traffic. He hasn't been on as much as previously. 6BRF has a master oscillator layout working fine. The fellows in Riverside are handicapped by school. Several of them have done splendid work in spite of this. 6AJI is the high point man of the Orange Grove County. 6CIA worked Z4AG with only 33 watts input. 6US is moving his heap into the house. 6GT is stepping out better than ever. 6BUR has heard 5NN and also worked N.Z. 6CSS. He is QRV for traffic. 6CMQ is going to try out 40 meters. 6RN only handled 6 mgs because he CQ's all the time. 6BBQ is on 80 meters. 3TS has been down on 40 meters but can't hear anyone. He is now on 80. 6AGK continues good work on 80 meters. 6ALF has little time for radio because of bootleggers, women, trying to grow a mustache (one hair every half-inch apart, hi—A.M.D.) etc. 6AKW does fine work without our QRM. He will take anything going anywhere. 6LJ now O.R.S. on 80-40 meters, QSO Z4AG, Z4AK, Z2AC and R9TC—50 watter here.

Dist. No. 3: Conditions in this district are improving each month. More hams are heard on 80 meters daily and some are moving down to 40. Traffic is also picking up. 6AKZ is QRW selling BCL sets. 6CGD had both generators go bad on him so had to QRT. 6ASV reports things going fine. 6JJ has spent most of the month rebuilding his transmitter for 80 meters. 6CMD is working the east coast regularly with a 5 watt bottle since going down on 80. 6CDG has a blown out generator so hasn't been on. He hopes to be on soon.

Traffic: 6CGO, 217; 6AIB, 29; 6ZM, 20; 6BFW, 18; 6AVR, 10; 6CNK, 7; 6BK, 8; 6OP, 2; 6BAS, 7; 6AJI, 44; 6GT, 35; 6CIA, 6; 6AGK, 17; 6BBQ, 52;

6RN, 6; 6CMQ, 15; 6AFG, 93; 6AAO, 66; 6BJX, 32; 6CBB, 30; 6IN, 32; 6CSW, 25; 6CTO, 38; 6BRF, 78; 6AKW, 33; 6CSS, 8; 6BUR, 26; 6PL, 40; 6ASV, 21; 6JJ, 7; 6CMD, 21; 6CHEX, 9; 6CGC, 7; 6CDV, 7; 6LS, 41.

Dist. No. 4: 6AMM got down on 80 meters and is moving traffic. New aerial and counterpoise going up. Reports no trouble in moving messages quickly. 6NK still down on 80 with one 50 watter. He is on once or twice weekly, and is checking and reporting NKF frequently. 6BON was using WE fifty, but changed to RCA 5 watter and getting out much better? ? ? 6HC put in a radio frequency power transmission line and it works FB. 6BDT worked NZ several times with one 50 watter. (Genuine Boiled Owl—up every a.m.) 6CKV is our wonder station this month. Came near working IBEL but lost him. Got a complete check from him and this is what the eastern station said, "you QRZ here QSB DC." A 301A using 200 volts Edison B did that with the meter registering O. This is authentic as the same station has worked La in daytime using the above tube and power. I am not sure about the number of the one station worked, but I am giving you this from memory. 6AME working all U.S. like local. Logged by 3 New Zealanders. 6AFQ handled his usual number of messages and DX. 6ADB is high station for messages handled in this district. FB! He is using 5 watter and getting out FB. 6CCY is rebuilding and expecting to get out much better. 6FY logged several NZ stations but no success working them as yet. 6AOI handled only 2 messages but it went clear over to Scotland, and he handled the return message. (FB, Art.) 6CLP reports traffic on low waves getting better. He is working all districts regularly with one 5 watt bottle. 6CJV reports DX good, but traffic very poor on 80 meters.

Dist. No. 5: 6BFY is back on the air again and expects to get going soon. 6BL is doing good work on 75 meters, having worked both Australia and New Zealand. 6CLS expects to do some great DX on 80 meters soon. The set is just starting to perk. 6RW reports ND as yet on 80 meters. He is having trouble getting the set to work (have patience, OM, we all have the same trouble at first.—D.S.) He has heard Z4AA and Z2AC. 6CLV says that his small msg rpt is due to his fire bottle going west. 6ACR has been remodeling his antenna system, etc. 6HJ had one of his tubes go west, he will be on 80 meters as soon as he can find time to tune the set. 6CPW reports QRM from a redheaded mama very bad so ND, but he is remodeling his set for 80 meters. 6CW reports working Z2AP and A8BG. (FB, OM, congrats.) He is also experimenting with a 5 meter set. 6CHL is doing good work on 80 meters having worked Z4AG and receiving a report from English 2AUL. Not bad for the first night he was on. He is using a single wire antenna and counterpoise. He also worked MIB and MBX. He will have a new antenna system up soon. Due to crabby B.C.L.'s he isn't on as much as he would like to be. 6AWT is doing fine work on 80 meters this month having worked New Zealand 21 times and Australia 6 times. A total of 19 mgs have been handled with these two countries. 6AC reports little doing due to a very bad power leak. He is doing fine on 80 meters. 6BUF says things are running along nicely on 80 meters. 6APH is remodeling his station and expects to be on soon with a 50 watter on 80 meters. 6ZAZ is using a 202 with B. Batt plate supply and has worked 3BHV. He is going to put in a 50 watter soon. 6BAV is doing fine now. 6QS, one of our new O.R.S., reports transmitter temporarily out of service but expects to get going soon. 6DG is remodeling his station and expects to get going in great shape soon.

Dist. No. 6: Well, well, if old 6AFZ isn't back on the air again with a 5 watter. He says friend wife is an enthusiastic radio fan too. He's just married, gang, and we wish him all kinds of happiness. 6ZX has up a new 40 ft vertical cage, but ND on DX as yet, as too much business this time of year. 6COK with one 5 watter is stepping out FB. 6SP will be using 5 watter straight Hartley coupled soon. 6CFG is doing experimental work with receivers. 6AMO is getting out FB on his 50 watter. He gets 2.1 amps on 83 meters. 6WP sends in a good msg report this month. 6CMG is not on much. 6BIP and 6TI are QSO Atlantic coast nightly. 6CFJ has moved to Fruitvale. His address is now 3717 Porter St. He says he is going to put up a big stick and expects to get out FB as Fruitvale seems to be the ham's Paradise. Berkeley: All of the fellows are

down on the short waves. 6AJF has his super-het working on 16 meters now. He will be working below 5 meters next month, with an X license on directional radio. 6ARB is QSO New Zealand, Australia and Mexico. He also hears Brazil and Argentina. 6BFU is still working out and expects to have a 250 soon. 6CEG has been appointed Assistant Traffic Cop, so you had all better behave yourselves. 6CKC is now an Assistant Publicity Manager for California. Most of his traffic is handled straight to the east coast. 6CLZ has just graduated from High school so maybe he will have more time for radio now.

