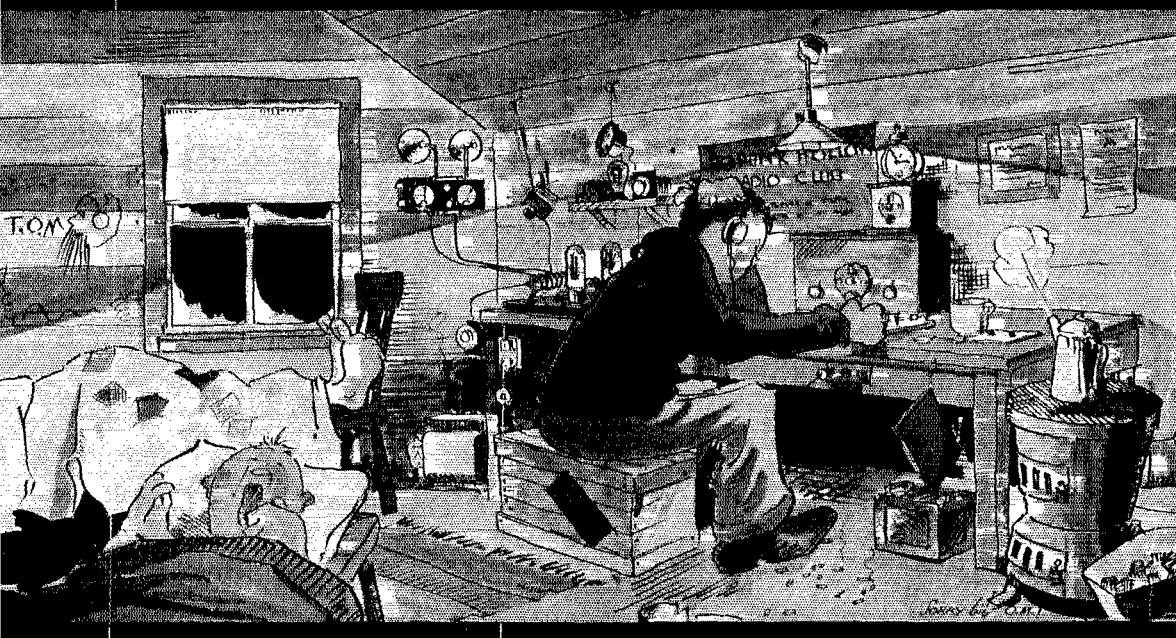


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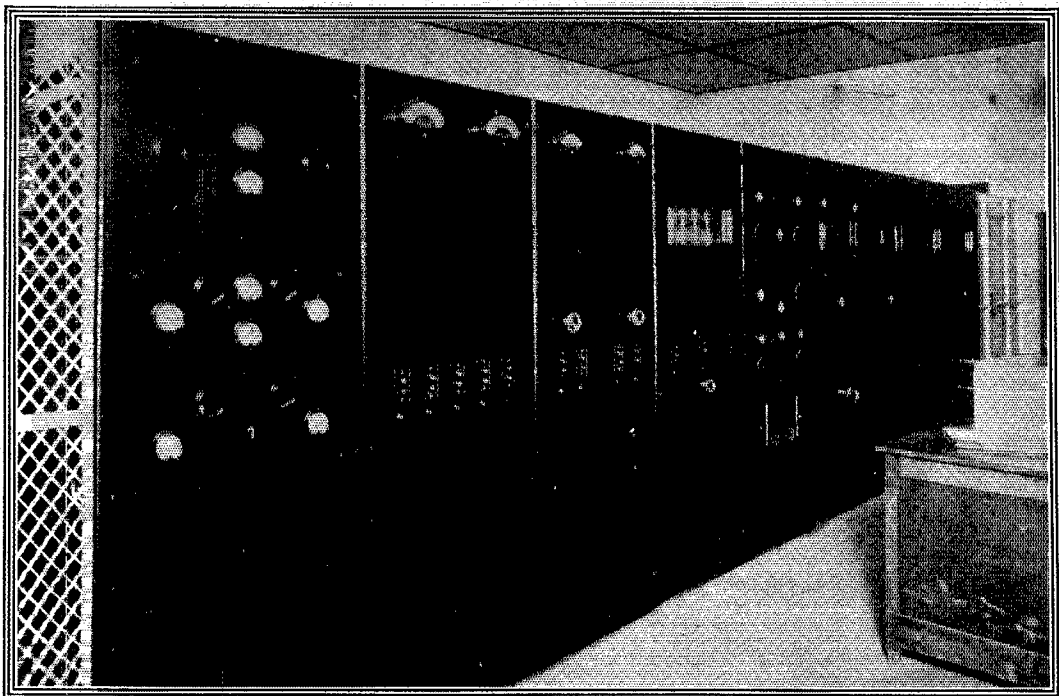
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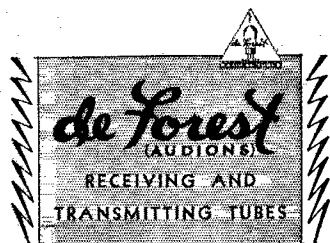
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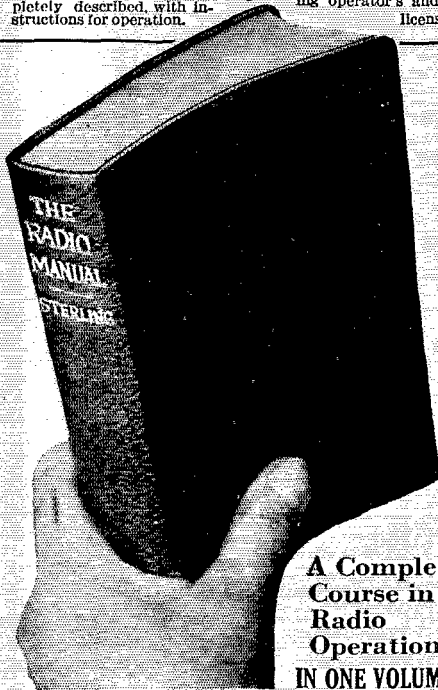
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MARCH 1931

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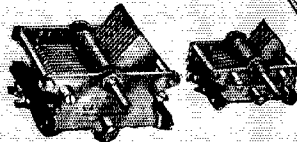
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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• EDITORIAL •

WITH about two dozen American manufacturers now authorized to build superheterodyne receivers for broadcast reception, a new complexity rears its ugly head above the radio horizon.

We're willing to admit that a properly designed and properly constructed superheterodyne is probably the finest possible receiver for broadcast reception. Trouble looms, however, with the opening of this heretofore exclusive manufacturing field to a large competitive manufacturing field, where there are great temptations to skimp a little to be able to sell a little cheaper and so corral more of the public's dollars. A good superheterodyne is difficult to construct and it will never be a cheap set. False economies in engineering and production costs, and in some cases apparently inadequate design skill, threaten to create much grief for manufacturers, dealers, ultimate consumers — and, unfortunately, for such users of the high-frequency spectrum as radio amateurs.

It is possible to construct thoroughly satisfactory superheterodynes. We believe that many of the existing and contemplated models are quite satisfactory. But the mere use of the superheterodyne circuit is no guarantee of perfection or even of reasonable satisfaction. Even if it is quite excellent as a superheterodyne, it may turn out to be the world's worst receiver if certain fundamental precautions are neglected. It is these precautions which, in our observation, are being overlooked or inadequately treated in some of the models already on the market and, according to report, in some of those yet to be launched. The design defects which we have in mind relate to the input selectivity and to the shielding. Always the weaknesses of the "super," these factors are the more aggravated with modern tubes with their greater sensitivity in reception and their greater power as oscillators.

Good design requires the presence of a high degree of selectivity between the antenna and the first detector and oscillator, and thorough shielding, particularly of the oscillator and first detector — coils, condensers, tubes and wiring. If these steps are not taken, the first thing that happens is that the receiver radiates, "blooming" all over the broadcast band and spoiling reception. In recent years there hasn't been much of this but there is danger now of its returning in vicious quantity. That is more the B. C. L.'s hard luck than the amateur's, however. But any such receiver is also open to a much more formidable source of grief — interference from high-frequency signals which get into the first detector or oscillator and there beat against a harmonic of the oscillator to form a signal which is amplified in exactly the same manner as is a desired signal. This interference can come from perfectly-adjusted high-frequency stations complying with every requirement of extensive regulations. It may be from high-powered commercial stations, from high-frequency broadcasting stations or from any other of the myriad of high-frequency users. In most cases, of course, it will come from an amateur station, because of the proximity of our stations to listeners' receivers. *And it won't be the fault of the amateur transmitters.*

One can't legislate against offering defective receivers for sale. The remedy lies in education. Manufacturers will save themselves much trouble and money if they perfect their models in the respects named. A simple laboratory test against a high-frequency oscillator will quickly show whether it is satisfactory or not. Dealers would be extremely well advised to make sure that the "supers" they stock are free of these defects, or they are in for a mighty interesting but hard time of it. Purchasers of new broadcast receivers should

realize that the bare word superheterodyne doesn't guarantee a thing. To protect themselves they should assure themselves that the super they buy does have thorough shielding and adequate input selectivity and is guaranteed against interference from legally operating high-frequency stations.

As to us amateurs and the unavoidable interference we may produce on such receivers through no fault of our own, we point out that government regulations give broadcast reception the protection of quiet hours only when the amateur station "causes general interference . . . on receiving apparatus of modern design." There's nothing modern about the superheterodyne principle itself; it antedates broadcasting. It is not entitled to the protection of the word "modern" unless modern knowledge is applied to its adaptation to modern-day requirements.

Like everything else that is manufactured, some firms will do a successful job of this, some will not. It would be unfortunate if any prospective purchaser of a superheterodyne were thwarted in that intent by these remarks of ours. We repeat that a well designed and well constructed superheterodyne should be very satisfactory. But be cautious, look them over first, and if you can't check up on these design features yourself, make the dealer guarantee your set against high-frequency interference.

This country has no place for a bunch of bum superheterodynes — except the nearest river.

K. B. W.

Those Jap Stations

THERE seems to be some misunderstanding surrounding the situation created by the existing operation of six Japanese non-amateur stations in our 7-mc. band. Perhaps a word is in order.

When these stations were first reported interfering with amateur work, the League went to bat to accumulate data to get them removed, and as part of that program asked the assistance of members in certain sections to log them, etc. Some of our members, instead of assisting, have inquired if it would not have been better and more effective, and the correct thing to do, to have protested when the Japanese government first "registered" on those frequencies at the Berne Bureau.

Unfortunately it isn't as simple as that. If that would have sufficed, of course the League would have done it. But mere registration is not a basis for protest. Paragraph 1 of Article 5 of the General Regulations annexed to the Washington Convention provides that any government may assign any frequency to any station on the sole condition that it causes no interference with any service of another country. Legally, then, the Japs have the right to attempt it, even though it is a foregone conclusion that interference to us will result. It is necessary for any service thus infringed upon to wait until the operation commences and the interference ensues; then it may demand relief. This, it may be said, is the attitude of our own Department of State. The program of the League, then, is to collect data which will show that the operation of these stations is caus-

ing interference to amateur communication, in violation of the treaty. As soon as these data are gathered, a protest can be made which should prove effective.

The same thing, of course, applies to any other "registration" on an amateur frequency.

—K. B. W.

A New Section Created in the Southeastern Division

AS provided in the Constitution and By-Laws of the A.R.R.L., the operating territory of the League is apportioned into Sections for the purposes of administration of the League's field organization. Action may be taken by the Communications Manager acting with the advice and consent of the Division Director concerned in the United States, its territories, and Cuba, and with the advice and consent of the Canadian General Manager in Newfoundland, Labrador, and the Dominion of Canada.

Recently twenty-one members in the western Florida territory in the Southeastern Division petitioned for the formation of a new section. Division Director Harry F. Dobbs gave the matter his full consideration and after considerable correspondence with the members concerned, he recommended the matter to Headquarters for the action requested.

This notice announces the creation of a *West Florida Section* of the Southeastern Division to include all counties in Florida west of the Suwanee

(Continued on page 24)

A Medium-Powered Oscillator-Amplifier Transmitter

Suggesting, in the Interests of More Nearly Perfect Performance, Air-Blast Oscillator Cooling and Transformer Coupling of Oscillator to Amplifier

By Ross A. Hull, Associate Editor

THIS is the story of a transmitter which failed at first to behave as its designer thought it would. The idea had been to build up a compact transmitter for our own use; one which would have a high degree of frequency stability, a particular freedom from frequency drift, clean keying, and ease of adjustment to a variety of frequencies within any of the bands. Obviously, an oscillator-amplifier was indicated. In deciding on the tubes to be used, we saw that we could have had one or two Type '10 amplifiers excited from a single Type '10 oscillator. Alternatively, we could have excited a Type '03-A from the same oscillator and gloried in the 50 watts output made available. But the most attractive scheme, as we considered it, was to feed one of the 75-watt screen-grid tubes from a Type '10, so obtaining a reasonably high output without the necessity for neutralizing adjustment.

The transmitter as first planned and built, as we have already suggested, proved to be a "flop" — not because of any inherent weakness in the oscillator-amplifier principle but simply because a small High-C oscillator feeding a large amplifier is a combination which appears to require something more than mere attention to the good old rule of thumb design principles. Of course, in speaking of the first performance as a "flop" we use the term relatively. In the self-excited transmitter, much of the frequency drift (as one weakness) is masked by the overall instability; one

does not expect crystal performance and one is gratified by a performance which even approaches that characterized as "crystal-like." With the oscillator-amplifier, however, good dynamic frequency stability and a note of high quality are expected. Under these conditions, any variations from the perfect performance are thrown up in high relief. The failings in our transmitter were made very obvious in just that manner.

We believe that discussion of the imperfections of the original transmitter is justified before telling of the merits of the final set. For the unsatisfactory features of that particular transmitter are really of great importance. In fact, they constitute the original reason this article was written.

THE DRIFT PROBLEM

The one serious handicap suffered by the usual oscillator-amplifier transmitter, where the oscillator is self-controlled, and often when it is crystal-controlled, is that the oscillator is lightly loaded and running continuously — the net result being that tube and circuit heating are greater and the frequency drift resulting from heating is much more serious than in the keyed and

more effectively loaded self-excited transmitter. This point has been only given minor consideration in the past, but its importance was made clearly evident as soon as this oscillator-amplifier transmitter was adjusted and put into operation. The frequency drift or "creep" seemed quite extraordinary. Steps were immediately taken to

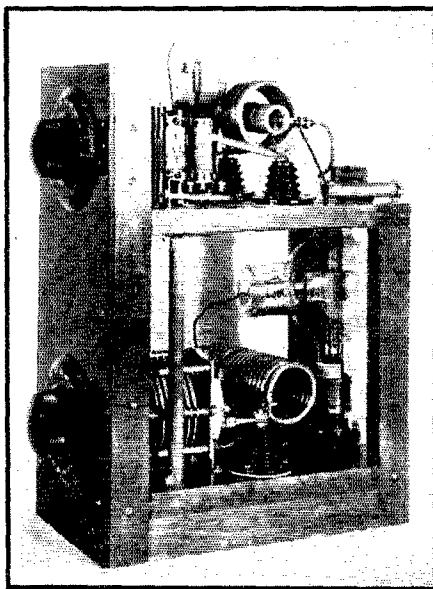


FIG. 1 — A VIEW OF THE OSCILLATOR-AMPLIFIER UNIT DESCRIBED IN THIS ARTICLE

Inductive coupling between the oscillator and amplifier permits the High-C oscillator to excite the amplifier effectively; air-blast cooling reduces the frequency drift to a negligible amount.

measure it. With 300 volts on the oscillator, the frequency drifted 5 kilocycles in 11 minutes. But 300 volts on the oscillator did not permit full excitation of the 75 watt with the usual capacity coupling, even though the excitation clip was at

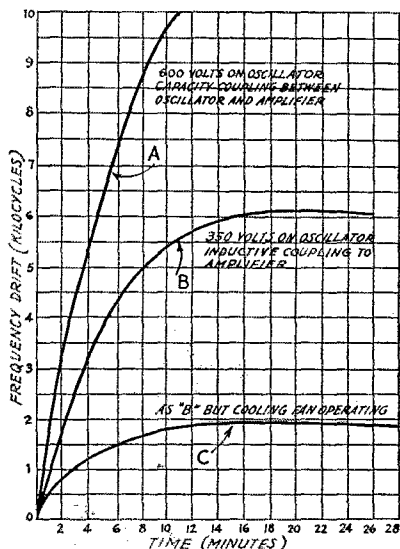


FIG. 2 — FREQUENCY PLOTTED AGAINST TIME TO INDICATE FREQUENCY DRIFT

The run "A" was taken with the transmitter as originally built, with the oscillator plate voltage necessary to excite the amplifier adequately. Curve "B" shows how the drift was reduced to less than half the original figure by operating the oscillator inductively coupled to the amplifier. A much lower plate voltage is then necessary for complete excitation of the amplifier. Curve "C" represents the performance with a household fan cooling the oscillator equipment.

the extreme plate end of the oscillator tank inductance. Raising the oscillator voltage to 600, to provide full excitation for the amplifier, resulted in a "creep" of 7 kc. in less than 6 minutes — a drift which almost sounds as if someone were turning the knob on the tank condenser! Comparison with a second unloaded self-controlled Type '10 oscillator (of open bread-board type) showed that this drift was not greater than normal though it was more rapid, probably because of the compact mechanical arrangement of the apparatus in this set and the resulting poor air circulation around the tube. The curves of Fig. 2 show just what frequency drift can mean in an oscillator-amplifier transmitter. Curve A shows frequency plotted against time with 600 volts on the oscillator. The curve is discontinued before a stable condition is reached but it might be mentioned that on this particular run the total drift was of the order of 20 kc. In both cases the oscillator was running continuously (as it would be in normal operation), and the tube was cold when started. This very unsatisfactory perform-

ance naturally called for reconsideration of the whole design. Here was a case, and obviously a typical one, in which the performance in respect to "long-time" frequency stability was made definitely poorer by the use of an oscillator-amplifier system.

AIDING THE OSCILLATOR

Several possible solutions to the problem presented themselves. In the first place, the voltage available for excitation purposes with the circuit of A in Fig. 4 was evidently too low at reasonable oscillator plate voltages. Sufficient excitation was obtained only at the expense of a high plate dissipation in the oscillator tube, and consequent overheating. A low-C oscillator tank probably would provide the necessary excitation voltage but, because of its harmful effect on the frequency stability of the oscillator, its use was naturally impractical. A partial solution was found in the use of a coupling transformer between the oscillator and the grid circuit of the amplifier, the secondary being untuned but provided with four or five times the number of turns in the primary or oscillator tank inductance. The arrangement proved to be exceedingly effective. With the usual capacity coupling between the oscillator tank and the amplifier grid, an oscillator plate voltage of 600 with an input of 24 watts was required to allow normal output from the 75 watt. With the transformer coupling, the oscillator voltage could be reduced to 350 (input 11 watts) without cutting the amplifier excitation below that required for normal output. This, of course, meant higher overall efficiency in the oscillator and less frequency drift as the result of lower heating. Moreover, it meant the simplification of

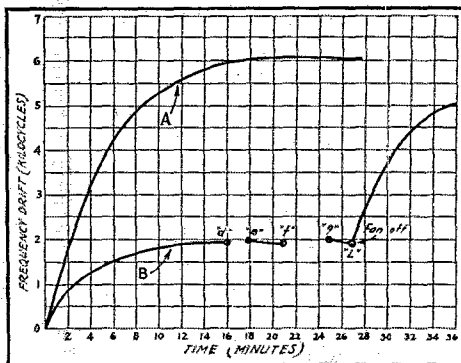


FIG. 3 — FURTHER CURVES PROVIDED AS EVIDENCE OF THE IMPROVEMENT MADE POSSIBLE

Curve A is a duplicate of B in Fig. 2. It is given to allow comparison with B, which shows the performance of the transmitter, with respect to frequency drift, when operated intermittently. Curve B was taken with the transmitter switched on from cold with the cooling fan running. The gaps between "d-c" and "f-g" indicate intervals when the transmitter and fan were switched off with the filaments left running. At the point "L", the cooling fan was switched off, other adjustments and conditions remaining the same.

the oscillator plate supply equipment. The improvement in the drift is made clear from a comparison of the Curves A and B in Fig. 2. But the performance shown at B could not be considered satisfactory although it is probably representative of the majority of small oscillator-amplifier transmitters. A frequency drift of 5 kc. in 8 minutes will not satisfy the critical amateur.

To get down to brass tacks, the most interesting of the possible methods of reducing the drift proved to be air-blast cooling of the oscillator. A first test with an ordinary household fan, propped up near the oscillator tube, brought about a striking improvement. Immediately, the total drift was reduced by more than half — as indicated in Curve C of Fig. 2. We could not fail to become enthused over the idea, even though we could foresee the possibility of “high-brow” folks scorning the device as hopelessly primitive. Dozens of curves were run off; with and without cooling; with the filaments running alone before the plate voltage was applied; with tubes started from cold; and with the apparatus additional to the tube warmed up beforehand. The result was the formulation of an operating procedure — applicable to any oscillator-amplifier transmitter — which, we imagine, can be depended on to eliminate the drift problem as it concerns the amateur operator. The idea is to grab off some small, inexpensive fan from the nearest drug store or electrical supply house, to mount it in the immediate proximity of the oscillator tube (but on a separate support so that its vibration will not be transmitted to the oscillator equipment) and to connect it in parallel with the switch which controls the plate supply to the oscillator. On first putting the transmitter into operation for the evening, the oscillator is either run for 4 or 5 minutes with the fan also running or, if time is limited, run for a minute or so with the fan switched off. In this way the tube and its associated equipment are brought up rapidly to the temperature at which the frequency will be constant. On switching the transmitter off at the end of each transmission, the fan goes off also, but the filaments are left on. In this way the temperature of the oscillator is kept reasonably constant at all times and the signal, as far as the listener is concerned, appears within a couple of hundred cycles after each “change-over.” Checking with the monitor is necessary to determine the correct placement of the fan to produce cooling sufficient to offset the heating which results from the plate dissipation and apparatus heating in normal operation. With the fan too close, the tube will actually be cooler with the plate voltage and fan on than it is with the filament on alone. The idea, of course, is to have the fan just balance out the heating from plate dissipation. The balance is not by any means a critical one. After a few trial runs we found that the fan could be placed so that the change in frequency resulting from

switching the transmitter off for 5 or 10 minutes (fan off but filaments running) was not in excess of 200 cycles. Naturally, the ideal position of the fan will depend on the plate dissipation of the oscillator under the particular set of adjustments used.

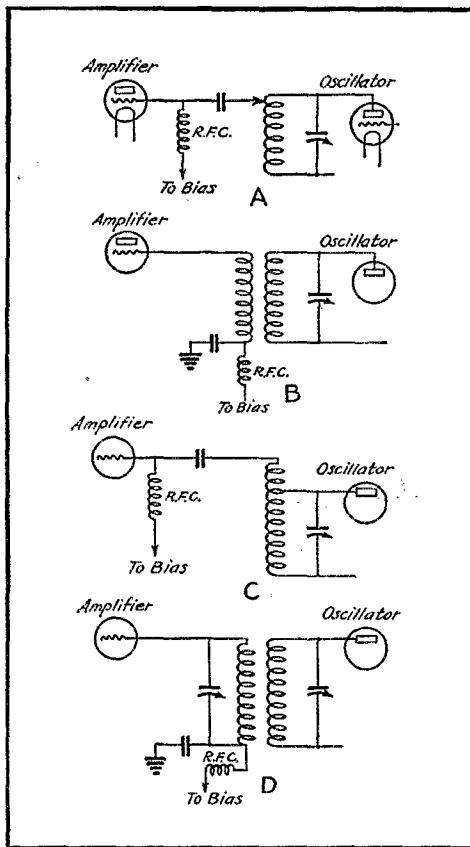


FIG. 4 — FOUR POSSIBLE METHODS OF COUPLING THE OSCILLATOR TO THE AMPLIFIER

The capacity coupled system shown at “A” is that used in most amateur transmitters to date. It is not particularly effective, however, when a small High-C oscillator feeds a large amplifier — as explained in the text. The transformer coupling, with untuned secondary, shown at “B” is the scheme used in our final transmitter. An alternative would be the auto-transformer of “C” or the transformer of “D” with both primary and secondary tuned. In this instance, a low value of C with a correspondingly high inductance would be in order for the grid circuit.

The curves of Fig. 3 provide graphical evidence of the value of this air cooling stunt in case the above written statements should be considered as so much “hooley.” Curve A of this figure is a plotting of the frequency drift of the transmitter started from cold with no artificial cooling but with the inductive coupling from the oscillator. A stable condition is reached 16 minutes from the start, the total drift being 6 kc. Curve B shows

the drift of the same transmitter with the same overall adjustments started from cold but with the fan running. The stable condition is reached in 10 minutes and the total drift is of the order of 1,800 cycles. At the point "d" (the output being tuned to zero-beat with a warmed-up crystal-controlled monitor) the transmitter and fan were switched off. At "e" — 2 minutes later — the transmitter and fan were again switched on, the new frequency being 100 cycles different from the old. After being run for four minutes, simulating a short transmission in ordinary operation, the transmitter and fan were again switched off at "f". After being shut down for four minutes the frequency reappeared at "g", indicating a change of 200 cycles. At the point "h", the fan was shut off with the transmitter undisturbed. Immediately, the frequency sailed off 3 kc. in approximately 8 minutes.

These curves are typical of dozens drawn up during experimental work with this transmitter. The evidence provided by them has convinced us

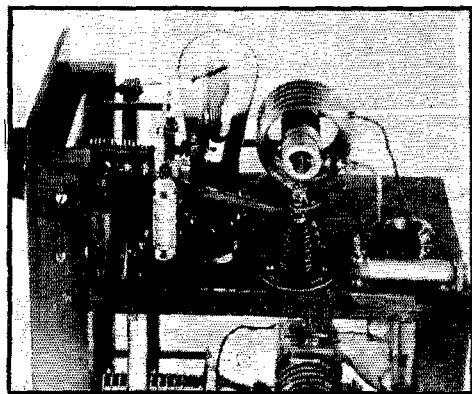


FIG. 6—A CLOSEUP "SHOT" OF THE OSCILLATOR TUBE, ITS TANK, AND THE ASSOCIATED APPARATUS

that the use of a cooling fan is unquestionably effective in reducing drift in the amateur oscillator-amplifier transmitter. Its use, in our own personal opinion, is almost essential to any transmitter in which a small High- C oscillator must feed a large amplifier. In cases where the oscillator feeds an amplifier tube of similar type, or

where the amateur is not concerned about a drift of a half dozen kc. during each transmission, the cooling is obviously unnecessary.

LAY-OUT DETAILS

In case the construction of a similar trans-

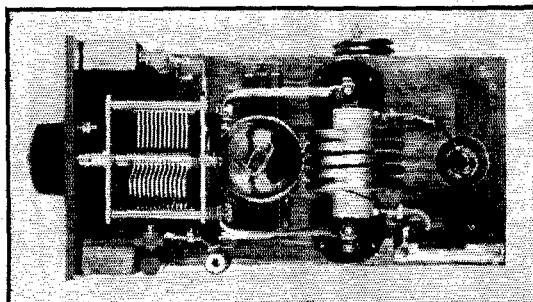


FIG. 5—A PLAN VIEW OF THE OSCILLATOR APPARATUS

Examined in conjunction with the text, this illustration gives a suggestion for one possible arrangement of the components. Rigid assembly and vibrationless wiring are absolute necessities in this portion of the transmitter if a stable output frequency is to be obtained.

mitter should be considered by anyone, we will give a brief description. Fig. 7 shows the complete wiring of the transmitter unit. The oscillator is the now conventional "T.N.T." or tuned-grid (fixed) tuned-plate circuit. The amplifier unit is wired in quite the normal fashion with series feed to the plate and screen-grid voltage obtained from the plate supply of the oscillator. The only unusual feature is the untuned sec-

ondary coil L_2 feeding the amplifier. This will be discussed in greater detail as we progress to the constructional features.

The transmitter unit is assembled on a small wooden frame, the dimensions of which are shown in Fig. 9. This frame is designed to permit something approaching the greatest degree of compactness, yet allowing the oscillator and the grid circuit of the amplifier to be effectively isolated from the amplifier plate circuit equipment. This is accomplished by putting the oscillator on the top shelf, the shelf itself being covered on the underside with thin sheet copper. The grid end of the 75 watter, being at the top, projects through a hole in this copper shield and the grid lead therefore emerges on the top of the shelf in a position where connection to the oscillator is convenient. In Fig. 5 the details of the oscillator arrangement are made clear. The tank tuning condenser is mounted on four small brass angles attached to the shelf board. Immediately behind it is the Type 10 tube and behind the tube is the tank inductance mounted on two G.R. stand-off insulators. Heavy copper tubing leads, with the ends flattened and drilled, are used to connect the terminals of these insulators with the terminals of the tank condenser. At the left side of the oscillator tube base are three fixed condensers — the two filament by-pass condensers C_7 and the plate circuit by-pass C_5 . To the right of the tank condenser is grid condenser C_6 and the leak R_1 while the grid coil L_2 can be seen alongside the right-hand upright of the wooden frame. It is wound on a length of hard rubber rod, fitted with two G.R. pins and plugged into two G.R. sockets

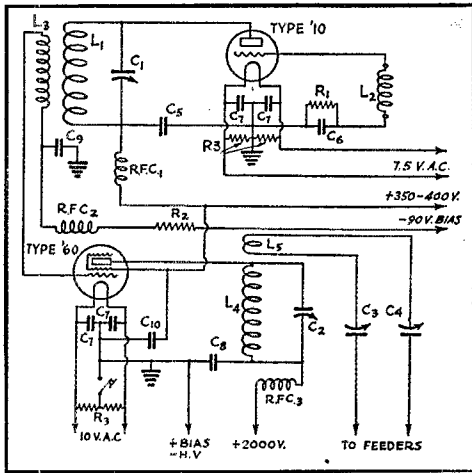


FIG. 7—THE COMPLETE CIRCUIT OF THE OSCILLATOR-AMPLIFIER UNIT

The apparatus utilized in the particular transmitter described includes:

- C_1 —500- μ fd. National Type EM500 variable condenser
- C_2 —250 μ fd. National Type TM230 variable condenser
- C_3, C_4 —250- μ fd. feeder tuning condensers (not fitted on the transmitter assembly)
- C_5 —.002- μ fd. Aerovox fixed condenser, receiver type
- C_6 —250- μ fd. fixed condenser, same type
- C_7 —.001- μ fd. fixed condensers, same type
- C_8 —.002- μ fd. Aerovox fixed condenser, 5000-volt type
- C_9 —.002- μ fd. fixed condenser, receiver type
- C_{10} —.01- μ fd. Aerovox fixed condenser, 2500-volt type
- R_1 —50,000-ohm Electrad fixed resistor Type B500 (25 watt)
- R_2 —25,000-ohm Electrad fixed resistor (75 watt)
- R_3 —100-ohm center-tapped resistors
- L_1 —5 turns of $\frac{1}{4}$ inch copper tubing, 2 inches inside diameter
- L_2 —50 turns of No. 30 d.s.c. on $\frac{1}{2}$ -inch hard rubber rod
- L_3 —25 turns of 22 gauge d.c.c. wire on 1-inch Victron or Bakelite tube
- L_4 —11 turns of 3, 16-inch copper tubing, $1\frac{3}{4}$ inch inside diameter
- L_5 —8 turns same tubing, same diameter

These coils are for operation on the 7000-ke. band. The dimension of coils for other bands can be determined by reference to previous QST descriptions or experimentally. The only possible difficulty will be with L_3 . A lower turn ratio between L_1 and L_3 probably will be desirable for the lower frequencies; a higher ratio for the higher frequencies.

The radio frequency chokes are of 300 turns of 34 gauge d.s.c. wire wound on $\frac{1}{2}$ inch wooden formers. The winding was done with the formers mounted in the chuck of a twist drill.

mounted on a small strip of bakelite. On the left upright of the frame is mounted the plate choke RFC1. The grid end of the amplifier is to be seen through the hole in the shield near the rear edge of the shelf. On its right are the by-pass condenser C_9 and the RFC2 of the amplifier grid circuit. These lay-out details can be followed again in Fig. 6. The untuned grid circuit feeding the amplifier is wound on a piece of "Victron-B" or bakelite tubing held in place by two machine screws, the heads of which are soldered to the projections on the ends of the tank inductance. G.R. pins are also mounted on this secondary former and contact is made to them with G.R.

sockets attached to the grid lead of the amplifier tube and a lead from one terminal of C_9 . The details of this coil, as used on the 7000-ke. band, are given under the circuit diagram of the transmitter. For other bands, the turn ratio between the oscillator tank and this secondary probably will have to be varied in order to get optimum excitation with a given oscillator plate voltage. In general, the secondary will have less turns for the lower frequencies and more turns for the higher frequencies. Fortunately, experimental determination of the right coil size is a very simple process.