Dist. No. 7: 6CBW is still without a receiver. 6PH has been working all districts and all states with 50 watts. 6ABX is now QRV for traffic with 20 watt C.W. and 10 watts fone on 195 meters. He will also have 100 watts on short waves. 6GR is also working all districts on a 50. 6AVM still going and QRV for traffic. 6DD is coming down to short waves. 6AGE is still QSO New Zealand and will accept New Zealand and Australian traffic up to 1 a.m. for delivery 1.30 a.m. He was also heard west of Japan.

Dist. No. 8: 6BAF was graduated from school and ORV for traffic every night.

Traffic: Dist. No. 4: 6NX, 4; 6ADB, 20; 6BON, 6; 6CJV, 2; 6AFQ, 8; 6AOL, 2; 6AME, 18; 6AMM, 5; 6CLP, 16; 6CCY, 12; 6FY, 4. Dist. No. 5: 6AC, 42; 6CHL, 23; 6BUE, 42; 6AWT, 40; 6APH, 1; 6ZAZ, 10; 6BAA, 16; 6CW, 14; 6CPW, 1; 6HJ, 7; 6ACR, 6; 6CLV, 14; 6RW, 15; 6CLS, 6; 6BQL, 15; 6BFY, 10. Dist. No. 6: 6AFZ, 3; 6COK, 14; 6SP, 24; 6CFG, 6; 6AMO, 91; 6WP, 67; 6CMG, 10; 6BIP-6TTL, 25; 6GU, 14; 6AJF, 4; 6ARB, 48; 6BFU, 40; 6CEG, 13; 6CKC, 42; 6CLZ, 31; 6ZX, 2. Dist. No. 7: 6DD, 4; 6AVM, 5; 6GR, 10; 6TH, 8; 6AGE, 29.

ARIZONA—Arizona seems to be waking up and going ahead by leaps and bounds. More interest is manifested and no doubt very shortly there will be many new O.R.S. Active stations in Arizona at the present time are: 6ACN, 6GV, 6PZ, Yuma; 6ASK, 6BDE, 6AAM, 6ANO, Phoenix; 6WI, Flagstaff; 6CUUW, Bisbee; 6FP, 6ZZ; Douglas; 6BKA, Tucson; 6AAM has 10 watts doing very nicely. ex-9AEC and another fellows will have 10 watts going soon with an 80 foot tower and cage antenna. 6ADH has quit on account of QRW. 6CSO has been on a few days with 15 watts "S" tube rectified A.C. going into a nice cage antenna and has two operators. Peterson, ex-6AUJ and Rowles, ex-6ZD are on every night from 10.30 to 1.00 and all night Saturday. 6ANO, Mesa is on regularly and QRV for anything. 6WI, F. A. Miller, Flagstaff, is doing his usual amount of good work and QRV for anything. He says that the gang on the coast will not QSO and register a kick being unable to put msgs across. This is a very nice report from Arizona and very glad to see that things are picking up.

Traffic: 6WI, 32; 6FP, 37; 6GS, 5; 6BBH, 41; 6CSO, 58.

HAWAII—Very little doing in the transmitting line here for the month ending December 15th. 6CEU is doing good work but does not seem to care about being an O.R.S. 6OA and 6TQ are the only two active O.R.S. in Honolulu. The Radio Club of Hawaii will open up soon with a "real" station, and we are in hopes that they will start the hams here going again. It is great the way the 75-80 meter stuff comes pounding in from the mainland and we should be QSO to shove traffic through.

In conclusion the D.M. wishes to say he is indeed gratified in the way the gang has supported him in the past year, and he feels that, with their co-operation, the Pacific division has advanced to where it occupies a position as one of the best districts in the U.S.A.

ROANOKE DIVISION

W. T. Gravely, Mgr.

NORTH CAROLINA—4TW is operating 4FA's set as 4FA is QRW with YL's. (Snap out of it fellows, this is no time for YL's—A.D.M.) 4FA and 4OG have in their applications for O.R.S. 4OG and 4LO will be back on the air shortly. New O.R.S.'s are 4MI, 4TS, 4PE. 4MI has been appointed D.S. of dist. No. 2. 4GW is very active and has worked England. 4MI broke all his records and worked G2KF. 4PE promises to be on soon. 4NJ is doing well. 4TS is planning a short wave set. 4TJ and 4JR are still the leading stations in dist. No. 3. 4TJ hands in a good size total, in addition to the fact that he spent most of his time hunting DX and experimenting. He is QSO Z4AK, England and France,

having the honor to be the only North Carolina station to work New Zealand. 4JS was on the air during Thanksgiving holidays and did some fine work taking a NANA relay message, which he delivered immediately. FB, OM! 4JR turns in a large traffic total in addition to DX hunting, is QSO England, France and Mexico, and works all districts. 13 of the NANA relay messages passed through this station. 4HR is on the air but no report. (Smatter, OM, better have sum reports or you will be minus an O.R.S.—A.D.M.) There seems to be a bit of laxness in dist. No. 4. (Smatter, fellows, can't you make anything perk on 80 meters?) 4RU and 4UN fail to send in a report. (Smatter, boys, QRW?—A.D.M.) 4SU is only active O.R.S. and he was on only about half the month, however did good work while on. 4BK has been trying to get down on short waves but reports no luck. 4RW has a new mast up after moving and will be back on air soon. 4NT, an old timer, will blossom forth with a new 100 watt and a couple of 80 foot sticks. (FB, OM, they all come back sooner or later.—D.M.)

WEST VIRGINIA—D.S. Jones has done some fine work in vicinity of Fairmont locating three illegal spark coil transmitters which were causing bad QRM on BC waves and for which the ARRL men were getting blame. 8DES is in school over Jersey, may get on the air there. 8BSU has been appointed CM Wheeling in place 8ZW who is at Carnegie Tech. this winter. Wheeling and Huntington are most active traffic places in the state. 8SP is testing with F8AB and F8CS on Saturday nights. 8CHQ has sold his 100 watt sink and is after a ¼ KW tube. 8CFE has been on the air several nights but finds it interferes with YL's so radio is running a bad second. 8DKB lost his father. (Sympathies, OM.)