The amplifier is arranged on the bottom shelf. A clear idea of the lay-out can be obtained from Figs. 1 and 12. The tube socket is mounted near the rear edge of the base in such a manner that the plate end of the tube projects forward. Between the tube and the tank condenser—the latter being on the front edge of the base—is the amplifier plate tank. It is supported, as in the case of the oscillator, on two G.R. stand-off insulators. In Fig. 9 the arrangement of the antenna coil can be seen. It is supported between one insulator on the base and a second one screwed to the side of the frame. Though the antenna coupling is not really critical (as it is on the self-controlled transmitter) provision for a variation of coupling may be made by soldering an extension strip to one of the coil lugs and hacksawing a slot along its length. Some rearrangement of the insulators may be necessary, however. In our own case, the approximate output coil

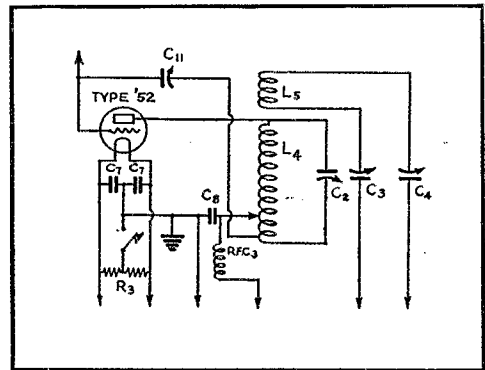


FIG. 8—WITH A TYPE '52 IN PLACE OF THE TYPE '60 AMPLIFIER, NEUTRALIZING IS ESSENTIAL

The apparatus all coincides with that described in Fig. 6 with the exception of C_{11} , a "23 plate" midjet condenser with half the plates removed and the remainder double spaced. The tapping from C_3 to the tank of the amplifier will usually be about a fifth of the tank coil from the low potential end.

size necessary to give an optimum value of coupling was first determined experimentally and the final coil was then built to suit. The condensers C_7, C_8 and C_{10} together with RFC3 were all mounted on the underside of the base-board. The

placement of the choke is alone important. It should be preferably at the end of the base farthest from the tank coil and mounted at right angles to the axis of that inductance.

Having a particular distaste for rows of binding-posts on a transmitter, we used an ordinary heavy receiver type battery cable for most of the supply leads. Two of the leads in parallel were used for each of the filament conductors to the amplifier tube, other single leads being used for filament and plate supply to the oscillator, bias supply to the amplifier, and ground. The high-voltage lead for the amplifier, and the keying leads, were brought out separately. The supply leads to the oscillator, after running under the base, reach the top shelf through two conduits made of brass tubing. These tubes were fitted for the sake of appearance more than anything else, though they form a convenient junction between the shield under the upper shelf and the ground connections in the amplifier wiring. A 3/16-inch bakelite panel and a couple of National Velvet Vernier dials constitute the *façade* of the transmitter.

There are no rules and regulations governing the type of plate supply equipment suitable for a

transmitter like this. A supply of between 300 and 400 volts will be necessary for the oscillator and the normal current will be of the order of 30 ma. The supply we used consisted of a transformer

delivering 300 volts on each side of the center-tap; a Type '80 rectifier tube; and a light duty filter choke with 4 μ fds. of filter capacity across each side of it. As previously mentioned, this supply also serves the screen-grid of the amplifier. The amplifier plate supply consisted of a transformer rated at 2,000 volts on each side of the center tap; a pair of Type '66 rectifier tubes; and a 30-henry 100-ma. filter choke with 2- μ fd. filter condensers on each side of it. A 90-volt "B" battery was used for bias supply. This voltage, added to the voltage developed across the 25,000-ohm resistor R_2 , appeared to give sufficient bias for efficient operation.

There is little need to go into detail concerning the process of tuning in view of the existence of George Grammer's comprehensive article on the oscillator-amplifier in February *QST*. The first procedure is to disconnect the amplifier plate supply and to tune the

oscillator to the desired frequency with a monitor or frequency meter. Then, with the feeder of antenna condensers set at zero, the amplifier plate voltage is applied and the amplifier plate tank condenser adjusted until the plate current of this tube is at minimum. Next, the antenna is tuned until the plate current rises to a maximum. The tuning of the feeder circuit will upset the amplifier tank tuning slightly, and readjustment will be necessary. But the reaction of the amplifier tuning on that of the oscillator will normally be only a matter of a few hundred cycles. A monitor, of course, is very desirable as an aid to the frequency setting and adjustment in general.

When the output appears to be normal, and when the note has been checked in the monitor, it will probably be found that the frequency drifts somewhat in the manner described at the start of this article. It is at this stage that the fan should be installed. To avoid the transmission of vibration to the transmitter itself, the fan should never be mounted on the same table or bench which supports the transmitter; that is, unless the bench is unusually solid. It always will be possible, however, to fit a small shelf in the immediate proximity of the oscillator, either mounted on the wall or suspended from the ceiling. In order to

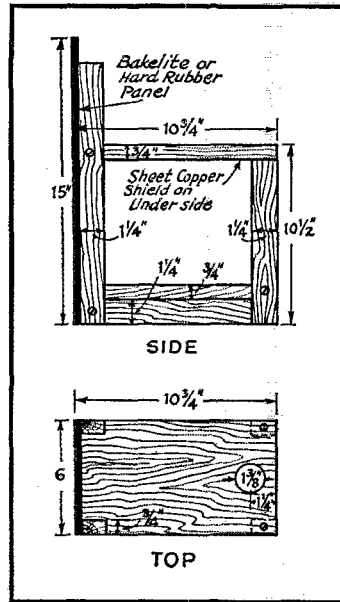


FIG. 9 — THE CONSTRUCTION AND DIMENSIONS OF THE TRANSMITTER FRAME

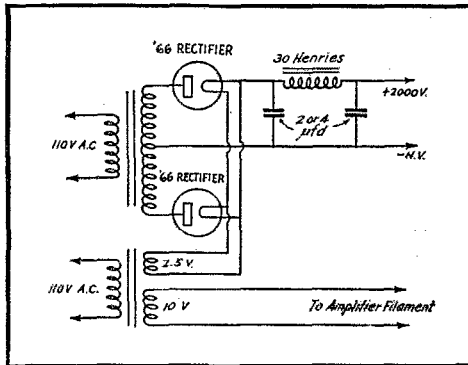


FIG. 10 — ONE POSSIBLE PLATE AND FILAMENT SUPPLY SYSTEM FOR THE AMPLIFIER

The high-voltage transformer may be of any type capable of delivering 2000 volts at 100 ma. with good regulation. Thirty henries is specified for the filter choke but any inductance of that order is suitable.

Filter condensers should have a rating of 2500 v.d.c. unless a "bleeder" resistance is used across the output. In this case, a rating of 2000 volts d.c. possibly would be safe.

find the correct location of the fan, the transmitter should be run, with the fan about a foot away, for 10 minutes or so. The monitor, at the same time, should be adjusted so that the beat note frequency increases as the drift occurs. Then, with a beat note somewhere in the middle of the audio range, the plate supply and fan should be switched off for a minute or so and then

intermittently or continuously for hours at a time without a frequency-drift or a creep of more than a few hundred cycles. And last, but not by any means least, the frequency of the output can be adjusted to any place in the band in about two jerks of a dog's tail.

Strays

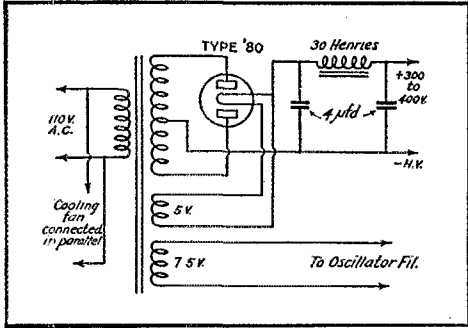


FIG. 11 — THE SIMPLE EQUIPMENT NECESSARY FOR PLATE AND FILAMENT SUPPLY TO THE OSCILLATOR

Apparatus of this type has been described frequently in recent issues of QST. A filament winding on the high-voltage transformer is permissible in this instance since the high-voltage is not keyed.

on again. If the monitor beat note has hopped to a higher frequency it is evident that the fan is too close; while if the frequency of the beat has hopped down in frequency it is an indication that the fan is not close enough. Three or four trial runs will indicate the position of the fan which will permit its blast to compensate for the heating of the oscillator during operation. The same layout and general arrangement is also, of course, suitable for the operation of a Type '52 tube in place of the screen-grid type. The necessary circuit changes are shown in Fig. 8. A convenient location for the neutralizing condenser is on the underside of the upper shelf immediately below the oscillator tank inductance. A hard rubber extension shaft could serve to provide a control on the front panel.

Providing the transmitter is operated in accordance with these suggestions, it can constitute a darned fine outfit. The output is adequate for real DX; the note is as pure a d.c. as anyone could wish; the frequency is practically free from the influence of swinging feeders or antenna; the keying is absolutely clean, and the rig can be operated

'Phone enthusiasts will be interested in a little booklet, "The Care and Use of Microphones," obtainable at ten cents per copy from the Universal Microphone Co., 1163 Hyde Park Boulevard, Inglewood, Calif. The title indicates quite clearly the nature of the contents. A list of "Don'ts" is included which should be taken to heart by the amateur who has any respect for his "mike."

The Department of the Interior, Dominion of Canada, has prepared a series of four maps of automobile roads in Canada which may solve the problem of getting good Canadian maps. Although primarily for automobile use, amateurs who have use for such maps will find them very convenient, since practically all towns are shown. The scale is 30 miles to the inch. The maps may be obtained free of charge by addressing the Director, Natural Resources Intelligence Service, Department of the Interior, Ottawa, Canada.

W6ABK recently took a portable set to a ranch in the Mohave Desert, and on setting it up discovered the key had been left behind. Nothing daunted; one was constructed out of the following "parts":

- 1 nail file
- 1 end wrench
- 3 medium-sized rocks
- 1 block of wood
- ½ deck of playing cards
- 1 small piece of tape

Figure out the combination for yourself. W6ABK says it worked!

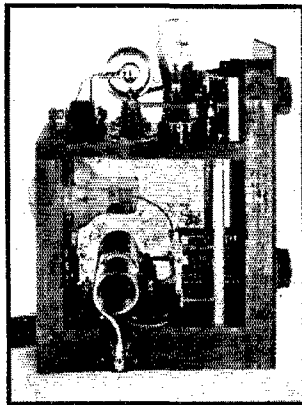


FIG. 12 — AND NOW THE SIDE VIEW

Further details of the lay-out, the mounting of the antenna coil and the arrangement of the conduits leading to the oscillator shelf are visible in this picture.

The problem of satisfactorily shielding the ignition systems of airplane engines to prevent interference with radio reception is an extremely important one. The Bureau of Standards has been working on it in cooperation with several commercial companies, and the results of this work are contained in Research Paper No. 158, "Engine-Ignition Shielding for Radio Reception in Aircraft." Copies may be obtained from the Superintendent of Documents, Washington, D. C., for 15 cents each.

Making the Family Antenna Do Double Duty

By P. H. Quinby, W9DXY *

An old bromide says "Necessity is the mother of invention." Sometimes I think it's laziness instead. Gillette couldn't strop a razor, so he invented the safety. Ford disliked walking, hence the automobile. Bell hated to write letters, so he made a telephone. And who invented this wireless thing anyway? He must have gotten sea-sick crossing the drink. Yours truly dislikes climbing up and down stairs, hence the following.

The OM has a little ham set tucked away in the basement and remote controls it from the dining room on long winter evenings. The OW will not admit of being a radio-fan, but likes to listen to a few good broadcast programs during these same winter evenings when the OM gets unsociable and puts on a pair of cans.

It so happened that the family antenna was a single-wire affair running from points west to a

brought necessity into the picture. It was necessary to put up another antenna. But memories of barked shins, dilapidated apparel and azure atmosphere turned me shuddering from the thought. The one antenna simply had to do for both sets. And it did.

The broadcast receiver was a Kolster K-24 (a conventional nine-tube neutrodyne circuit) with built-in power speaker. The transmitter was an ordinary High-C Hartley circuit, with a fairly decent d.c. plate supply. The keying relay was in the center-tap, flanked on each side with a small iron-core choke, and shunted with a condenser in series with an adjustable resistance as shown in the diagram. The antenna was voltage fed off the end, and coupled to the plate side of the inductance through a very small capacity. A two plate midget condenser is used here with the plates meshed not more than $\frac{1}{4}$ inch. The broadcast receiver was then coupled onto the antenna through an r.f. choke.

The transmitter being on the 3500-kc. band, all three r.f. chokes (L_2) are 3500-kc. chokes as described in Fig. 1. A neon tube passed across the windings will test their efficiency. If correct, this choke in the lead to the receiver will reject the 3500-kc. transmission but will pass incoming broadcast signals on to the receiver. In rejecting the 3500-kc. transmission, it will not absorb any power output from the transmitter or by-pass it to ground through the receiver.

Many filament transformers have a very low-impedance secondary winding. It is therefore advisable to have an iron-core choke on each side of the key. This will prevent the surge from backing up either way, and the chokes need not be large enough to materially lower the plate current.

The shunt resistance on the key is a 400-ohm potentiometer using the switch-arm and one end, leaving the other end free. In final adjustment, the broadcast receiver is turned on full force and tuned to some frequency where no broadcast is being heard. The key is then worked and resistance R_2 adjusted until the key clicks cannot be heard in the broadcast receiver. This will ordinarily be in the middle third of the potentiometer. When this point is reached your job is finished. Your neighbors — and the OW in the next room — will then live happily ever after.

If your key clicks are cured, but you still get a hum in the receiver, look to your plate supply, it's probably not d.c. If you get a d.c. squeal, your BC receiver is oscillating. That is no fault of the transmitter. Don't say it can't be done. Come on over and see one in operation at W9DXY.

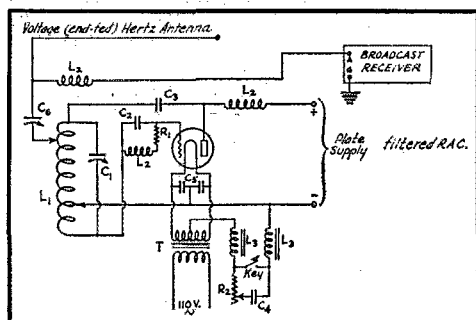


FIG. 1 — THE TRANSMITTER AND BROADCAST RECEIVER ARE OPERATED ON THE SAME ANTENNA SIMULTANEOUSLY

- L_1 — 3800-kc. tank inductance
- L_2 — 3500-kc. r.f. chokes. Each 60 turns on 3-inch diameter form
- L_3 — 1.5-henry chokes
- C_1 — Tank tuning condenser
- C_2 — 250- μ fd. air-dielectric grid condenser
- C_3 — 250b- μ fd. air-dielectric plate blocking condenser
- C_4 — 1- μ fd. high-voltage filter condenser
- C_5 — .006- μ fd. fixed filament by-pass condensers (mica)
- C_6 — 2-plate midget antenna coupling condenser
- R_1 — Grid leak, 10,000 ohms or so
- R_2 — 400-ohm potentiometer
- T — Filament transformer
- X — Key or keying relay

single-pole double-throw switch in the basement, where it could be switched at will to either the transmitter or broadcast receiver. However, it took more than the will to switch it over — it took a lot of climbing up and down the stairs. That's where the laziness comes in.

Then, as stated previously, the OW wanted to listen in while the OM was transmitting. That

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The Old Timer Investigates Push-Pull

A Story With Some Practical Dope

By Eugene A. Hubbell, W9ERU*

TUMP-tump-tump-tump, tump-tump."

Lee looked up from his *QST* and called out, "Hi, yourself; come on in."

The door swung open and Ed. stumbled over the doorstep, his hands, arms and pockets filled with radio parts. "It's a wonder you wouldn't put your shack down in the coal-cellar, it is dark enough outside to cut panels out of. Here, take some of this junk."

Lee laughed and helped Ed. with the parts. "What's the matter, Old Timer, have you got a grouch on this evening? Didn't you like my taking that VK away from you this morning? Cheer up, I won't be on tomorrow."

"No, I don't care about that. What I want to know is just what in heck you are using here now. You darned near cover half the band over at my place, ever since last week-end. For the love of Pete, what are you using here now, one-kw. water-cooled?"

"I'm sorry to cause you any QRM, OM, but I got hold of another good fifty watter last week-end and am sure tickling the ether now. Built up a push-pull tuned-plate tuned-grid, with a resonant choke instead of a tuned grid circuit, and she do perk!" Lee dug up a *QST* from under his log. "Look here, this is the circuit."

Ed. looked it over for a minute, turned to the front cover, and exclaimed, "Why, this is that two Type '45 push-pull set in November *QST*. I didn't know you could use it for high power. Say, Lee, I wish you would give me the dope on push-pull like you did on other stuff a while back.¹ I want more output from my set, and I have a few bucks laid aside for new material. Suppose you give me the low-down on this push-pull stuff everyone is raving about. I don't see anything more than two tubes in parallel."

REDUCING EFFECTIVE TUBE CAPACITY

"Oh, you've missed the whole point of it. Well, I suppose the dope started while you were way off on that construction job, and not reading much of anything. Here is the dope that seems to have started the whole business: An article in *QST*, December, 1928, issue on 'Push-Pull Transmitters'. I won't read it all to you, but the idea is to cut down internal tube capacities by putting them in series instead of in parallel. Here's the diagram of a regular tuned-grid tuned-plate, and

you can see the tube capacities in parallel with the tank capacities. Well, the tube capacities must carry their relative share of the tank current, which is hard on the tube and decreases the effective tank capacity."

"Whoa, Nellie, you're running away from me. Stop imitating Floyd Gibbons and let's have the

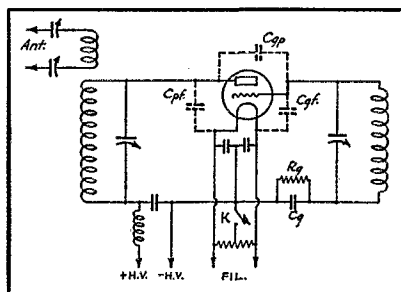


FIG. 1 — "... A REGULAR TUNED-GRID TUNED-PLATE, AND YOU CAN SEE THE TUBE CAPACITIES IN PARALLEL WITH THE TANK CAPACITIES"

explanation about ten per. Maybe sending double would help." Ed. studied the diagram for a moment while Lee made some notes.

"All right, here goes. First, a tube has inter-element capacities; that is, plate filament, plate grid, and grid-filament. Get that?"

"Sure. Proceed!"

"Second, these capacities are in parallel with certain tank capacities. In Fig. 1, plate-filament capacity, or C_{pf} , is in parallel with the plate tank tuning condenser. Likewise, C_{gf} , the grid-filament capacity, is in parallel with the grid tank tuning condenser. In Fig. 2, the Hartley, C_{pf} is in parallel with the whole coil, C_{pf} with the part between plate end and filament tap on the coil, and C_{gf} with the part between grid end and filament tap on the coil. Get me OK?"

"Oh, sure, but what difference does that make, so long as we have a good Hi-C tank? You told me this before in a little different way."

"Well, when we have tube capacities in parallel with the tank circuit like this, they must carry their relative share of the tank current — meaning that the elements must carry a goodly share of r.f.; and the larger the tube capacity, the less the condenser capacity in the tank circuit. Why, when we get up to 14 mc. we have a great deal of the current traveling through the tube, heating

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¹ An Old Timer Gets Back In The Game, *QST*, Nov., 1930.

the elements, causing expansion, and causing erratic action because of the large amounts of radio frequency current traveling where it doesn't belong. Well, Lamb, in his article, gives for example a Type '03-A in a Hi-C' circuit. In this set the tube capacity amounts to some three

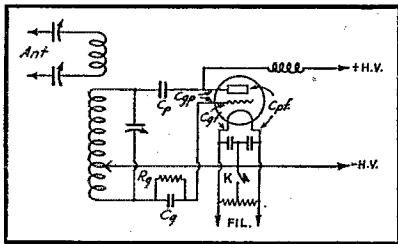


FIG. 2 — "IN THE HARTLEY, C_{pg} IS IN PARALLEL WITH THE WHOLE COIL"

percent of the tank capacity. This doesn't seem like much, but when we want to increase power by putting another tube in parallel, we are getting through the tubes some six percent of the total current in the tank circuit and, since the tank current in this set amounts to perhaps fifteen amperes, the tubes are carrying very nearly one ampere. See?"

"Yes, I believe I get that OK. But where does the push-pull come in?"

"Well, OM, this is it. When we use a push-pull circuit, like the Hartley in Fig. 3, we have the tube capacities in series, and that makes the current through the tubes just one quarter of what it was — and that's some difference." Lee sketched his third diagram while Ed. watched with a puzzled frown.

"I think I get it, all right. Let's see. The plate-filament capacities are in series. I see that all right; but the plate-grid capacity and grid-filament capacity are there just the same, aren't they?"

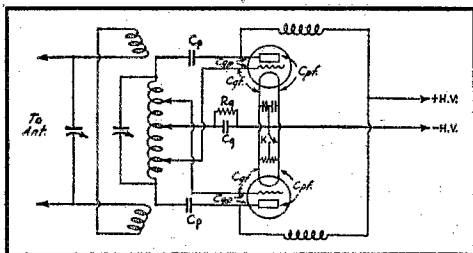


FIG. 3 — "WHEN WE USE A PUSH-PULL CIRCUIT ... WE HAVE THE TUBE CAPACITIES IN SERIES ..."

"Yes, that's true. And that's why I think my push-pull Hartley acted rather erratic, compared to the tuned-grid tuned-plate push-pull set I had here." Lee drew another diagram while Ed. watched. "In this push-pull tuned-grid tuned-

plate the plate-filament capacities are in series across the plate tank, while the grid-filament capacities are in series across the grid coil. The plate-grid capacities merely provide feedback for the grid excitation, and are also in series all the way around the circuit. Get it?"

"By the way, what happened to that tuned-grid tuned-plate set with the two Type '10s, anyway? I don't see it here, but you had it last week." Ed. looked around the shack, high and low, even in the wastebasket.

"Hi! You won't find it in there, Ed. I traded it off for one of those fifties. Well, I think you have the idea of 'why push-pull,' and now for some diagrams on the circuits to use, if it is OK with you.

CHOOSING THE CIRCUIT

"Some bright fellow thought up an idea to make a tuned-grid tuned-plate, either single ended or push-pull, with single control instead of dual control."

"What's that, the idea shown in the November, 1930, *QST*? I thought that was just for low power." Ed. reached for the *QST*.

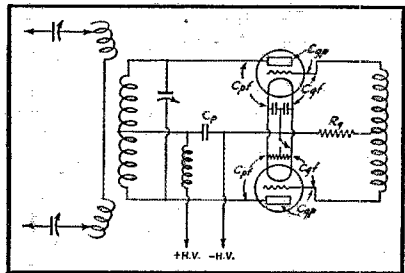


FIG. 4 — "IN THIS PUSH-PULL TUNED-GRID TUNED-PLATE, THE PLATE-FILAMENT CAPACITIES ARE IN SERIES ACROSS THE PLATE TANK ..."

"Indeed it isn't just for low-powered sets. That is the circuit shown in Fig. 4, and it is the one I'm using for the pair of fifties. Come out in the other room and take a look."

"You bet. Um-m-m, le'see. Why, you haven't your grid coil wound like *QST* shows. You've lots heavier wire on it, haven't you? And mounted with binding posts, too. What's the idea?"

Lee picked up one of the grid coils. "Why, no idea at all on the mounting, except I didn't have any G.R. plugs and jacks around, but I used this wire because I was afraid that number thirty-two wouldn't stand the current very well. I used some number sixteen enamel covered, and it works very well. I had to use a few more turns than specified, however. Doesn't seem to make any difference though, because the coil doesn't get warm at all." — "What do you get out of this set, with the two fifties?"

Lee turned on the power and pressed the key

for just an instant. The ammeter crawled up to two-and-a-tenth.

"Whoopee, look at her go!" Ed. shouted. "That's some radiation."

"Say, for the love of Mike, how many times do I have to tell you that antenna meters read the current traveling through them, *not* radiation. It does look good, but doesn't mean much except with some standard of comparison already established. For instance, I used to get 1 ampere work with the two Type '10s, and did plenty good work with them, but I'm well satisfied. These tubes aren't for high frequency use anyhow. I'm going to trade my Type '60 for a '52 and get another one to match, and then you will hear a set as is a set!"

"I hope you don't find anyone to trade with. If you get any more power I'll have to move out of town to hear anything at all. I don't mean to kick, but you sure blanket me. Don't worry, I'm going to move over the river in a week or two, so I'll be about three miles off, and that will help considerably."

Lee laughed. "Let's get back to the diagrams. I regard Fig. 4 as the best all-around circuit for anyone to use. For ultra-high frequency work use the one with the 'split' condensers. That's this one, Fig. 5. But it is harder to tune, because it will go out of oscillation easily when one tank or the other is detuned."

"I'll build one like this set of yours, but with a pair of Type '10s. Say, what are those tubes you are using? They are Type '03-A, aren't they?" Ed. looked at them.

"No, they are Type '11 tubes. I know they shouldn't be used on 7 mc., but they put out a very good sig, and they didn't cost me so much. Besides, I'm putting only 220 mils at 1100 volts on them; 110 mils apiece isn't a high plate current for them.

"Well, to go on with the diagrams, and construction details, just remember that both sides must be identical for best results. That is, the connections should be the same as to length, and position, as far as possible. The grid choke should be of such a size that the set draws the minimum current at the low frequency end of the band upon which you wish to work. You'll have to use your milliammeter in tuning this set, although I don't think you'll find it so necessary as in the regular tuned-grid tuned-plate. The circuit doesn't go out of resonance, like the one you built."

"That's sure an advantage. I should think that being unable to tune the choke would make the set less efficient, since it tunes over such a wide range."

"I thought so too, before I built one of these affairs, but it doesn't seem to. I suppose it really works best near the peak of the choke, where the set draws least current, but the choke is quite broad in tuning, and I see no loss of efficiency. I

tuned this set up on 3800 kc. the other night, and it drew exactly 65 mils for the two fifty watters at 1100 volts d.c., with no antenna coupled. The High-C Hartley drew 125 mils on the same frequency with no antenna coupling. That's why I junked that set. I didn't build a Hartley push-pull oscillator with these two, because of the difficulties encountered in changing bands, what with three clips on the coil and flexible wires running around. It is a good circuit, but I just don't warm up to it.

ANTENNA COUPLING AND R.F. CHOKES

"Now in coupling your antenna, remember to have the two antenna coils wound in the same direction, and always adjust so that the coupling is equal for each side, so neither tube is over-

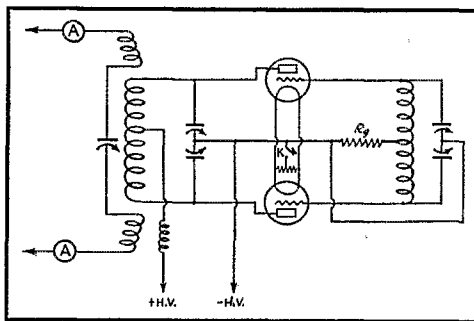


FIG. 5 — "FOR ULTRA-HIGH-FREQUENCY WORK, USE THE ONE WITH 'SPLIT' CONDENSERS"

loaded. If you had two filament supplies for the tubes and put a closed circuit jack in each negative return to the filament center-tap, you could adjust for exactly equal loading by plugging your milliammeter first in one side and then in the other. See the article on antennas in December, 1930, *QST*."

"How about antenna condensers; I suppose both have to be used, eh?"

Lee sketched the antenna coupling arrangements on the diagrams already drawn. "Fig. 3 shows the antenna the way I use it on 3800 kc., as I have my 7-mc. Zepp with 30-foot feeders on the set for that band. Fig. 4 shows it on 7 mc., and Fig. 5 shows it with a single series condenser instead of two. Or you can use two series condensers and one ammeter."

"Any r.f. chokes needed? I see you have one in your outfit."

"Yes, I don't just remember the full dope now, but there was an 'Uncle Jimmy' story some *QST*'s back, in which The Piper showed that the second harmonic flows in the common circuit and to be absolutely sure, an r.f. choke should be used in the set. Believe that was in September, 1930, *QST*. Look up all these articles now in that mess of *QST*'s I have for you and read the original dope. You want to read first, "Push-Pull Trans-

mitters" in the December '28 issue; then the one on the two '52s in June '30; the Uncle Jimmy story in the September '30 issue, and the one on the two '45s in November, '30. Guess that does the whole business, doesn't it?"

OTHER APPLICATIONS

"Can you use this idea for crystal control, or master-oscillator power-amplifier circuits? I've got an idea I'd like to try them one of these days."

"You bet you can. There is an oscillator-amplifier crystal job shown in diagram form in that push-pull article in December, 1928 *QST*. Also you will note a couple of references in the article to some other data on push-pull used with crystal transmitters. They aren't always so good for high frequency output, because they do not put out much of a second harmonic for frequency doubling. However, for a straight 3500-kc., or straight 7000-kc. transmitter, it should work very nicely. And you can use a push-pull amplifier on a single-ended oscillator or doubler, too. See that December, 1930, description of W1MK; it gives the dope in good shape. Well, I'm sorry to shoo you away, OM, but I've got a sked in exactly four minutes. What did you bring the parts over for?"

"That was the mess of junk I have for a new receiver. We'll talk that over some time later. I'll not bother you any longer now, so good night, Lee; and I sure want to say thanks for the help, OM." Ed. picked up the diagrams and notes and swung the door open.

"See you in a few days, OM. Good night."

Ten Years Ago This Month

FELLOWS, we did it! Smashed it into bits — just naturally lambasted the everlasting stuffing out of it! Ain't it a grand an' glorious feeling? It is! Tiddle-de-da-de-doo!" Thus did K. B. W. kick off "The Story of The Transcons" in *QST*, March 1921. Reading it, we were inspired to suggest the publication of a few extracts each month from the old numbers. What stories of ambitions, accomplishments and progress could be retold! That March issue has a greeny-blue cover with a picture of 6ZK on it. A 1-kw. spark station it was, with two waves — 200 and 375 meters. The receiver, pictured on the cover, had fifteen dials (we counted 'em).

But to continue with the Transcon story — the affair apparently was a success. "Do you ask why all these screamers?" continues the text, "Be it known to you, Fellow A.R.R.L. Members, that this little old organization of ours created some glorious additions to the history of Citizen Wireless in the Transcontinental Relay Tests of middle January, when we broke the previous record so badly that you'll never find the pieces. We put one across and back in six and a half minutes!" All this, of course was on 200 meters and above and with spark transmitters. Yet in the

eight pages devoted to the details of performances, the story reads like the report on a 1931, 3500 kc. Transcon.

Down near the middle of the issue are some station descriptions, led off with 6JD — the station later to become a famed Pacific conqueror. "The home-made transformer" says the description, "is of the closed-core non-resonant type, with the secondary wound over the primary on both legs of the core—secondary voltage 15,000, power input 1064 watts." Other stations described are, 4XB, 6ZK, 9BY, 5ZX, SVJ, 3HJ and Canadian 3GE. Most of them had thundering big spark rigs with many knobbed single-tube receivers.

"The Power Tubes Arrive" is the only real hint in the issue of the coming vogue of tube transmission. "It is rated at 5 watts, but is a big husky tube, and is good for 10 watts continuous service" says the description of the UV202 — which at that time was just to be released for amateur work.

"The Operating Department," since displaced by the "Communications Department" had its own big slice of *QST* then as now. Page after page of reports indicate solid activity in traffic handling, chiefly with short-haul relays. 9ZN had the honor position with 370 messages to his credit.

But the amusing feature of the issue, as we see it now, is a full page display announcement of "A.R.R.L. 'CQ' Party, April 1st." In large black letters it says: "CQ — What does it mean to you when you hear it? To most it means that some bird is causing unnecessary QRMI. The A.R.R.L. Operating Department has declared war on 'CQ' as an outgrown antique — Everyone is invited to take part and open up on high power and any old speed and call 'CQ' as per schedule below — and get 'CQ' out of his system for all time." It was an appropriate day for the stunt all right but the old "CQ" wouldn't die. With all the progress and developments of the last ten years, "CQ" still takes up at least as much time and space on the air as it ever did.

Strays

The small thermal circuit breakers made by both Westinghouse and G.E. are FB for protecting a transmitter in case something goes haywire. They are placed in the 110-volt line, of course, and take the place of fuses. They may be obtained in several ratings, ranging from 2 to 14 amperes, and cost about \$3.50.

W3CAB uses a High-C wavetrap for cutting out interference from a station a block or so away. The trap consists of a four-turn coil of No. 8 wire shunted by a .001- μ fd. variable condenser. Most of the capacity is used when the trap is tuned to the band. With the trap many stations could be heard and worked through interference, while it was impossible to copy any of them without it.

Mercury-Vapor Rectifier Ratings and Circuits

A Further Contribution to Design Data for the Amateur Power Supply System

By H. T. Maser* and H. L. Saxton*

In a previous number of this magazine, a type of rectifier tube known as Radiotron[™] UX-866 was described, and a few conditions for its use were discussed.¹ The purpose of this article is to give a more detailed explanation of the ratings as well as to discuss some filters and circuits for use with this tube.

HOT-CATHODE mercury-vapor rectifier tubes are rated in terms of the fundamental tube limits. The maximum peak inverse voltage, which is the safe flash-back limit which the tube will stand while operating within the rated temperature range, and the maximum peak current through the tube, which is dependent on the emission available, are the two most important tube limits.

In a rectifier circuit, the maximum peak inverse voltage is the highest voltage peak that can safely be placed across the tube on the reverse half-cycle. Referring to Fig. 1, when tube 1 is conducting, the voltage drop from *a* to *c* is approximately 15 volts, so that the highest voltage from *b* to *c*, or across the non-conducting tube, is the peak transformer voltage, E_m , less the tube drop of about 15 volts. Thus, for practical purposes, the peak inverse voltage in this circuit may be taken as 1.4 times the total transformer voltage (r.m.s. value). The maximum peak inverse voltage for the UX-866 tube is 7500 volts.

Referring to Fig. 1, the point *O* is taken as ground potential, represented in Fig. 2 by the

between lines *a'* and *O* and from *a* to *b* by the distance between *a'* and *b'*. The shaded portion shows the available output voltage, tube drop being neglected. The average, or d.c. voltmeter reading from *c* to *O*, is given by the broken line *c* and is equal to .636 times the peak output voltage.

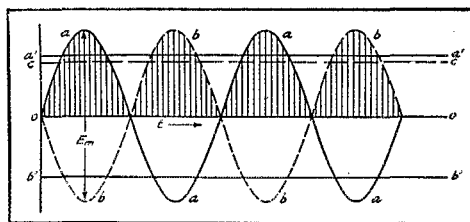


FIG. 2 — VOLTAGES IN CIRCUIT A AND WAVE FORM OF OUTPUT VOLTAGES FROM CIRCUITS A AND B

No filter and a resistive load.