VIRGINIA—3MK, new aerial system going in soon. 3CKA off the air most of month, blew up his fones and QRW school. 3CKK off air, bum "A" battery new one now, uses four coil Meissner circuit. (You're right for once, OM.—D.M.) Put up an 80 foot stick cost one dollar per foot, unlike 3CEL, no lumber yard close to his stations. 3TI, bemoaning loss of the one and only five watt, junked the chemical rectified for self-rectified Hartley. 3KS, 3TI's portable, used at Norfolk Radio Show, with a lo water composed of parts belonging to the gang, handled 150 messages in six days on 77 meters. This coupled Hartley was feed with a plate supply of 600 volts from 3IN's Emerson MG, the aerial and CP one wire each about 23 feet above ground and about 20 feet between the two, antenna current about 1 amp range was about six hundred miles. 3BBT and 3UU are away at school. 3QC is the only Norfolk station on 80 meters. (You birds are missing the best in radio we have ever had, drop down and get in with the gang.—D.M.) 3HM and 3UY at Richmond are ready to go. We are glad to see that the Richmond gang are still alive. 3ATB had his cable to catch inside of pulley on his 70 foot mast and has been off the air, we expect him back shortly on 80 meters with 10 watt with a two wire aerial from his 45 foot stick straight into the shack. 3AUI is planning a home made 500 watt tube using a pump to keep the vacuum while working the tube. (Right here is where the Yamacraw will have a bit of extra work.—D.M.) 3SG will resume operation as soon as the juice is put into his new home. 3BGH has quit the game. HI, and a couple of haw-haws! 3BMN handled the Virginia Daylight Transcon and was promptly notified by 6CGO when latter was worked that he had received one of 3BMN's messages. Ray says the short waves are the berries, has worked Porto Rico, 6CGO, 6AWT, 6CHL, 6EW, 6BUJ, etc. 3BFE says school QRWd him badly. 3BUY is applying for O.R.S. 3BGS expects to get on short waves soon and will try out the four coil Meissner. (Amen, brother, you are going right now.—D.M.) Anyone heard anything from 3CEL since he got all that mast up? 3BVL is home for Xmas and we expect to hear him on the air.

3CKL is getting down on short waves. This station has worked all districts, two Canadian, worked forty-one states and reported 1700 miles off Los Angeles. Very QSA at 7AM EST. Has logged Z4AK and A8BQ. He is blessed with an excellent location. 3BZ still has trouble with the traction company sanding tracks and causing bad QRM. (Take up the tracks some night, OM.) 3CA worked G2KZ.

Traffic: 4JN, 15; 4GW, 12; 4MI, 9; 4UM, 6; 4TS, 6; 4JR, 188; 4TJ, 30; 4SU, 15; 8SP, 12; 3MK, 12; 3CKA, 5; 3CKK, 1; 3TI, 15; 3KS, 150; 3BMN, 38; 3BFE, 2; 3BUY, 21; 3BGS, 3; 3CKL, 16; 3CA, 22.

N. R. Hood, Mgr.

9DFH

191 Msgs.

C.W.

E. F. Hushaw, Fowler, Colo.

COLORADO—Denver: 9DUN and 9CLD each split honors for next to most traffic this month. The traffic report for the Denver district shows a wonderful improvement which speaks well for the new type sets that have been installed in so many places. 9AMB is now in the Colorado University so the good reports from this station will be missing for a while. The station is still in operation, however, by his brother. 9EEA will have up a 90 foot mast soon with a record station. 9CAA has had the station on the air regularly. 9QL and 9CJY have been on regular and moved traffic. 9EFY reports, but no traffic handled. The Denver report is very gratifying this month.

Dist. No. 1: 9AOI has kept the north part of the state open to traffic. Stay with it, OM, you seem to be the only opening through your district.

Dist. No. 2: This district takes the box seat this month for most messages handled. 9DFH put through 191, a small station with a good op and a good station. All stations reporting, which seems to be our 100% reporting district. 9EAE, 9CDE, 9CHT have all been on and moved quite a bit of traffic. Keep her going down there and remember the storm routes, if they should be needed. (This is a fine showing this month, men, and the D.M. appreciates your good efforts in getting things moving good again.)

UTAH—Salt Lake City: Dists. No. 1 and 2: Very few stations reported this month, 6RM and 6CJB reporting traffic moved. 6RM is doing excellent work on 41 and 75 meters. 6CJB has just completed a new installation and reports good results from his new location. 6CKI is on 75 meters with UV201 tubes with Western Electric constant current supply and reports good QSO with the west coast. 6BUI, the station of the D.S. for Dist. No. 2, has been put on the air. 6RV is operating a 5 watt tube set on 80 meters and is doing good work. 6FM reports no traffic moved due to other duties keeping him QRW this month. Good report, men, and looks fine to see so many of you down on the short wave bands. Let's have some details on the short wave sets if you have anything different.

The A.D.M. reports a fine time at the Modesto Convention in California while on his vacation. Reports a fine gang of fellows out there and heard some fine talking. Fine luck, OM, to have been there!

WYOMING—Dist. No. 1 and No. 2: 7HW reports traffic moved and his station on the air as regular as his other duties will permit. 7AJT keeps the northern end of the state open together with 7NR and 7HK. These are the only three stations in operation in the state and are doing fine work. Keep it up, men, you are all the stations that are left at present.

Traffic: Colorado: 9AMB, 10: 9CAA, 185; 9CJY, 58; 9DUN, 175; 9QL, 10; 9DFH, 191; 9CDE, 31; 9CLD, 175; 9CHT, 10; 9EAE, 27; 9AOI, 58. Utah 6RM, 42; 6CJB, 2; 6RV, 60; 6BUI, 25. Wyoming: 7HW, 5; 7AJT, 15; 7HK, 20.

SOUTHEASTERN DIVISION

H. L. Reid, Mgr.

GEORGIA—Dist. No. 1: 4KU, 4IO, 4OA, are doing nearly all the work, all three working New Zealand. 4IO worked Europe 21 times this month and N. Z. four times. 4KU leads in DX, working England, France, Argentina and New Zealand in one month. (FB). 4EQ is getting out well. 4SI is back on with a new 5 watt.

Dist. No. 2: 4XX is doing fine work. 4DY is still on higher waves. 4PL is off the air—QRN from other work. 4BW is getting out fine on low waves. 4FZ is going strong on a new 50 watt. He worked France and leads the state in traffic.

Traffic: 4EQ, 21; 4IO, 36; 4SI, 22; 4BW, 12; 4FZ, 104; 4DY, 7.

ALABAMA—Amateur activity seems to have dropped off slightly this month. Seventeen stations reported with a total of 755 messages handled. Dist. No. 2 leads for the month with 205 messages, with district No. 3 following close with 204 messages.

5XA, at Auburn, handled 174 messages, with 5ACM, at Anniston, running second with 138 messages.

Dist. No. 1: 5ACM again leads the district with 138 messages. These messages were all handled on the 160-200 meter bands of waves but 5ACM expects to be down on the 80 meter band soon. 5QP is the only station reporting from Gadsden this month. Birmingham seems to be away behind this month, as only 12 messages are reported. Seems that D.S. Connolly had better get busy and find a way to put some pep into this bunch. Too many DX hounds in Birmingham must be the reason for the poor showing. 5AMH has been rebuilding in order to get down on 80 meters. The first rain to hit Birmingham in 63 days took its spite out on 5AMH and ruined \$150.00 worth of apparatus. (You have our sympathy, old man.) 5MI recently worked Z2AC and Z4AG and has been consistently reported across the pond. 5MI and 5ZAS have combined and make many promises for DX but not for traffic. All credit for traffic this month goes to 5ADS and 5AMH.