The maximum peak plate current which a tube may carry at any time is one of the limitations of a rectifier tube. This peak current should never exceed .6 ampere in the UX-866.

In the single-phase full-wave rectifier circuit using two tubes (Fig. 1), the current flows on the first half of the cycle from *a* to *c*, through the load to *O*, and on the second half of the cycle flows from *b* to *c*, through the load to *O*. This means that only one-half of the transformer is being utilized at one time. Thus, only half the transformer voltage is available for voltage output. The full-wave circuit requiring four tubes utilizes the complete transformer during the whole of each cycle and consequently gives approximately twice the voltage output of the two-tube circuit at the same peak inverse voltage. Here (refer to Fig. 3), on the first half of the cycle, the current passes from *a* through tube 3 and in returning from the load, passes through tube 2 to *b*. On the second half of the cycle, the flow is from *b* through tube 4, and the return from the load is through tube 1 to *a*. In both of these single-phase full-wave circuits, the average, or d.c., plate current of any tube is one-half the average

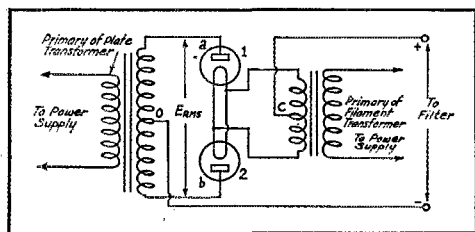


FIG. 1 — CIRCUIT A: SINGLE-PHASE FULL-WAVE TWO-TUBE RECTIFIER CIRCUIT

straight line *O*. Assuming no filter and a resistive load, the curves *a* and *b* represent the instantaneous voltages at *a* and *b* respectively. The a.c. meter reading from *a* to *O* is given by the distance

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¹ O. W. Pike and H. T. Maser, "A New Type of Rectifier Tube for Amateur Use" — *QST*, February 1930.

load current, since each tube conducts only half the time.

In the three-phase half-wave circuit, shown

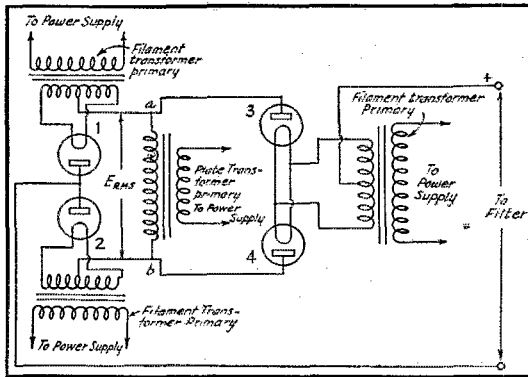


FIG. 3 — CIRCUIT B: SINGLE-PHASE FULL-WAVE FOUR-TUBE RECTIFIER CIRCUIT

in Fig. 4, each tube carries current for one-third of a cycle (120 electrical degrees), and the wave shape of the output voltage is as shown in Fig. 5. The average (d.c.) output voltage is equal to .827 of the peak output voltage.

In the three-phase half-wave double-Y circuit (Fig. 6), the two three-phase sides of the circuit are connected 180° out of phase, the interphase reactor dividing the current equally. The wave form is given in Fig. 7. By means of the interphase reactor, it is possible to operate tubes in parallel, and therefore this circuit is capable of delivering twice the current output of the three-tube circuit. The primary windings of the plate transformer work on both halves of each cycle, each primary winding delivering power to one side of the circuit during one half of the cycle, and to the other side of the circuit on the reverse half-cycle.

Fig. 8 shows the three-phase full-wave rectifier circuit. The wave form of the output voltage obtained is shown in Fig. 7. This circuit delivers twice the voltage output of either of the three-phase half-wave circuits for the same peak inverse voltage. The average output voltage available is .955 of the peak output voltage.

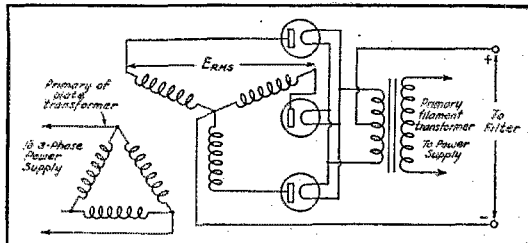


FIG. 4 — CIRCUIT C: THREE-PHASE HALF-WAVE RECTIFIER CIRCUIT

When the load is purely resistive and no filter is used, the load current has the same wave form as the load voltage. Thus, in each rectifier circuit, under these conditions, the average load current has the same relationship to the peak load current as the average output voltage has to the peak output voltage. The following table gives voltage and current values in the five rectifier circuits described, for resistive load and no filter.

Table I — Voltages and Currents Obtainable from Various Rectifier Circuits with No Filter and a Resistive Load

Circuit	Peak Inverse Voltage, E_m	Max. E_m for UX-868	Average Output Voltage Z (d.c.)	Max. E (d.c.) for UX-868	Max. Load Current (d.c.) for UX-868
A 1.414E	(r.m.s.)	7500	.318 E_m	2385	.382
B 1.414E	(r.m.s.)	7500	.636 E_m	4770	.382
C 1.414E	(r.m.s.)	7500	.478 E_m	3585	.496
D 1.414E	(r.m.s.)	7500	.478 E_m	3585	.991
E 1.414E	(r.m.s.)	7500	.955 E_m	7162	.573

In many cases the output voltage of the rectifier is not affected by the addition of a filter,

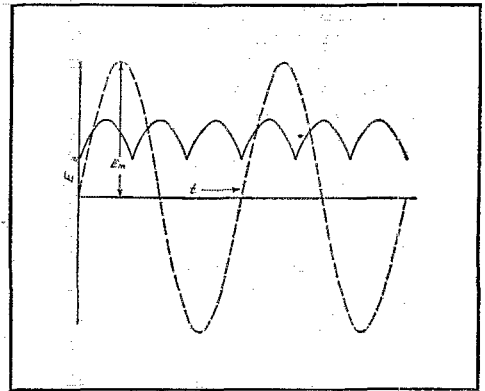


FIG. 5 — WAVE FORM OF OUTPUT VOLTAGE FROM CIRCUIT C
No filter and a resistive load.

but the wave form and magnitude of the plate current are always changed by a filter. The output voltage is made up of a d.c. component and an infinite number of a.c. components. Any output circuit which is not a pure resistance offers different impedances to these components so that the currents resulting from these voltages do not have magnitudes directly proportional to the magnitudes of the voltage components and do not have the same phase relations with respect to the voltage components. The result is necessarily a different wave form of current.

Let us consider a filter of the type shown in Fig. 9. This type of filter has the advantage of increasing the voltage output from the filter,

but the allowable current output is reduced to a small percentage of the peak plate current. The first condenser here offers a low impedance path

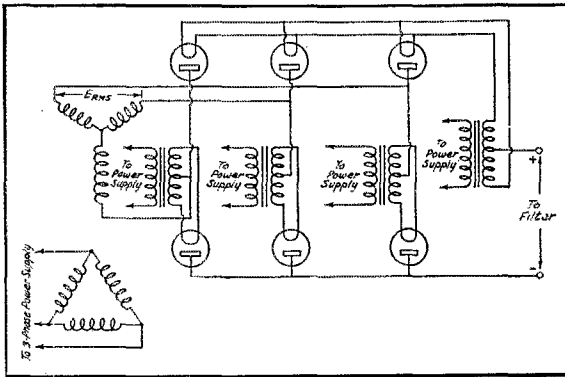


FIG. 6 — CIRCUIT D: THREE-PHASE HALF-WAVE DOUBLE-Y RECTIFIER CIRCUIT

when the rectifier is first thrown on, and if the power transformer has low leakage reactance, a tremendous surge of current is drawn through the tubes. Thus, this type of filter should be used only with a transformer having high leakage reactance. Most transformers designed for amateur use have high leakage reactance so that in many cases this difficulty is eliminated. Three-phase transformers, which are not usually de-

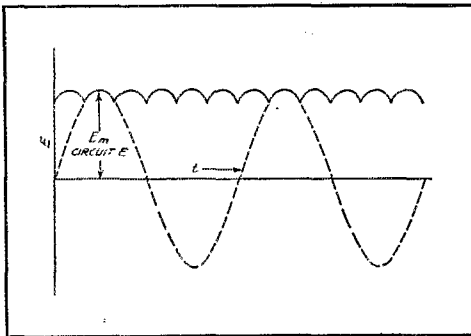


FIG. 7 — WAVE FORM AND OUTPUT VOLTAGES FROM CIRCUITS D AND E
No filter and a resistive load.

signed for amateur work, have comparatively low leakage reactance, and therefore it is not generally advisable to use this type of filter for three-phase rectification.

The filter shown in Fig. 10 is the type best suited for use with hot-cathode mercury-vapor rectifier tubes. A filter of this type may be designed to keep the ratio of peak plate current to average, or d.c., load current at a low value thereby permitting a larger direct current output without exceeding the peak current rating of the tubes used.

Table II gives empirical formulas for obtaining the minimum values of L and C , for the filter circuit of Fig. 10, which may be relied upon to keep the peak plate current less than the limiting value for the UX-866 tube providing the average load current and average plate current do not exceed the values given in the table. The average load current may be read on a d.c. ammeter placed in series with the load, and the average plate current of any tube may be read on a d.c. ammeter in series with the anode of that tube.

The capacitance given in the table is chosen small enough to prevent excessive surges when power is first applied to the circuit, and yet large enough to give adequate filtering. If the inductance is increased, it is permissible to increase the capacitance in the same proportion. If the two inductances in a two-stage filter are not of the same value, the larger inductance should be connected next to the rectifier, and the maximum value of each capacitance should be calculated on the basis of the inductance preceding it in the circuit.

Table II — Minimum Values of L and C ,
For Filter Circuit of Fig. 10

Rectifier Circuit	E (Ave.) Rectifier Output	Max. Ave. Plate Current per Tube (amps.)	Max. Ave. Load Current (amps.)	Min. Value of L (henries)	C (microfarads)
A	.318 E_m	.15*	.3*	.08 E_m/f	450,000/ fE_m
B	.636 E_m	.15*	.3*	.16 E_m/f	225,000/ fE_m
C	.478 E_m	.1*	.3*	.03 E_m/f	533,000/ fE_m
D	.478 E_m	.2	1.2	.015 E_m/f	267,000/ fE_m
E	.955 E_m	.2	.6	.02 E_m/f	200,000/ fE_m

*For 100% increase in the first inductance over minimum value, the plate and load currents may be increased 50%. For 200% increase in the first inductance, the plate and load currents may be increased 67%.

With a two-stage filter and minimum value of inductance, a ripple of less than 5% is obtained for the first three cases. This is usually adequate filtering. In the last two cases, the ripple is less than 1% for a two-stage filter. Better filtering may be obtained by increasing the inductances over minimum value. If desired, the capacitances may be increased by the same percent as the inductances with still better results. Additional sections of filter will, of course, give greater smoothing.

To illustrate the use of the table, suppose we wish to design a single-phase rectifier, and a filter, to deliver 1000 volts at .3 ampere for operation from a 60-cycle power supply. We must choose a value of E (average) somewhat higher than the load voltage, say E (average) = 1200

volts, in order to allow for filter drop. In the two tube rectifier circuit, E (average) = .318 E_m so that $E_m = 3775$, a value well within the peak

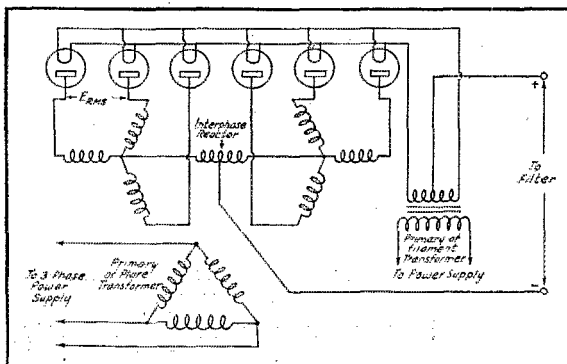


FIG. 8 — CIRCUIT E. THREE-PHASE FULL-WAVE RECTIFIER CIRCUIT

inverse voltage rating of the tubes. The table gives $L = .08E_m = .08 \times 3775$ 5 henries as a minimum value. Also,

$$C = \frac{450,000}{f E_m} = \frac{450,000}{60 \times 3775} = 2 \mu\text{fd.}$$

If a larger value of L were used in the first stage of the filter, say 10 henries (100% increase

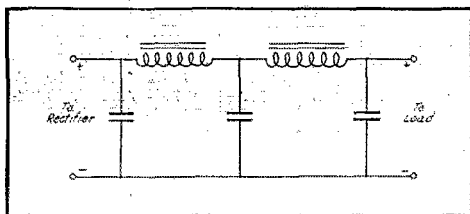


FIG. 9 — CAPACITIVE TWO-SECTION FILTER
This type of filter increases the voltage output but the allowable current output is reduced to a small percentage of the peak plate current.

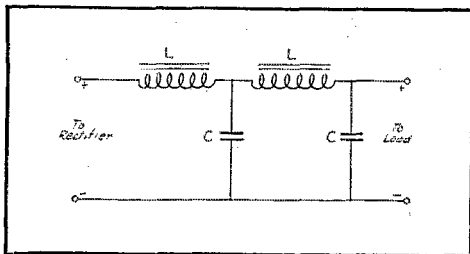


FIG. 10 — INDUCTIVE FILTER
This is the best type for use with hot-cathode mercury-vapor rectifier tubes.

in inductance), it would be possible to obtain .45 ampere average current output without overloading the tubes. For 15 henries (200% increase in inductance), .5 ampere would be allowable. By further increasing the amount of inductance, more current can be drawn, a limit of .6 ampere being approached as the inductance is made larger and larger. At the same time the smoothing is improved.

It must be remembered that in many filter inductances, the cores become saturated when a fairly large d.c. component is passed, and allowance should be made for this fact.

Strays

W4FM — Say, OM, did you know that W4AIJ had a severe attack of "YL-itis" and his ma gave him a couple spoons of sugar?

W4RU — What for?

W4FM — Haven't you ever heard of sugared hams?

Corrections

In Fig. 1, page 19, January *QST*, there should be a connection between the center tap of the audio-frequency transformer secondary and the line marked "chassis."

In Fig. 5, page 32, fifth line of the cut label, "R₁" should be "R₁₅". In the 10-ke. multivibrator circuit, R₁₁ of the right-hand tube should connect to A—instead of to +A. In the cut label of Fig. 6, page 36, "C" should be "C₅".

A New Section Created

(Continued from page 8)

River. All amateur operators and stations in this territory are invited to report activities regularly to a Western Florida Section Communications Manager effective with his election.

A.R.R.L. members residing in the new Section have called to their attention the notice soliciting nominating petitions for a Section Manager which is printed in the Communications Department pages of this issue. Nominations signed by five or more members must be received on or before March 20, 1931, to be valid. While activity reports should continue to be made through the Florida S.C.M. until completion of the election for a Western Florida Section Manager, the new Section will exist as such effective March first and participation in the Fourth International Relay Competition, complete plans for which are included in this issue, will recognize the Western Florida Section as an independent unit.

— F. E. H.

A Portable Test Panel

A Set Tester That Does the Work of a Large Test Panel

By A. C. Buden-Kaye*

RADIO service men, radio doctors, technicians, engineers, sound experts, and other allied branches of the industry use one type or another of set tester. Most of these set testers are flexible enough for practically all the tests a service man desires, making one meter do the work of five or six, with the necessary calculations taken into consideration. The disadvantage of a tester containing only two or three multi-purpose meters is that if the operator should happen to burn out one meter, because of some defect in the set being tested or through his own carelessness in placing one of the switches on the tester in an incorrect position, the tester or the damaged meter would have to be returned to the factory. This handicaps the service man for several weeks unless he happens to have a spare tester on hand — which is not likely, judging from what most testers cost. This condition applies especially to the service shops which use small set testers as the sole means of testing.

The writer has designed and built a set tester which is equivalent to a large test panel. Its advantage over the usual test panel is that it can be taken to any part of the service room and tests can be made with the chassis and power pack in the console or cabinet. With a test panel that is permanently fastened on the wall or bench the chassis and power pack have to be taken out of the cabinet to avoid the usual maneuvers of neck stretching in making tests.

This portable test panel contains nine precision instruments, a resonance indicator or output meter and an oscillator. Two meters in particular will appeal to those men who hold responsible positions in the service field. One is the capacity meter with range of 0 to 1.5 and 0 to 15 microfarads. This meter is directly calibrated by the manufacturer. The other is an ohmmeter with a range of 0 to 500,000 ohms, also directly calibrated.