Dist. No. 2: The honors for the month go to 5AOM. 115 messages were handled with one 5 watt tube on 80 meters. Good work, OM. Station 5AGD is no longer an ORS and the call has been re-issued. Stations 5AC and 5QK have been heard in England and 5AC has logged Z4AA, Z4AG and Z2AC. Australian 2CM and Bermuda BER have been heard by 5AC. D.S. Rush seems to have made a live bunch of hams in Mobile.

Dist. No. 3: C. M. Trum of Montgomery has originated a "Brass Pounder's League" and expects to boost traffic and interest in the Capitol City. Several good prospects for new ORS appointments have been located. Third district stations continue to operate on the higher waves with success.

Dist. No. 4: D. S. Dustan reports 174 messages from 5XA for the month. 5XA is now operating on both 80 meters and 155 meters with regular watches.

Traffic: 5AC, 38; 5ACM, 138; 5ADA, 24; 5ADS, 8; 5AJP, 61; 5AMH, 12; 5AOM, 115; 5AR, 6; 5NL, 4; 5QP, 15; 5QK, 32; 5QP, 11; 5WI, 115; 5XA, 174.

SOUTH CAROLINA—In the eastern part of the state 4SY and 4SL are keeping things humming. 4RR-4VL remodeled his set and antenna system and now the thing won't work. Fellows in Spartanburg think 75 meters is a new kind of yardstick.

Traffic: 4RR-4VL, 2.

FLORIDA—The outstanding feature this month is the intense interest being taken in amateur work due to the advent of short waves. Many old timers who have been inactive because of the possibilities of the higher waves being more or less exhausted, are being reclaimed because of the new and vast possibilities opened to them in the short wave field. Among them is J. C. Cooper, Jr., of Jax., who is starting up with a powerful 5 watt.

Miami, one of our largest cities, and until recently one of the deadest, has become so active that she is becoming the center of the state's activities. 4FM, an old timer, is back with us on 40 and 80 meters and has worked N. Z. and all U. S. with two 5 watters. 1CPO, of 1ARY spark fame, is in cahoots with F. M. (nuf sed!) 4IG, 4NE and 4FM have become valuable relay stations and are receiving ORS appointments. 4CH has been copied three times in England and once in Belgium with one 5 watt. Much credit for Miami's success is due to D.S. 4QY, and C.M. 4CH, for they are real traffic men.

4XE maintains quite regular QSO with N. Z. since his first QSO with Z2AC a month ago. He is doing excellent work on 40 meters and extensive experimental work on 20 meters. 4IZ and 4UA have been appointed ORS and are doing good relay work. The Jax. gang has gone in for 40 meters, with good results. 4FS has worked all U. S. districts and has been copied in N. S. and England with a 5 watt and one wire antenna and C.R. 4KK has dropped to 75 meters, making 100% of Florida's O.R.S. on short waves. 4SB worked all districts in one night.

Traffic: 4FS, 72; 4IU-4XE, 49; 4UA, 83; 4FM, 28; 4QY, 19; 4SB, 21; 4KK, 16; 4CH, 18.

CUBA—With improving weather conditions radio is again coming into its own in Havana.

Q2BY, on 150 meters, power input of 100 watts, handled msg. Q2MK, on 85 meters power input of 20 watts, handled 13 msg. Q2LC is a new station.

Short waves are certainly a big factor in our work, as QRM from the commercial spark station PWA is very bad. Reception is also improving and many foreign stations are being logged, namely, F4SA, Z4AA and Z4AP. Canadian stations are heard consistently and some have been worked. Every district

of the U.S., excepting the seventh, is heard and worked nightly.

We are on the air consistently now, QSO points south and QRV for southern bound traffic.

WEST GULF DIVISION

F. M. Corlett, Mgr.

There was just about one big thing hit this neck of the woods in December, and the other divisions probably had so much more of that than we, that we will get the merry, merry, but just the same, the big thing was a COLD SPELL! Why, right here in Dallas, the mercury was almost down to zero, and the Rio Grande Valley had about the first freeze they ever heard of.

Our first real chance to do some railroad relief work in this section was gummed because nary a chirp could be gotten out of Houston. Everyone is asking the D.M. what was the matter with those birds—there were no telegraph lines working to Houston for more than a day, and as I don't know what was the matter, and have been too busy to go down and find out, I'm going to take a guess at it and say that weather conditions, which put 80 miles of telegraph poles down, might have put some aeriads down too. If this is not the answer, let's hear it.

MEXICO—BX-1EI reports total of 5 hours work with New Zealand. He has a schedule at 3.30 a.m. HI. He also worked G2OD nearly an hour. He says "ND on QSRing yet—QRM fm Gvt. HI."

NEW MEXICO—No reports. Let's hear from you fellows. If you can't write, try relaying one through 5ADN, 5AJJ or any Dallas ham.

NORTHERN TEXAS—This month has been a fine one for DX work as shown by the fact that Australian and New Zealand stations have been copied regularly by several Texas stations. Also 5DW worked Aust. 2YG and Z2AC. On December 1, 5AEX was QSO with G2UD. Another important work was done when 5ADV, in cooperation with 5ZG, WFAA, WEAY and WOAI, located a Katy train out from San Antonio on December 19th. The only new O.R.S. this month is 5AKX. Stations who desire to become O.R.S. should drop a card to that effect to the A.D.M. Some six or eight stations are now working on the 40 meters wave; the majority of all Northern Texas stations seem to be on the 75 to 80 meter band, and the balance are still on the higher waves.

Traffic: 5DW, 10; 5NW, 36; 5AMB, 4; 5LL, 16;

5AKX, 4; 5AJT, 25; 5VU, 30; 5FC, 60; 5PH, 27; 5ADH, 14; 5ADV, 22; 5UO, 22; 5AJH, 21; 5ZH, 4; 5OQ, 11; 5AJJ, 22; 5HY, 99; 5AKN, 32; 5CT, 6; 5CV, 2; 5QW, 3; 5SD, 9.

SOUTHERN TEXAS—The cold weather has brought new life and renewed activity. Some relief was given railroads during the severe cold wave and sleet storm when communications were cut off. San Antonio made desperate attempts to get QSO Houston but ND during the emergency. Why?

Nearly all the gang is now down on 80 meters. 5EW is QRK F8AB on 15 watts and is putting in 50 watts. How? 5RA is a newcomer and applies for O.R.S. FB. 5ZG is on the air for the holidays. In Corpus Christi 5MS and 5ABJ are moving traffic fine. 5APM manages to move traffic in spite of stubborn transmitter trouble. Route traffic for Cuba and Panama through 5MS. Reports are still too slow in coming in, please, please mail 'em on the 20th so I don't have to delay this report and risk not getting it published.

Traffic: 5MS, 21; 5APM, 12; 5EW, 30; 5XAQ, 5ACZ, 5; 5ABJ, 14; 5ZF-5AHH, 13; 5ZAI, 35; 5CA, 32.