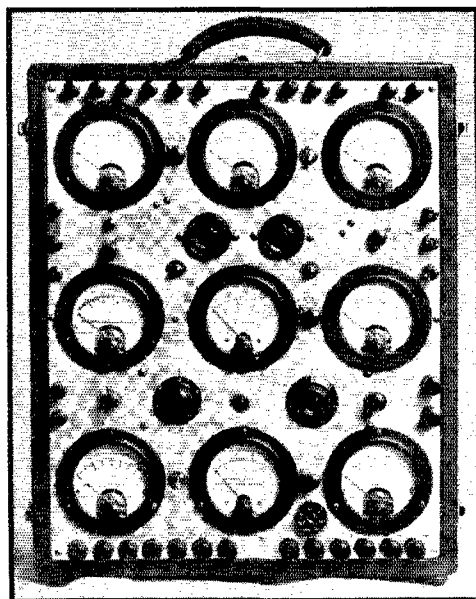
With 9 meters in a test set it is almost impossible to make an error. A great deal of time is also saved in making tests because all meters are in circuit and all one needs to do after inserting the plug (attached to the end of the cord connecting with the Jones socket on the tester) is to take one glance at the instruments and the trouble, if any, is immediately indicated. This makes trouble shooting almost a pleasure.

CONSTRUCTION

The carrying case is 16 x 13 x 4½ inches, outside measurements. It is constructed of white

*45 West 45th St., East Plymouth, Pa.

pine and covered with leather. The depth of the lid is 1¼ inches, the case itself being 3¼ inches deep. The inside dimensions of the case are 12 x 15 x 3¼ inches. The lid is fastened to the case by 5 clasps such as one sees on musical instrument cases. Velvet lining is glued on the inside.



AN ABUNDANCE OF METERS FEATURES THIS SET TESTER

In addition to the regular tests made on the set with the aid of a cord and plug, each of the meters can be used for outside measurements by means of the binding posts.

The panel is aluminum and measures 15 x 12 x 3/16 inches. After the panel was drilled it was engraved by stamping the required inscriptions under binding posts, switches, etc., with a set of steel dies. The stampings were then filled in with red wax crayon and a hot soldering iron held over them till the wax was firmly imbedded in the panel.

To eliminate a permanent attachment of the cord and plug adapter, a Jones socket is installed on the panel. Thus the cord can be put out of the way when not required.

The circuit of the oscillator is a Hartley using a Type '99 tube. A small broadcast band r.f. inductance, center tapped, is used for the oscillator coil. The circuit is tuned to either 1400 or

650 kc. by switching either the 40- μ fd. or 250- μ fd. condenser in shunt.

The resonance indicator or output-meter rectifier is nothing new, being the well known Fleming valve arrangement using a Type '99 tube with the grid and plate joined together. The 0 to 1½ milliammeter connected in the plate circuit is used for visual indication. The use of this resonance indicator is recommended for balancing or neutralizing a set, since the apparent intensity of sound in the 'phones or loud speaker is not a very accurate indication. The 2000-ohm shunting resistance shown in the circuit diagram is used whenever the resonance indicator is attached to a receiver whose output is fed into a magnetic

fier-current meter MA_1 for one plate and the plate milliammeter MA_2 , 150-range, for the other. To measure the screen current of a screen-grid tube use the 1.5-ma. range of the screen-current meter, MA_1 . In all screen-grid tube tests a short lead must be connected between the binding post "tip" and the cap (control grid) of the tube. Another lead should be connected between binding post "clip" and the grid clip in the radio set.

GRID VOLTAGE MEASUREMENTS

Use the 150-volt positive range of the grid voltmeter to measure the screen voltage of a screen-grid amplifier tube. If the tube is being used as a space-charge amplifier use the 150-volt

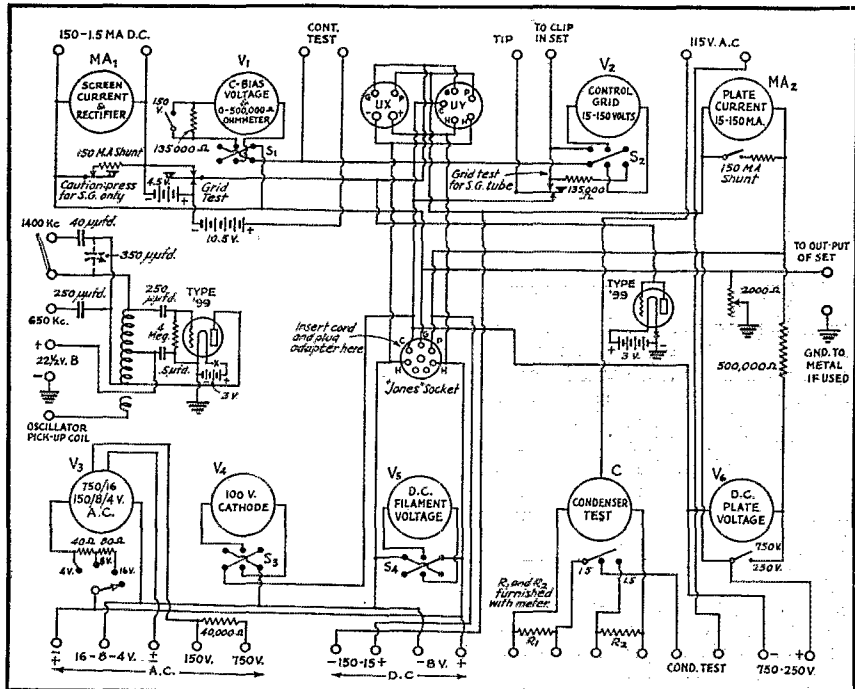


FIG. 1 — SCHEMATIC CIRCUIT DIAGRAM OF THE TEST SET
The list of components is given at the end of the article.

speaker, since otherwise the unduly high direct current probably would damage the meter. With a speaker of the dynamic type, the two binding posts of the resonance indicator circuit are connected across the movable coil of the cone. The impedance being low, the protective resistor need not be used.

The connections and specifications for the remaining components are given with the circuit diagram in Fig. 1.

USING THE TEST PANEL

To measure the current of a full-wave Type '80 rectifier tube, use the 150-ma. range of the recti-

negative range. In testing the regular three-element or heater-type tubes the meter indicates the grid bias. Caution: Cut the meter from the circuit by means of the "off" position of the polarity switch when testing rectifier tubes.

CONTROL-GRID BIAS

Use the 15-volt negative range of the control-grid voltmeter, V_2 , for the top or control grid of screen-grid tubes. When the tube being tested is a space-charge amplifier, change this range to 150 volts, positive. Cut this meter from circuit by means of the "off" position of the polarity switch when it is not being used.

PLATE CURRENT

The plate milliammeter, MA_2 , is in the circuit at all times and has both ranges, 15 and 150 milliamperes, brought out to binding posts.

A.C. FILAMENT VOLTAGE

The a.c. filament voltmeter ranges, 4, 6, and 16 volts, are obtained by means of the a.c. selector switch. The 150- and 750-volt ranges are obtainable only at the binding posts.

CATHODE VOLTAGE

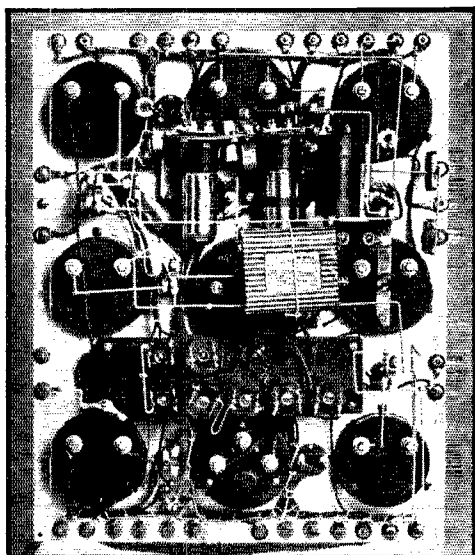
The cathode voltage of the three-element tube is read directly on the cathode voltmeter, V_4 .

CONDENSER CAPACITY

Connect the two binding posts marked "115 Volts A.C." to an alternating current source. Run two test leads from the posts marked "X" (condenser test) and connect to condenser to be tested. Read direct in microfarads on condenser meter, C .

D.C. PLATE VOLTAGE

Read direct on plate voltmeter, V_6 .



ALL APPARATUS IS SUPPORTED BY THE PANEL

One of the Type '99 tubes mounted just about the center is a broadcast-band oscillator and the other is used as a rectifier to indicate resonance when lining up ganged r.f. stages. On the small panel are mounted the multipliers and shunts for the various instruments.

CONTINUITY TEST AND USE OF OHM-METER

Connect the resistor or circuit to be tested across "Cont. Test" binding posts. Read the resistance value directly in ohms on screen-grid voltmeter, V_1 , which is also calibrated in ohms.

OSCILLATOR

Only two frequencies are available. If more are desired the radio-frequency coil will have to be shunted with more by-pass condensers or another binding post installed on the panel and a variable condenser used to cover the whole BC band. A red pilot light can be installed on the panel to show whether oscillator or resonance indicator is on.

PARTS REQUIRED FOR THE TEST SET

- MA_1 — 0-1.5-150 d.c. milliammeter
- V_2 — 0-1.5-150 d.c. voltmeter, 1000 ohms per volt
- V_1 — 0-1.5-150 d.c. voltmeter with extra scale, 0-500,000 ohms
- MA_2 — 0-1.5-150 d.c. milliammeter
- V_3 — Voltmeter, 750-150-16-8-4 volts a.c.
- V_4 — 0-100 d.c. voltmeter, 1000 ohms per volt
- V_5 — 0-8 d.c. voltmeter, 1000 ohms per volt
- V_6 — 0-250-750 d.c. voltmeter, 1000 ohms per volt
- C — Condenser meter 1.5-15 μ fd.
- 1 150-ma. shunt for 0-1.5 milliammeter
- 2 135,000-ohm multipliers to increase 15-volt range to 150 volts
- 1 150-ma. shunt for 0-15 milliammeter
- 2 20,000-ohm multipliers for 750-volt a.c. range
- 1 80-ohm multiplier for 16-volt a.c. range
- 1 40-ohm multiplier for 8-volt a.c. range
- 1 500,000-ohm multiplier for 750-volt d.c. range
- 1 Cord, plug, and adapter
- 1 Filament selector switch and dial
- 2 Single-pole double-throw push buttons
- 1 Single-throw single-pole push button
- 1 Hard aluminum panel 15 x 12 x 3/16 inches
- 4 Carter d.p.d.t. switches
- 1 Carter s.p.s.t. switch
- 1 Carter d.p.s.t. switch
- 3 Cutler-Hammer toggle switches
- 35 Eby binding posts
- 1 UX Socket
- 1 UY Socket
- 2 UX Sub-panel sockets
- 1 Carter 2000-ohm variable resistor, small size
- 1 "Twin Coupler" r.f. Coil, No. 125
- 1 4-meg. Grid leak
- 2 250- μ fd. mica condensers
- 1 40- μ fd. mica condenser
- 1 .25- μ fd. condenser
- 1 Jones Socket and plug (7 contact)
- 3 4.5-volt "C" batteries
- 1 22½-volt "B" battery
- 50 Fibre washers and bushings for binding posts
- Lumber for case (see dimensions)
- Rubber feet, catches, cover, velvet, glue, etc. Miscellaneous screws, nuts, bolts, etc.

A Home-Made Sub-Standard of Frequency

An Easily Constructed 100-kc. Crystal Oscillator With Temperature Control

By F. Dawson Bliley, W8CU*

THE accuracy of a 100-kilocycle piezo sub-standard for both laboratory work and amateur precision calibration far surpasses that of the ordinary type frequency meter used in the past. When it is realized that measurements can be taken to fractions of a kilocycle at high frequencies the importance of this instrument is apparent. The benefits of such an instrument may be appreciated more fully when it is shown that harmonics may be heard as high as twenty to thirty megacycles, often without the use of any radio-frequency amplifiers. A little calculation will point out the fact that the limits of all the amateur bands are indicated by one of these harmonics, excepting 1715 kc. Obviously, therefore, one can tell who is inside the amateur bands and also where to find commercial sta-

The top lid is important and great care should be taken to see that it fits tightly with the sides. A more elaborate oven can be built but this type works very well at ordinary room temperatures. Care should be taken to see that the room is of a fairly constant temperature during reading because abnormal changes in room temperature (from 35 degrees *F.* to 70 degrees *F.*) will cause as much as one degree change of temperature inside the box. The lid of the box should never be lifted before making accurate readings because it may take a half-hour for the whole oven and equipment to again come back to the initial temperature.

The simplest and most inexpensive source of heat is a ten-watt electric light bulb, although a Christmas tree light may be satisfactory for miniature ovens. The lamp should be painted with black stove enamel. The painting is very important to the proper operation of the thermostat, for, in the case of an unpainted bulb, the radiated waves will directly heat the thermostat and other equipment rather than the convected heat. This results in irregular operation of the thermostat and unsteady oven temperatures. The heater bulb should be placed on the bottom of the oven and when so mounted gives better heat regulation than in any other position. A lining of asbestos will make the box fire-proof, though this is not absolutely necessary.

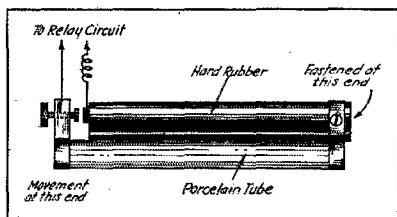


FIG. 1—THE HOME-MADE THERMOSTAT

A piece of hard rubber panel material is rigidly fastened at one end to a porcelain tube about six inches long. The rubber strip is free to expand and contract along the tube, thus making and breaking the external control circuit.

tions on many of the high frequencies. Surprising as it may seem, a 100-kc. sub-standard is easily built.

The 100-kc. oscillator described in this article consists of a 100,000-cycle piezo-electric quartz bar kept at a constant temperature in an "oven," an oscillator circuit, and an isolating amplifier, using type '26 tubes.

THE HEAT CONTROL BOX

The most important part of the whole assembly—and the part with which the greatest care should be taken—is the heat chamber and associated equipment. The heat chamber, or oven, is a box about six inches square, composed of a heat insulating material such as Celotex. The greater the number of thicknesses of this material the better, but three layers will suffice.¹

* 649 West 9 St., Erie, Pa.

¹ A better form of heater-box construction is that in which a heat distributing layer and a layer of heat attenuating material are placed between the source of heat and the

THE THERMO-REGULATOR

The straight linear expansion thermostat has been found to be the most easily built. The thermostat is, no doubt, the heart of the standard. Experiments were made with various types of mercury and bi-metal thermostats. The mercury type thermostats with large bulbs are very accurate, but extremely difficult to build because they require considerable glass working, platinum points and evacuation to make the job last any length of time—all of which require considerable time and skill and infinite patience. One objection to the usual bi-metal thermostat is the vibration at the contact points and resulting radio noise. On the other hand, the linear expansion thermostat is positive in operation, is not disturbed by sudden jars, takes up little room, and is easily adapted to front panel adjustment.

It might seem best to use two metals for the chamber in which the crystal is placed. This gives much closer control of the crystal temperature. See Fig. 3, page 31, January, 1931, *QST*, and the accompanying discussion.—**EDITOR.**

thermostat elements but investigation will show that porcelain and hard rubber are far better with respect to temperature coefficients than the common metals.² Hard rubber will expand about forty times as fast as porcelain (the expansion of which is practically nil) while zinc expands only fifteen times as fast as porcelain. A six-inch porcelain tube makes a cheap and good base, as shown in Fig. 1. Along the top of the tube is a

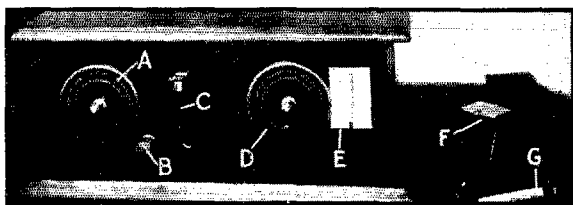
strip of hard rubber panel material about one-half inch wide, the hard rubber being clamped to the tube at one end and so cut that the hard rubber can rest on the porcelain throughout its entire length, thus assuring stable operation of the thermostat. As the heat increases the hard rubber expands along the tube and

pushes the two large silver contacts together. The thumb-screw is not absolutely necessary but is an aid in making fine adjustments. It may be connected to a front-panel dial.

No attempt should be made to use the thermostat directly to control the heater power because the movement of the contacts is but a few ten-

ths of an inch and arcing troubles will result. An old telephone relay is just the thing in this case. Very low voltage relays are preferable; they cause less contact trouble. One that will work on three volts and has a "back contact" (makes connection when the relay is open) is the most fool-proof. It will be seen by reference to Fig. 2 that the only possible chance for the heat to remain on any length of time would be due to a failure of the relay battery. However, batteries used in this type of intermittent service will last

for months without replacement. The operation of the relay should be occasionally checked, however. Under certain conditions the relay winding may be energized for ninety seconds and dead for twenty, which means that the heat is turned on for only twenty-second periods. A quarter-watt neon pilot light, mounted on the panel front and connected directly across the heater lamp, will indicate whether the heat is on or off. Large silver contacts should be used on the relay.



FRONT VIEW—THE FRONT PANEL

The dial at the left controls the oscillator tuning A. To its right is the heat-control relay C, and just below the relay is a hole in the panel behind which the neon lamp is mounted. The right-hand dial D is attached to the thumb-screw on the thermostat and serves to regulate the temperature while the heater is in operation. The top of the thermometer E and the recalibrated scale are at the right. F is the crystal holder; G the thermostat, B the coupling midget condenser.

BENDING THE THERMOMETER

A front panel thermometer for reading the heater box temperature is the key to the entire outfit, for it indicates the exact crystal temperature and, indirectly, the frequency.

This may be made out of an ordinary

house thermometer which has a scale from about -20 to 130 degrees Fahrenheit. Generally, the thermometer should be fashioned so that the part from 90 to 130 degrees F. may be read on the front panel, as shown in the photograph and Fig. 3; the other part of the stem must stick back into the box and be at right angles to the panel. The bending may be done in the following manner:

Place the bulb of the thermometer in a bag of snow or cracked ice; this will contract the red filler to 32 degrees. This is necessary because if heat is applied near the liquid in the glass stem it will quickly vaporize and burst from the bulb. At a point about two inches from the 32 degree mark (about 75 degrees) apply a sharp concentrated flame. During the heating process—and it should be slow—rotate the glass to distribute the heat evenly on all sides of the stem. When the flame turns yellow the glass will be sufficiently pliable so that it can be bent. This should be done out of the flame. Having finished the job, the thermometer should be allowed to cool slowly. When the thermometer is absolutely cold remove the ice, allowing the red filler to climb up the stem.

The thermometer is easily mounted by drilling a hole through the panel and Celotex insulation pushing the bulb end in first and stuffing the space around the stem with cotton for support as well as for heat insulation. Arrange to have the bulb as near the crystal holder as possible in order to indicate the true temperature of the crystal. A new scale for the front of the ther-

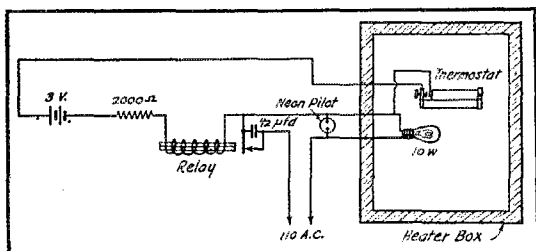


FIG. 2 — THE HEAT-CONTROL CIRCUIT

The relay should be a back-contact affair, that is, one which closes the external circuit when the relay coil is not energized.

thousandths of an inch and arcing troubles will result. An old telephone relay is just the thing in this case. Very low voltage relays are preferable; they cause less contact trouble. One that will work on three volts and has a "back contact" (makes connection when the relay is open) is the most fool-proof. It will be seen by reference to Fig. 2 that the only possible chance for the heat to remain on any length of time would be due to a failure of the relay battery. However, batteries used in this type of intermittent service will last

² Handbook of Chemistry and Physics, Chemical Rubber Co., Cleveland, Ohio.

mometer should be made and checked against a small but accurate thermometer placed temporarily in the oven. A close observation of the readings will indicate any possible temperature changes and consequent frequency variations.

THE CRYSTAL HOLDER

The crystal holder should be well built, to withstand sudden jars and to maintain calibration. The holder in Fig. 4 will stand much abuse. This holder is constructed of two well-lapped brass plates separated by a piece of bakelite panel (not hard rubber) and has an opening in the center just large enough to hold the crystal, allowing but little movement in any direction. The bakelite must be ground down until it is several thousandths of an inch thicker than the crystal and the two surfaces are parallel. Such a holder, with a fixed gap, is suitable for precision oscillators.

THE CRYSTAL

One-hundred kilocycle bars are from one to two inches long, depending on the cut and general

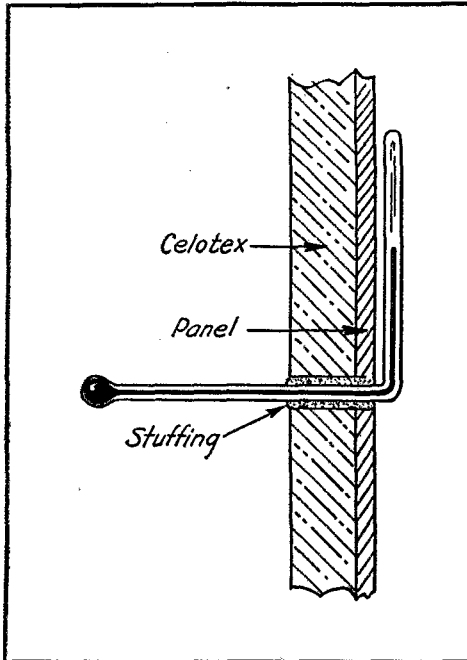


FIG. 3 — HOW THE THERMOMETER IS MOUNTED AFTER BEING BENT

The method of bending is explained in the text.

dimensions. We know that every quartz bar can be made to oscillate on two frequencies, one a longitudinal vibration and the other a transverse. For instance, an X-cut 2000-kc. crystal will oscillate on a low frequency of about 140



TOP VIEW — INSIDE THE CABINET

The oscillator and amplifier are contained in the left-hand compartment. In the box at the right (formed by the three layers of Celotex) are placed the 10-watt lamp, the crystal mounting, the thermostat, and the bulb end of the thermometer. The lamp is placed directly below the crystal holder, which is held above it by four wire "legs."

kilocycles, depending on the width, and a Y-cut 2000-kc. crystal will oscillate on about 190 kilocycles, also depending on the width and the manner in which the edges are ground. One hundred kilocycle bars are the same crystals with which we are all familiar, but are of slightly different dimensions to increase the power output.³ No attempt will be made to describe the grinding process since so much has been written about it in past issues of *QST* and in the *Radio Amateur's Handbook*.

Of course frequencies other than 100 kilocycles could be used, but none would give the desired harmonics in continuous even multiples of 100 kc. Moreover, a crystal of an odd frequency would require an enormous amount of figuring in determining the values of its harmonics and even then would not have harmonics at both edges of every amateur band, excepting 1715 kc. Then, too, calibration from WWV signals and other standard frequency transmissions might be impossible.

The arrangement of the apparatus in the heater box should be such that the crystal holder, thermostat, and bulb of the thermometer are close together, with the heater remote and below. If the source of heat is at one side some time will elapse before the heat gets to the thermostat and uneven temperatures will result. An arrangement between the thermostat and the panel front for regulating the temperature aids in making fine adjustments and makes unnecessary the removal of the lid from the box. The insulated wires connecting the parts inside the box with those outside must be of a small size, such as No. 24, to

³ 100-kc. bars may be obtained from several concerns advertising regularly in *QST*. — EDIRON.

minimize heat leakage through the copper wire.

BUILDING THE OSCILLATOR

The oscillator circuit is the usual in which the crystal is connected between grid and filament of the oscillator tube. If the standard is to be placed permanently within a foot or so of the receiver an amplifier may not be absolutely necessary, and the arrangement shown in Fig. 5 may be used. The variable midget coupling condenser should not be used unless absolutely necessary because when adjusted it has a tendency to change the frequency slightly. A better system, however, is one completely isolating the oscillator by means of an amplifier, as in Fig. 6. This not only makes the oscillator nearly fool-proof but also adds much volume to the lower frequency harmonics and increases the possibility of picking up the very high frequencies.

Large capacities in the oscillator circuit tend to reduce the strength of the harmonics and

wound (or unwound) to the right number of turns. Various sizes of grid leaks, from 5 to 9 megohms, should be tried. It is advisable to use

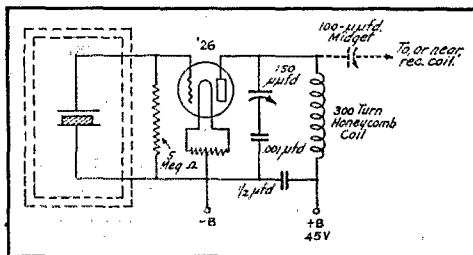


FIG. 5 — THE OSCILLATOR CIRCUIT

quick-heating radio tubes so that the oscillator may be used at a moment's notice. Type '01-A tubes are preferable for d.c. and Type '26 for a.c. A midget condenser is connected to the amplifier output for varying the coupling to the receiver.

CALIBRATION

When the standard has been entirely built and tested for stable oscillation, good amplification, and steady heat control, it is ready for a rough check against the broadcast stations on 600, 700, 800, and 900 kilocycles. The harmonics of a good 100-ke. crystal should be found to deviate not more than 50 cycles or so from the broadcast carriers.

The frequency of this sub-standard may be adjusted by three different methods. The first method is that of varying the gap over the crystal. Changing the air gap between the crystal and the top plate will make changes in frequency of the order of 1500 cycles in a million. This rough adjustment can be used for the preliminary calibration. Finer adjustment is made by means of temperature changes; and, in the case of the short⁵ 100-kilocycle bars, the frequency varies inversely with the temperature. These changes are of the order of 5 to 14 cycles per degree Fahrenheit per million cycles. The plate tuning condenser will make variations of about 10 cycles per million for full scale.⁶ In the case of the short bars the oscillator must be tuned to a frequency about fifty cycles higher than 100 kc. using the first method. This will make allowance for the frequency drift after the heat is turned on in the oven, because, as previously

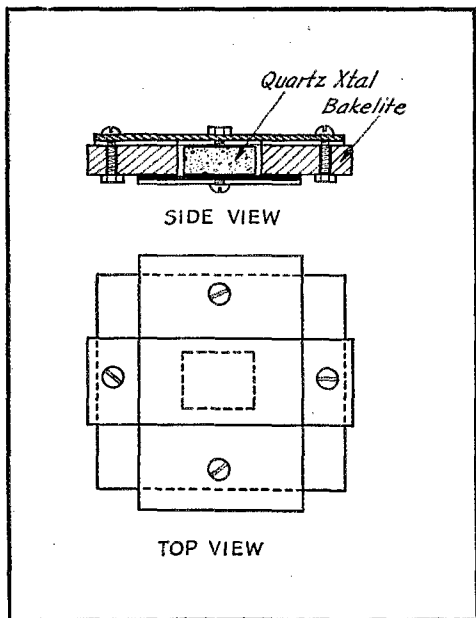


FIG. 4 — CONSTRUCTION OF THE CRYSTAL HOLDER

should be avoided whenever possible.⁴ This applies in particular to the honey-comb coils. These have been used in the past and are to be preferred to the single-layer coils only because of their compactness. A 150- μ fd. condenser offers enough tuning providing the coil has been

⁴ For the sake of stability a High- C tank circuit is just as desirable with crystal oscillators as with self-controlled oscillators. The preferable method would be to design the oscillator for stability alone and depend upon the amplifier for harmonic strength. — EDITOR.

⁵ X-cut crystal working on the transverse mode of vibration. — EDITOR.

⁶ This depends, among other things, upon the $L-C$ ratio in the tank circuit. Recent investigations by the General Radio Company indicate that variation of the tuning capacity from the value at which oscillations start to the point where they stop causes frequency changes of the order of 45 parts in a million. The change is most rapid at the point where oscillations are about to cease (indicated by minimum plate current on the oscillator tube). Cf. *General Radio Experimenter*, November, 1930. — EDITOR.

stated, the frequency will decrease as the temperature rises. As a harmonic from the standard approaches zero beat with the calibrating signal the heat is turned off and the temperature allowed to settle for a minute or two. There should be no hurry about the calibration work. Once the harmonics all seem to approach zero beat on the four stations, nothing more can be done until a standard frequency transmission is scheduled.

The 5000-kc. Tuesday afternoon and evening schedules of WWV are especially applicable to accurate calibration of a sub-standard of this type because the transmissions run continuously for two hours at a stretch and are interspersed with extremely long dashes. Moreover, the transmitted frequency is accurate to a few parts in a million and is entirely free of the usual QRM. The two transmitting periods (one afternoon and one evening) are arranged to give the widest coverage with a minimum of skip-distance difficulty. The schedules for these transmissions are published monthly in *QST*. The signals would be received on 5000 kc., of course, and the sub-standard's 50th harmonic would be adjusted to zero beat. The thermostat should be adjusted to change the temperature in the proper direction, sufficient time being allowed after each adjustment for the temperature to become steady. As

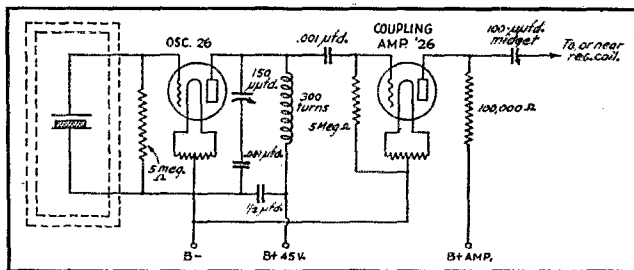


FIG. 6—THIS DIAGRAM SHOWS HOW TO ADD AN AMPLIFIER TO THE OSCILLATOR

The amplifier serves to isolate the oscillator from external influences and thus improves the stability. At the same time it also increases the strength of the harmonics.

a final adjustment, the plate tuning condenser should be set for zero beat. Then a permanent record should be made of all temperature readings (oven, room and even outdoor), the plate tuning condenser setting, oscillator plate and filament voltages, and, if possible, the oscillator plate current value. A change in any of these can affect the sub-standard's frequency in some degree and all should be kept as constant as possible.

PRECAUTIONS

The builder should bear in mind that once the instrument is accurately calibrated, the adjustments should not be touched or the apparatus moved until the next schedule. The importance

of this may be realized more fully when it is remembered that a variation of but a few cycles on the fundamental frequency can cause an error as great as several kilocycles on the high-frequency harmonics. The percentage error is the same on all the harmonics but the amount of error in cycles is different for every harmonic and directly proportional to the order of the harmonic.

If every amateur would become sufficiently "frequency conscious" to build a simple and inexpensive frequency sub-standard of this type, there would be no excuse for further operation outside of the bands. As laboratory equipment its uses are many; as amateur equipment it is worth its weight in gold.

Strays

W6EEL, reading a radio article in the *San Francisco Examiner*, discovered that a certain aircraft set uses a 500-cycle direct current alternator for plate supply. He wants to know where to get one!

W9DNC recently put up a new antenna, and, after testing it out, disconnected it temporarily so no one could clutter up the air while he was at work. Next day he went back to the set and called a CQ, raising a station in New York. After a QSO of about ten minutes, during which W9DNC's signals were reported R7, he discovered that the antenna was still disconnected from the transmitter! The feeder was about ten inches from the set, so the capacity coupling would be extremely small. Why go to the trouble of putting up an antenna?

W5LB found an easy cure for hum in an a.c. receiver. None of the usual cures seemed to work but the hum stopped completely when a .25 meg gridleak was substituted for the conventional 7 or 8 megs. The sensitivity was about the same with either value.

A variometer with leads soldered into a tube base makes a good broadcast coil for the short-wave receiver. Half of the rotor turns and all the fixed turns should be used. The coil has the added advantage of being variable.

—Ray Howe, Red Wing, Minn.

Most food stores sell "canned" chicken which is put up in glass jars a little larger than the ordinary custard cup. W8AE uses the jars for lead-in insulators.

The Fourth International Relay Competition

March 8 to 21—Contest for Most QSOs—All Parts of World with U. S. A.—Canada—Worldwide!—No Foreign Entries Required—Entries Helpful to U. S. A.—Canadian Operators—New Rule Permits Any Amateur Station to Take Part Without Advance Entry

By F. E. Handy, A.R.R.L. Communications Manager

THANKS for such a fine party. The contest was vy FB!! With low power here I worked 24 countries in 5 continents. Every hour was solid fun. Wish you had them more often. Don't forget to have another soon. Begging you for another as soon as may be." These comments taken at random from reports on the *Third International Competition*. DX, the Official Organ of the Hongkong Amateur Radio Transmitting Society, refer to the contest as "the most stirring competition in the era of radio communication" in the official report citing the success of VS6AH. Readers are referred to August, 1930, *QST* for the detailed account. All of which is by way of introduction to this announcement of a Fourth International Relay Competition to bring new and renewed international DX friendships.

The March contest is world-wide in scope. It will show which foreign amateur stations can make the best record for reliable QSO's with this continent—and it will show the outstanding stations for working DX in each one of our A.R.R.L. Sections. There will be plenty of fun and DX to go around. Amateurs with the prefixes W and VE will be taking part in a QSO party with stations in all parts of the world including Hawaii, the Philippines, Porto Rico, Alaska, etc., where K and KA are used. Experimental or test messages are to be handled to prove that actual solid QSO's are made. However, the nature of this test is so designed that the government regulations will not prevent anyone in any foreign locality from taking part. Our test traffic would under no circumstances be filed for handling by commercial communications channels and complies with the international regulations as to what may be handled in every particular.

General Plan of Competition

Stations in the United States and Canada signifying intention to take part will each be provided with official A.R.R.L. test messages just in advance of the opening date of the contest.

Stations outside the U. S. and Canada will try to work as many W and VE stations as possible to get the test messages. As soon as each such station is in possession of one of the official test messages which has been acknowledged to the

station from which it was received, a reply message will be prepared and assigned the exact serial number given in the North American test message. This *reply contest message* may be sent to *any other W or VE station* than the one from which the message bearing that serial number was taken. No address is necessary on any of the test messages but the serial number and identification group are very important for identification purposes. The return message will *not* count for anything in the score *if returned through the same station* that sent the original test message or if the text and signature duplicate a message already sent. *No station can accept a reply test message bearing his own serial number combination* on penalty of disqualification. Messages with incorrect serial numbers don't count for any one. The text and signature (if any) of the reply messages must total at least ten words to count—ham abbreviations aren't words, either. Five figures or fraction thereof count as one word when sent in a group.