OKLAHOMA—Dist. No. 1: Great activity is reported at Perry, and the A.D.M. has four applications for O.R.S. appointments on file. 5UJ is doing fine work and reports that a C.M. will be needed for Guthrie in the near future. 5ZAV and 5AIU attending Oklahoma U. at Norman, were doing good work until they treated their 50 a little too roughly and are now using the smaller bottles until the 50 can be replaced. We hope that the Norman stations will report next month.

5APG has only been on the air the first part of December and is undergoing repairs at present. The original 5 watt bottle is still in operation at this station. Nine months and she is still perkin'. We are sorry to lose 5XBP, who is attending school in the east.

Organization in Oklahoma is far from perfect and the A.D.M. finds progress rather slow due to conditions in regard to state communication on the short wave bands. DX seems to be easier than local communication and this fact partly accounts for the disorganized traffic lines in Oklahoma.

The A.D.M. desires more reports next month and hopes that districts No. 2, 8 and 4 will line up. C'm on, gang, let's show those Texas Long Horns how it's done!

Traffic: 5UJ, 26; 5APG, 15.

CANADIAN SECTION

In two directions Canada has gone ahead enormously during the past month. From a traffic point of view DX records have been shattered in all directions. Three Nova Scotia stations and one British Columbia station have been in communication with New Zealand and one British Columbia station with Australia. The East and West coasts have been in touch with each other direct and remarkably good records are being hung up weekly during the Wednesday night Canadian relays, particulars of which are given below.

The big point of interest, however, of the past month has been the matter of the Division Managers' meeting at Winnipeg on the 1st of the month and we give below the items discussed at this meeting which are of general interest.

Borrett, 1DD; Argyle, 2CG; Langford 3XN and Russell, 9AL, all met at Toronto on the 28th of November and took the same train west. While on the train eastern matters were very thoroughly discussed and draft resolutions were drawn up so that the meeting would not be held on arrival at Winnipeg by having to do this necessary work.

On our arrival at Winnipeg on Sunday, the 30th of November, we promptly met Brickett, 4HH, and Ober, 4DQ, and after lunch and a look around the city, we went into session at five o'clock that afternoon, the results of which session are set out below. In the evening the whole gang took a trip to see the station of 4CR, and the eastern fellows particularly were pleased to hear the way in which the signals rolled in to this station compared to the very much weaker signals in the East and they all envied 4CR his location at the hub of Canada.

Next morning, December the 1st, we met Mr. Hebert and went over with him the resolutions of the divi-

sion managers. After lunch photographs were taken of the gang and we paid a visit to the Manitoba Government Telephones broadcasting station, CKY. In the early evening a general meeting was called of all Winnipeg amateurs, particulars of which had been broadcast from CKY and by the daily papers. A very small attendance was had and the meeting was very short owing to the necessity for departure of the east bound bunch on an early train.

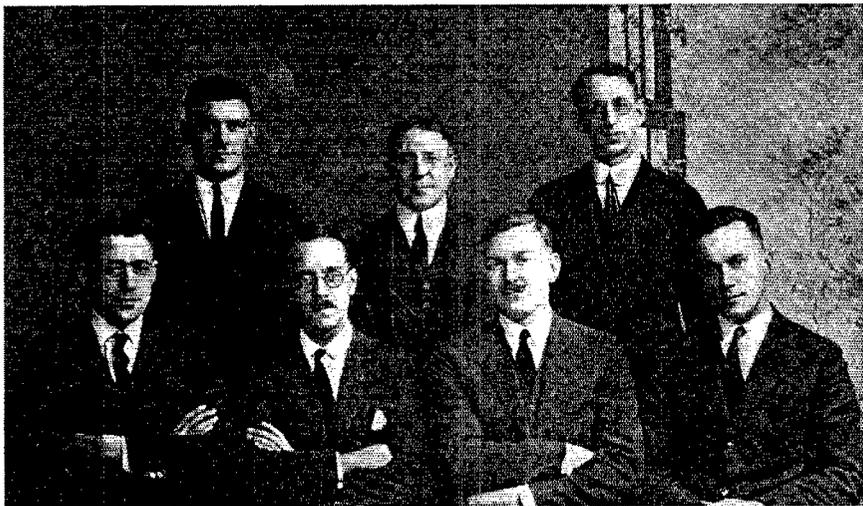
The following are the particular resolutions of interest to the Canadian crowd:

It was arranged that every Wednesday night at 10:30 P. M. Mountain standard time every Canadian division manager would be on the air on 125 meters and would try and work each other. It was also arranged that we should try and get all other Canadians on the same band of waves at the same time so as to have a sort of general Canadian meeting every Wednesday evening. It was urged upon the division managers to circularize all their men to operate on the 125 meter wave so as to avoid the interference experienced on the 80 meter band and also to have the Canadians know where to look for one another. This scheme has been at work at this writing for two weeks and success has been very great. The first week only the eastern section of the country was in communication and on Wednesday the 17th, both 1DD and 9AL were able to work 4DQ and we hope as these tests continue to have regular meetings on the air of all the better Canadian stations. This wave is an exclusively Canadian amateur wave and for that reason is a wonderful one for our work.

The second motion had to do with the Canadian Amateur Wireless Association being boosted in Winnipeg. The proposal was made to take the C.A.W.A.

into the A.R.R.L. as a provincial organization affiliated with the League. On chatting the matter over with the Winnipeg amateurs it was decided however that there would be no advantage to doing this and it was decided that no further consideration should

The next motion of the division managers arose out of the figures shown by the League of membership in Canada. It was pointed out that only one-half of the copies of QST sold in Canada were sold on subscription, the balance being by news stands



THE CANADIAN MANAGERS MEETING AT WINNIPEG. Left to right, seated: J. V. Argyle, Quebec Div.; W. C. Borrett, Maritime Div.; A. H. K. Russell, Canadian General Manager; A. J. Ober, Vancouver Div. Standing: C. H. Langford, Ontario Div.; A. A. Hebert, field representative from Harford headquarters; J. E. Brickett, Winnipeg Div.

be given to this separatist movement and that we would just let nature take its course.

It was also suggested that the two western divisions, the Winnipeg and the Vancouver divisions, both had names which were decidedly inappropriate to their vast size in so far as they only had the name of one City as their division name instead of having a broad name somewhat descriptive of the region which they cover. It was tentatively suggested subject to the approval of the divisions themselves that the Winnipeg division should have its name changed to the "prairie" division and the Vancouver division to the "Fraser" division. The Canadian General Manager will be pleased to hear from any member of the two divisions in question as to what the members think of this suggestion.

The next motion was one of great interest to all Canadians when it was proposed that the office of division manager in the Canadian divisions should be made an elective one and that elections should be held every two years in each division. It was arranged that votes should be called for a new division manager in the Quebec, Ontario and Winnipeg divisions at once, so that the new man might take office in 1925 and that in 1926 there should be beside the new Canadian General Manager new division managers elected for the Vancouver and the Maritime divisions. Circular letters have been sent by Headquarters to each member of the League in each three divisions above mentioned asking that a vote be sent in promptly to the C.G.M. of the member's choice for division manager.

Arising out of this motion was the next one which was that all division appointments were automatically suspended as soon as the new division manager took office and only on his renewal of the appointments would the station in question be considered to hold its former office.

It was also arranged that the division managers forward in for publication in a Canadian section of QST a certain amount of other material to go into a separate Canadian section of the League magazine. Plans are now going forward for a separate section for Canadian news and within the next few months Canadian amateurs will have their own section of their own magazine. The C.G.M. hereby requests any Canadian amateur who fancies himself a cartoonist or artist to send him a heading illustration for the Canadian section and it is hoped that a hearty response will be had to this appeal.

and all the division managers felt that something should be done to raise the membership numbers by some sort of a drive for membership and this will be done as soon as the new division managers take office.

Other matters taken up by the managers were in connection with the question of Canadian advertising



in QST, the boosting of the publicity department by furnishing news items from each of the divisions to the other divisions and publicity department in suggesting that the C.G.M. be empowered to do all in his power to boost the representative of Canada at the I. A. R. U. conference at Paris in 1925.

As a final motion the use of the 80 meter band of waves with coupled circuits and properly filtered and choked supply was urged on all Canadians as a means of combatting interference with B.C.L.

The Canadian General Manager will be pleased to hear from any League member in Canada on any point of the above motions; also don't forget the Wednesday nights 125 meters at 12:30 Eastern Standard time.

MARITIME DIVISION W. C. Borrett, Mgr.

Whether we are located in a natural receiving spot for radio on old Mother Earth, or whether it is just luck, or that we in the Maritime division are well stocked with enthusiasm and go-getter type of radio hams, is the question that the D.M. would like to settle in his mind, and he is rather inclined to believe it is the latter. Whatever the reason, it is certainly a matter of pride to all concerned to see the Maritime division again in the front of the gang in the race for more amateur radio records.

Among our stations that should receive special mention this month is 1AR, better known all over the radio world as "Old Joe." Joe has opened up, for the first time in Canadian amateur radio history, communication with the following countries: Belgium, Denmark, Sweden and New Zealand. To have been the first in any one of the above would have been a record worth holding, but to create four new records in one month is something far beyond our fondest hopes. In addition to this 1AR has worked C5BZ on the west coast of Canada, and again is entitled to a niche in our hall of fame. By the looks of things Joe has a firm grip on the Murphy Cup for 1924. This is the silverware presented by Mayor Murphy of Halifax for the Maritime ham who does the most during the year for radio in the Maritimes, and there is no doubt that Joe has brought the Maritime division to the notice of the rest of the world more than any other ham so far this year, and therefore, has done most for amateur radio in the Maritimes. Unless some other ham works Mars or does some particularly wonderful feat, Old Joe should win by a mile. (FB, OM—D.M.)

Two other Maritime stations have done particularly good work, 1DQ and 1DD, both of whom have worked New Zealand. 1DQ reporting having worked 4AA and 1DD NZ4AG. An interesting sidelight on the working of New Zealand is the fact that U6AWT of San Francisco, Calif., copied both 1AR and 1DD while they were QSO N. Z., and sent them cards confirming the two-way work.

Our old friends the European stations are coming in these days by the dozen and every night English, French and Dutch stations, as well as a few new other foreign stations can be heard pounding away and keeping up the good work and making the 1ARU an established fact by two-way amateur radio contact.

Trans-Canada work is splendid and the Maritime gang are working more Canadian stations in the Quebec, Ontario, Winnipeg and Vancouver divisions than ever before in the history of amateur radio. The D.M.'s relay on Wednesday nights certainly has done the trick on 125 meters to put Canadian ham radio where it should be. In Nova Scotia 1AW, who has been very ill, has now come to life again and is very QSA all over the division, and in fact has been reported in England twice. He reports that more signs of activity are noticed among the CB hams these days and before long hopes to have four stations going down there. 1DM at Caledonia mines is reaching out particularly well. In Halifax many of the gang can be heard testing night after night but none have really gotten down to any traffic handling as yet. 1EF and 1BQ have been experimenting down around five meters and should soon be in a position to give the Canadian section of QST a nice report of their results. 1DF and 1DJ have been appointed O.R.S.'s.

In connection with O.R.S.'s, the D.M. wishes to remind all O.R.S.'s that they must report to the C.M. or other League officials every month, whether they have handled any traffic or not, and next month any O.R.S. that does not report to the C.M. or A.D.M. by the 23rd day of the month, will have

his certificate cancelled. Don't expect the C.M. or A.D.M. to ring or write you. You took the O.R.S. appointment knowing what is required of an O.R.S. A little more pep, please, gang, in reporting. 1AB, 1AI and 1AK of New Brunswick have been appointed O.R.S.'s, which gives NB five first class stations as O.R.S.'s, in covering a wide area of the province. 1AB is QSA in Toronto. 1AM has moved down to the low waves and is very strong in Halifax. 1BV, our traveling representative, reports that the NB gang is coming along in fine shape and states that they hope to come in a body to Halifax for this year's convention, which will be held at the Queen Hotel, Halifax, on Saturday, March 21st, and all stations in the Maritime division will please notify the D.M. by letter at once whether they will be in attendance. Mr. Hebert, the treasurer of the League, will be with us this year, and as many as possible should get to Halifax. Just ask the boys what sort of a time they had in Halifax last year and that will make you sit down right then and there and send your letter to the D.M. Mayor Murphy of Halifax will also attend, to present the cup. Don't forget, write that letter today!

1EI of St. John as usual is on the job and is running 1AM a race for the honor of leading DX in NB. 9AK and 1BZ are still in the rebuilding stages and should be on again soon. 1AJ at Parrsboro is about to burst forth and will be a welcome addition to our gang. 8AR at St. Johns, Newfoundland, has the material for a special ham set of 100 watts and is expected on at any time. He made a visit to Halifax this month and met several of the boys. He should be our best connecting link with England all year, as he reports that he can hear the English stations any afternoon. He will work on 125 meters. All stations are again reminded that photographs and articles are wanted by the D.M. for publication in the Canadian section of QST.

Traffic: 1DJ, 9; 1DD, 34; 1AR, 42.

ONTARIO DIVISION C. H. Langford, Mgr.

The important move of the month is the formation of the regular Wednesday morning relay. While primarily a D.M. affair, all stations are asked to be on the job. The time is 12:30 A. M., EST, on 125 meters. To date, most all eastern stations that have been in on this have worked as far as C4DQ. If you can stay up a bit later, the C5's can be worked.

3NI is still using two fivers and finds on difficulty in reaching out. 3AR has moved to Manitoba. Sarnia reports unusual tube trouble for non-appearance on the air. 3TB and 3XN of London, are found either on 125 or 75 meters, approximately. 3DH has been re-issued, new QRA is, St. Catharines, which, by the way, boasts of 5 stations. They are all on the lookout for traffic for points on the Niagara Peninsula. Quipp is now located in Peterborough, and is busy getting old 3EY on the air. 3DB of Hamilton, is in Kingston. 3AZ and 3CK are two new stations in Toronto. Glad to hear 3OH on a times. 3MP and 3YY are found on 80 meters any decent night around 11 P. M., also between 5.30 and 7 in evening. Harrison reports working C6NE and hearing a number of foreign stations. 9CC is experimenting on 4 and 5 meter stuff. 3NF is doing consistent work on 80 meters. 3HE is on 80 and 125.

QUEBEC DIVISION J. V. Argyle, Mgr.

Things have moved again this month with new records, more traffic and far better individual handling of it. The trans-Canada weekly relay on Thursday mornings beginning at 12:30 A.M. on our exclusively Canadian wave of 125 meters, has been an immense success; 2CI, 2FI, 2AZ and 2CG specializing in this work. Continuous communication with New Brunswick and Nova Scotia to the east and with all Provinces west to Alberta, is kept up from 12:30 to 1:30 A.M., and traffic runs through very smoothly. This started as a division manager's relay and now is an all O.R.S. affair. All Quebec stations should get in on this; it's great to be QSO all the other Provinces and it is found that our special wave of 125 meters is splendid for traffic handling. Arrangements have been made with British 2NM to work us on this wave on these Thursday mornings so that will make the thing very interesting.

Reid, C2BE, wears the laurels for being the first to connect directly with British Columbia, C5DA being

at the other end. Our new station C2CI at St. Theresa is making out well, specializing on the 125 meter wave and working west to C4DQ regularly. 2AX has also broken into the limelight by being our first to work Mexico, he having been QSO IB.

2BN, 2BE and 2CG are working across the Pond every night they remain up. 2AZ and 2AX have also won the right to become ROTAB's by working an English station. 2CG received confirmation of reception of his signals from Argentine CBS. Tommy at 2BG is on a little more frequently lately working across to Europe and to the west in his usual style. New Zealand stations are being heard by 2BN and 2BE and great is the competition to be first to work that country. 2BV and 2HV are getting into their stride and handling more traffic over longer distances. 2CT, 2CN and 2AB have got down to the lower wave and report better DX and what traffic can be found is kept moving.

The following have made O.R.S. in recognition of the fact that they have proved they can handle both a station and messages: 2AM, 2CI, 2AV, 2AZ and 2FL.

It has been demonstrated in Montreal that most of the QRM complained of by B.C.L.'s was from the 175 meter phones in the city, and it was agreed at a general meeting that phone work would not take place in the future after 7 P.M. every day. Very little QRM is caused to B.C.L.'s here from the filtered C.W. stations on 80 meters but to avoid any chance of trouble from this source none of these stations are operating during broadcast hours.

Fine business, gang, keep up this last month's splendid work.

Traffic: 2BG, 12; 2BE, 25; 2CI, 14; 2FL, 10; 2CG, 21.

VANCOUVER DIVISION A. J. Ober, Mgr

Activity still keeps up, and right now there is a big traffic business. There are more stations on than ever in the history of this division, but the greatest trouble is that there are too many bands of wavelengths used. If you want to be QSO the east coast and QSR traffic quickly, just try 125 meters, also get in on the D. M. relay on 125 every Wednesday night at 10:30 P. M. M. S. T. The second D. M. relay was a success, 4DQ having worked all Canadian D. M.'s, and C. G. M. Owing to the present name of this division localizing too much, it was decided at the D. M. meeting to change it, and Vanalta has been suggested, which is composed of Vancouver and Alberta. What do you think, gang?

ALBERTA—4IO is handling a lot of traffic on 75-80 meters. He is always QRV for Calgary traffic and QSR. 4AX is now stepping out and working the 8th and 9th districts and has some real DX to his credit. 4CW, our old friend the night hawk, tells us he has sold out and will QRT—too much business QRM. 4AB is brushing up on the code again and dusting his 10 watter. 4DQ is on every night with two ops spelling off on the brass and the silverware, and is on 80 meters from 3:00 P. M. until 6:30 P. M., and 125 meters from 11:30 until he falls asleep.

Traffic: 4AX, 19; 4IO, 22; 4DQ, 22.

VANCOUVER ISLAND—5CT is down on 125 meters and can QSR to Winnipeg any time. He reports QRN very bad lately but in spite of this he turns in a good traffic report. This district takes pride in telling the world they deliver every message. Atta boy! 5HK hands in a report which shows that he is alive, and will be on 125 meters for traffic his way.

Traffic: 5CT, 19; 5HK, 10.

EDMONTON—4HF is the only station on the air that way. He is on regularly but we don't know his working QRH. (Better try 125 meters, OM, if you want to hear all the Canadians from coast to coast—D. M.)

Traffic: 4HF, 10.

VANCOUVER—Hurrah! The Vancouver gang is battling its way to fame and glory!

The outstanding event of the month was the near connection of 5GO with 2AC. That's FB, OM's! At the present, the alleged connection is not verified but knowing "GO", it is ok. He reports a 250 Western Electric on the way west to use on 80 meters. 5BZ tops the list for traffic. Rumor has it that he is on his fifth or sixth fire bottle now since he started in May 1924. Keep it up, OM, you will soon come level with 5GO's score of 28. Hi! 5AH has just got over a bad attack of scarlet fever and has his set loosely coupled. 5AN works the east coast regularly with one lone VT2. He also moves mes-

sages. 5BA has some fine letters in his shack from New Zealand. His sigs are reported QRK on 175 meters. (Who sed 80 meters was the whole cheese.) He has a peach of a cage aerial which no doubt is responsible for the DX; and insulators hi hi-oak boiled. 5BJ at New Webster built a new low-loss tuner which was a revelation to him. 80-250 meters. Why the long wave stuff, OM? A 5 watter was a UV201 struggle for their fair share of juice. 5HS reports an intended come-down to 80 meters where all the good stations are these days. He will be off the air for a little while rebuilding. Wheeeeeeeeee! make way for the new super-station of Vancouver 5HB. Input to start with 1/2 k. w. self-rectifying Marconi Outfit. Fred sez "get ready to hawl your cans off gang." Loose coupling of course and 80 or 125 meters naturally. 5GF is now on 75 meters and has a raft of cards from the east coast already, as has all of the gang on the short band. The Western Electric 50 watter is FB hr and is not at all hog-gish on the juice.

Things are going to hum in Vancouver as they have never hummed before. Think of this, gang, we have a column in a local paper all to ourselves QST style. FB. We intend carrying on a hot campaign on bum tuners among the B. C. L. Fraternity as well as bring our activities to the notice of the general public. There is always some Vancouver station on every night for traffic both 80 and 150 meters, preference being 80 meters.

The B. C. A. R. A. Incorporated (we have a real honest to gawd club here) has sure injected life into the 5th Canadian district, ever since the convention things have been getting steadily better. FB, gang, stick together and we will accomplish wonders through our cooperation.

Traffic: 5GO, 20; 5BZ, 36; 5AH, 21; 5AN, 20; 5BA, 17; 5BJ, 11; 5HS, 24; 5GF, 16; 5AS, 22.

TRAFFIC DEPT. INTRODUCTION

(Continued from Page 1)

There is no part of the country which is without this service because you can copy some one of the above stations no matter where you live.

N.A.N.A. THANKSGIVING RELAY

An impromptu relay of interest was conducted for the North American Newspaper Alliance on Thanksgiving Day for the purpose of demonstrating the possibilities of amateur radio communication in emergencies. No special announcements were made before the relay took place, as we wanted to show the N.A.N.A. what could be done. We presume that each newspaper which is a member of the N.A.N.A. has reported back to the central office the number of messages received and due credit will be given each amateur when the story is released nationally by N.A.N.A.

By far, the greatest amount of credit goes to Ed Glaser, 2BRB, for starting 101 messages and sticking to the key until his job was done. One thing that can be said about 2BRB is that messages handled there are taken care of in ship-shape order—no delays and 100% deliveries.

Reports of handling of the N.A.N.A. messages have been received from the following stations, for which we extend our thanks: 1BCC, 1BHW, 1KZ, 1ZL, 2COZ, 3BMN, 4JR, 4JS, 6CSS, 7OY, 7LS, 8AWJ, 8TR, 8GZ, 8BVR, 9XI, 9BSO, 9DTK, C4IO, and C5AN. Some of the above stations handled more than one message, but just how the messages reached their destinations and what time they made is not given in the logs.

A Trophy for the King of Traffic Handlers!

THE other day, while operating 1MK, your own A.R.R.L. Headquarters Station, an amateur told us that he was so sick and tired of hearing that old "rubber-stamp line," "QRK? QSB? NIL HR CUL" and that he was just itching to handle some real messages again. He wants to see the old Brass Pounders' League, he wants to handle messages *a la* QSH and he recalls how old Chain Lightning Hill, 4GL, and Larry Dunnam, 3ZY, used to bat 'em out lickety-split without QTA's. He feels that he is completely fed up on this testing business and it is about time everybody knew everybody else was "QSAVY."

We agree with him 100% and the old Brass Pounders' League is back again—are you in the line-up, OM? Yes, we must get back to our business of handling messages, but we want a better class of messages. We want to know who is the best traffic handler in the A.R.R.L. and a beautiful trophy will be awarded to that operator for his effort. Yes, sir, we'll crown him "King of Traffic Handlers" in all glory!

"Mr. Goodfellow," who owns and operates one of the finest amateur stations in the world, has offered a plaque to the Traffic Department to be awarded to the amateur operator who handles the greatest number of boni-fide messages for three consecutive months. This beautiful trophy will be engraved suitably to cover the name of the winner and the number of messages handled, etc. Nothing like it has ever been done for the traffic man before—so hop to it, gang, with all speed. The plaque is valued at a figure between \$150.00 and \$200.00.

We don't like to set down any hard and fast rules, but rules are necessary in any contest and here they are:

1. Any A.R.R.L. Member, holding an amateur operator's license and operating an amateur station, is eligible. The official starting date of keeping count of your messages is the beginning of the March operating month in your division. If you don't know what date that is, write to your Division Manager.

2. This Traffic Department Trophy will be awarded to an individual operator and not to a station. Where stations are operated jointly by several operators, credit will be given each operator for his individual work. In cases of this kind an affidavit must be furnished that the messages were handled only by such an individual. This is a contest of operating skill and not station equipment.

3. The prize will be awarded to the operator who leads all other operators in the number of boni-fide messages handled for three consecutive months. He must be high man each month for three straight months. QST will announce the leader each month. Message reports are to be sent through the regular channels of the Traffic Department. Upon request of the Division Manager or his duly appointed assistant, copies of all messages are to be sent in for verification. Therefore, be sure to keep copies of every message you handle and have them ready to send in. This is important!

4. Messages of the "rubber stamp" variety will not be counted. These are messages which may have the same text and which are sent to more than one addressee. None of this "UR-CRD-RECD-WL-QSL-LTR" will get by, so don't try to toss in any "ringers." Messages handled for the purpose of inflating the real total will be thrown out.

5. All messages are to be handled in accordance with standard A.R.R.L. practice with respect to prefix, number and date. Abbreviations in the texts of messages will

not be permitted—use plain English and spell each word out fully. Messages held for relay longer than 48 hours will not be counted. Messages of the B.C.L. applause or request variety will be permitted.

That's about all there is to say and that is necessary only because we want to remind you about the correct ways of handling messages. You all know what is wanted, so watch out for riff-raff messages and don't let them slide through and then expect "Mr. Goodfellow" to make the award for inconsistency. See that your messages are of high class and leave no room for doubt on that score. So far, so good, BUT—

How and where are we going to get good messages in large numbers? No, we must not "manufacture" them, they must be good messages. Here is a suggestion! The B.C.L. sends wires and letters to his favorite broadcasting stations every night. These messages are not terribly important, but we could handle them and why don't we get after them? We could get enough each night to keep every station busy for several hours. FB, eh!

Up to this point everything looks FB, but how do we let the B.C.L. know that we want to get going on his traffic? Easy! Just go to the radio editor of your newspaper and ask him to print something like the following for you or get your nearest broadcasting station to make the announcement.

Dear Mr. & Mrs. B.C.L. & Family:

Amateur radio station 9XYZ, located at 7585 Wavelength Avenue, telephone Broad 200, invites you to make use of the facilities of the station to send applause messages to your favorite broadcasting stations free of charge. Of course, we cannot guarantee delivery of every message right away, in fact some of them will be lost, but we'll get some of them through and we'll do our best for you. Why not applaud your favorites with a radiogram?

Sincerely yours,

(Sign your name)

How does that idea strike you, OM? Anything wrong with it? Let's have your reactions. It has all kinds of possibilities. It makes for better co-operation between the amateur and the B.C.L., it brings the name of the A.R.R.L. before the public because the announcer will say something like this: when he receives a radiogram, "A radiogram from so and so has been delivered by 9XYZ of the American Radio Relay League," etc. See the connection?

But aside from all that it affords you one way of getting messages of sufficient worth to enable you to roll up a big score each month in competition for the Traffic Department Trophy.

It won't be long before you will notice how conspicuous CQ is by its absence, also the "rubber stamp" QRK-QSA-VY will disappear because no real traffic handler will have time to waste on this sort of thing, at least if he is going after the title of King of Traffic Handlers, and the prize that goes with it.

—F. H. S.