Just as soon as a few test messages are off the hook, the replies will begin coming back. Everyone will be looking for replies because these count for more in the scores of the stations handling them.

In the coming tests participating stations will be limited to sending *one* test message to each station worked. As many messages can be sent to *a given locality* as you can work stations there. This contest (we hope) will help you to add to the list of countries you have worked, and perhaps you will be able to submit your application for a WAC certificate after the fun is over.

Stations in *all* localities need only take part on the dates announced and report results in full at the end of the tests as provided in the rules to be eligible for the certificates which will be presented to the winning stations in each locality. *Competition:* In this international QSO contest the list of international prefixes¹ assigned to amateur stations will be used as a basis for partition-

¹ The Sixteenth Edition of the Rules and Regulations of the Communications Department (1931) contains an up-to-date list of these prefixes and will be forwarded free of charge to any address on receipt of a postal. The new edition also contains the complete text of the F. R. C. regulations for amateur stations, data on operating practices, a photograph of W1MK and other useful information.

ing foreign localities. One handsomely engraved certificate will be presented to the winning station in each foreign locality in token of its achievement in making the greatest number of solid two-way contacts with U. S. A.-Canada stations.

In the U. S. A. and Canada operators will be competing in the main with other operators located in the same A.R.R.L. Section.² There's nothing to prevent you from working to be national "high station" if you like, but certificates will be awarded to the winning stations scoring the highest for each U. S. and Canadian A.R.R.L. Section.

Scoring

The basic principle of both the W/VE station and the station in a foreign or remote locality receiving one point when the test message is acknowledged by the station in the remote locality has been followed. Also the count is two points for each station when a reply contest-message (to U. S. A. or Canada) is acknowledged or OKed by a W/VE station.

Certificate awards will be made to the highest scoring station in each continental section. This puts operators in the same localities in competition and is equally fair to all. There are unavoidable differences in the ease of working certain countries from the east or from the west coast and in the numbers of active amateur stations in the different countries at any one time and so the plan to have amateurs in one section compete only with other amateurs in the same section is the only satisfactory solution for all concerned.

The highest scoring stations in the national scheme of things will be of interest, too, and the balanced credit plan tested last year will be used again with some slight changes. Stations in Minnesota, Iowa, Missouri, Arkansas, and Louisiana and east of these states will be regarded as "eastern" stations, and all stations in states west of those named will be classed as "western" stations. Stations in the Ontario, Quebec and Maritime Sections will be classed as "eastern" and in other Canadian Sections as "western." The sum of the points obtained with all stations with which contest traffic is exchanged will be multiplied by certain arbitrary factors built up from simpler ratios, dependent on a consideration

² See page 5, this issue QST.

of the relative difficulties of working different continents from a position on either the east or the west coast. The factors are given herewith and you will note that due to the widely separated portions of North America, it has been necessary to group some countries. In addition, our records indicate that Mesopotamia must be segregated from the rest of Asia and separate factors applied. In our list the factor for the east coast group of

stations is always given first. Europe, 3, 11; Africa, 15, 10; South America, 3, 3; Mesopotamia, Iraq and Palestine, 5, 15; Asia (China, Japan, Malay States, E. Siberia, Siam, French Indo-China), 20, 10; Oceania, 4, 3; North America (Alaska, 4, 3) (Mexico and all Central American countries, 3, 3) (Porto Rico, Cuba, Bermuda, Bahamas and Antilles, 2, 5) (Greenland, Iceland, Newfoundland and Labrador, 3, 5).

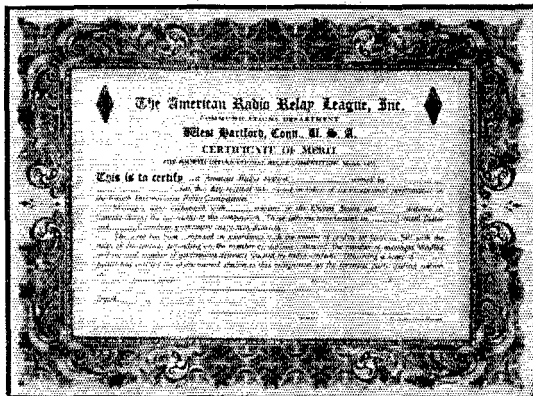
After all the individual scores have been multiplied by

the proper factor depending on whether you classify as an eastern or western station and the results added together this amount is to be multiplied by the number of continents worked to give the total score. The contest will then offer a distinct incentive to qualify for the WAC Club! With our own continent qualifying as one (except that W and VE QSO's with other W and VE stations will not count in the test, of course), we wonder how many stations can succeed in working all continents in the two weeks of our tests.

To make the contest scores of somewhat similar magnitudes and interest for participants residing in remote localities, we are ruling that their total scores shall be multiplied by the number of U. S. and Canadian districts they have succeeded in contacting to give the total score. There are nine U. S. federal inspection districts and five Canadian districts making a possible multiplier of fourteen!

Certificate Awards

As in our previous international contests, there will be certificates awarded to the winning foreign contact stations in each of sixty-four Sections in the U. S. and Canada. Of course stations in the outlying localities, Alaska, Hawaii, Philippine Islands, Cuba, Porto Rico, and Newfoundland,



IN WHATEVER COUNTRY YOU LIVE, YOU WILL COMPETE DIRECTLY ONLY WITH OTHER AMATEUR STATIONS USING THE SAME INTERNATIONAL PREFIX

The attractive blue certificates that will be given to the leading station in each locality outside the U. S. A. and Canada in our International Relay Competition as shown above.

using prefixes other than W or VE will be awarded certificates based on their work with W/VE stations just as in the case of other remote localities. In addition as many "certificates of merit" will be issued for remote points as there are participating and reporting foreign localities. The main competition you receive will be that of the operators in your immediate Section of our A.R.R.L. organization. Provision has been made to tabulate the Section scores too, to determine for both contests which Sections have the most active organization in proportion to the distribution of licensed amateurs in the different sections.

Every station operator has an equal opportunity insofar as this can be arranged in this contest. Much depends on the judgment of the individual operators in determining the times and frequencies of operation of each station as well as on operating ability itself. Low

power apparatus succeeds as often as high power on 14,000 kc. as was clearly demonstrated in our last international competition.

As usual a full report of our contest results will be printed in *QST* with the names and call signals of the certificate winners in each Section in the mainland United States and Canada, and in each and every remote locality in the world where amateurs participate. Reports are wanted from every station whether the score is one or one thousand, whether you live in the U. S. A. or in China. Get in on the fun and cooperate with your fellow ham by sending in your log and messages as confirmation of his score and so that we may mention your work with the rest.

W/VE Participation without Advance Entry

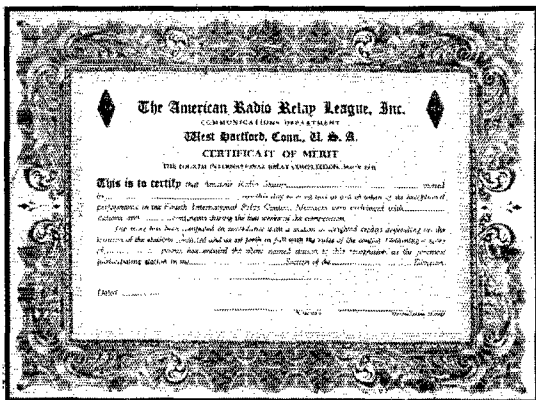
New arrangements make it possible for late comers to take part in the fun without advance entry. Of course it has never been necessary for the stations in remote localities to "enter" — but in the international affairs of previous years American amateurs were required to enter to receive special logs and official messages, as well as a serial number assignment. These helps are available as usual, and such entries are solicited in advance (just send a QSL-entry card) so that we may give you a full set of forms before this "open season" we have declared on DX arrives.

You are urged to enter promptly if there is the slightest chance of participating.

But for those who have failed to read the advance announcements or who may find on hooking up with a foreign station that a message is "expected of them" there is a way out. A "test msg" asking a question on any subject, having a text of ten or more words, may be prepared and sent in just the form shown in the sample message,

"nr258652 X97."

Every such participant who is not officially entered in advance of the contest shall assign himself a distinctive six-numeral group which shall be used as the first part of each message-number he originates. Every message sent must ask a *different* question and be prefixed by a distinctive designating cipher combination which shall consist of one letter followed by two numerals in each case. That is, the second message originated by a certain



THE CERTIFICATE OF MERIT TO BE AWARDED TO THE STATION SCORING THE HIGHEST NUMBER OF POINTS IN EACH AND EVERY U. S. AND CANADIAN SECTION IN THE FOURTH INTERNATIONAL RELAY COMPETITION

contest station might bear the number 258652 Y98; the third message, number 258652 A54, etc. Rule 6(a) should be read carefully before reporting results.

In General: The 7-mc. band has carried the burden of our DX contacts for some time and will, no doubt, be depended on for many of the points in this contest. However that may be, overlooking *either* the 3.5- or 14-mc. bands this year is likely to prove a costly mistake. In the last contest the 14,000-kc. band proved ideal for daylight DX to remote points — good for evening work until 9 p.m. or later, too, and what a relief after 7 mc. QRM.

Stations using 14 mc. for the first time are cautioned to use care to keep in the band — slight tuning capacity changes, antenna changes, etc., can change frequency over very wide limits — interference with A.T. and T's 14,440-kc. channel (GBW) from off-frequency amateur operation will not be decidedly out of order.

Also W/VE hams are being heard across the water *regularly* on 3500 kc. this season, QSA5 reports from G-ZL-VK, etc. In the Transcons just concluded and to be reported in full next month this band was used with the greatest ease for 3000-mile coast-to-coast work, not only by such key-pounders as W6AKW, W6AM, W4JR, W1SZ, W3CXM, etc., but also for 100% voice

QSO's by those behind the mikes at W7ANT, W6CNE, W1BCR, and W4TM. In addition let us say that many of the 'phones are being reported nightly by European amateurs. W3GS keeps "sked" with G6WY who has worked W1EU, W3AQR, W3AWU, W3AWB, W3UX, W3OZ, W3AJN, W8BAS, W8UV, W8BTV, W9AIN and VE3ZZ. Also G5BY gets across regularly, W1HD has worked D4UAN with 34 watts input, W1WV contacted Netherlands and the like, *all on 3500 kc.* But why mention more — these things just go to show that it will be very much worth while to give 3500 kc. a twirl for points. The best

ever the odds, it's the spirit in which we take part that counts. Likewise the opportunity to exchange QSLs with all stations contacted or heard to make a permanent record of the occasion should not be overlooked.

Last year's results indicate that the majority of stations worked were raised, not by sending CQ, or testing on a half-dozen frequencies — but by *first* listening and locating foreign amateur stations, then going after them. No excuse for ten minute CQ's, although *directional* CQ's in accordance with the R. and R. will help in some circumstances. The stations in remote localities,

SUMMARY OF FINAL SCORE

Fourth International Relay Competition

Station _____ Serial Number _____

POINTS GAINED HANDLING MESSAGES WITH:	MULTIPLIED BY	THE PROPER FACTOR SEE "SCORING"	EQUALS	TOTAL POINTS
<i>Europe</i>	x		=	
<i>Africa</i>	x		=	
<i>South America</i>	x		=	
<i>Mesopotamia Iraq and Palestine</i>	x		=	
<i>Asia (China, Japan Malay States, E. Siberia, Siam, French Indo-China)</i>	x		=	
<i>Oceania</i>	x		=	
<i>North America</i>				
<i>Alaska</i>	x		=	
<i>Mexico and Central American countries</i>	x		=	
<i>Porto Rico, Cuba</i>	x		=	
<i>Bermuda, Bahamas and Antilles</i>	x		=	
<i>Greenland, Iceland Newfoundland and Labrador</i>	x		=	
<i>Sum total Points- No. continents worked-</i>				
FINAL SCORE _____ = <i>Sum total points x number of continents worked</i>				

REPORT FORM—REQUIRED OF W/VE STATIONS—SEE RULE 6(a)

use of *all* our hands, the exercise of judgment in operating to avoid congested band conditions and use available equipment to best advantage will have much to do in determining the results.

"1931" stations with good notes and stable frequencies will help make *this* contest more enjoyable. Both public opinion and government regulations have ruled against "ac" notes and we hope to hear less about them this year. With perhaps double the amount of operation normal for this season the planning of frequencies and hours for most effective participation and real operating skill are essential to win. All stations in the swim will be "sporting" we are sure. What-

not W/VE stations, are the ones using CQ most effectively in previous international DX affairs.

Operators interested in the times when signals from foreign localities will come through best are referred to data presented in the I.A.R.U. department of *QST* (back numbers), to the table, page 42, September, '29 *QST*, or to the detailed article and optimum frequency curves presented in *Proc. I.R.E.* for November, 1930. Here on the East Coast we remember the 3500-ke. signals from Europe used to come in well in January and February from just after dark until about 2 a.m. E.S.T. (or sunrise time in England). On the West Coast contact with Australia, the Philip-

piners, China and New Zealand probably can be established on 7 mc. shortly after midnight and maintained until local sunrise time. We haven't space to go into detail here but can perhaps summarize approximate information for groups of localities briefly. For Lat. 42°, Long. 75° (Schenectady) contact should be good *in winter* as follows: With Europe 7 mc., 5 p.m. to 1 a.m. E.S.T.; 14 mc., 3 to 4 a.m. and 2 p.m. E.S.T.; South America, 7 mc., 9 p.m. to 6 a.m. E.S.T., 14 mc., 6:30 to 9:30 p.m. and 2:30 to 9 a.m. E.S.T.; China, 14 mc., 2:30 a.m., 9 a.m., 3 p.m., 7 p.m. (best times to try); India, 14 mc., 11 a.m. to 1

amateur privileges by off-frequency operation or who operate nearer the band edges than the accuracy of their frequency measuring equipment will justify *should* be penalized as provided in the Rules. With highly accurate s.f. transmissions sent every Friday and Sunday from W1XP, W9XAN and W6XK and the widespread use of accurately calibrated dynatrons such as described in October, 1930, and February, 1931, *QST*, only outright negligence in attending to these matters is responsible for amateur off-frequency operation. Let's see less of it. At any rate, Rule 7 means just what it says. Disqualifications will be

LOG SHEET, FOURTH INTERNATIONAL RELAY COMPETITION

This sheet must be complete and accurate
Each message received counts 2 points and each one sent counts 1 point

STATION WORKED	COUNTRY	CONTINENT	YOUR FREQ.	MESSAGE SERIAL NR.	SENT OR RECEIVED	DATE	TIME	POINTS

p.m., also 5 p.m. E.S.T.; South Africa, 14 mc., 4 p.m. and 11 p.m. E.S.T.; Australia and New Zealand, 14 mc., 7 to 9 a.m., midnight to 4 a.m. E.S.T. This information takes transmission conditions into consideration, but without assurance that these are the convenient operating hours when operators in the countries named actually get on the air.

Disqualifications

Last year over a score of stations were disqualified by the award committee. Of this group a large number were guilty of off-frequency operation. The use of a station unlicensed by the F.R.C. (borrowed call) and also the receipt of reports after the closing dates specified in the Rules were other reasons for disqualification. Those disqualified for off-frequency operation were in the majority, however.

Participants are requested to observe and report fully on all irregularities in the interests of justice. Also, all A.R.R.L. Official Observers are requested to make a special effort to log and report any and all stations that may be off-frequency with the usual accuracy and care during the competition, too. The award committee may have as much data from independent sources as possible to aid in rendering fair, impartial decisions. It is believed that careless amateurs who jeopardize

enforced on consideration of any and all evidence which is presented.

Example of Contest Work

We shall assume that at the start of the contest VK7CH works W6BAX and takes one of his test messages selected at random from his (W6BAX) list of messages provided by A.R.R.L. HQ. just before the tests begin. After the stations finish their QSO, W6BAX looks for other countries to work while VK7CH writes out an answer to the message he received to give to some *other* station in the U. S. or Canada the first chance he gets. On his next QSO, VK7CH hopes to send this reply message and at the same time *receive another message* to boost his score. If the message he takes on the second QSO happens to have the same text as the previous message, he can take it or ask for a different message if he likes. If he takes it, he must be sure to answer it *differently* before QSPing back to a U. S. or Canadian station. Late in the contest VK7CH may work W6BAX again. Unable to *take* a second message from him, he can give W6BAX *a reply to a message* taken from any U. S. or Canadian station *except* W6BAX. W6BAX will know it is a different message because it will bear a different serial number than the one assigned any similar message which W6BAX may have originated. Every set of

message assignments is identified with a participating station by the cipher number which *must* be used in numbering the reply test message for identification and checking purposes.

Sample messages as sent by U. S. or Canadian amateur stations:

TEST MSG DE W/VE. (Insert call signal.)
Nr. 258652 X97. (Insert date.)

WHO WILL REPRESENT YOUR COUNTRY AT THE COPENHAGEN TECHNICAL CONFERENCE -----

Answer as worded by any amateur in another locality and sent to some *other* U. S. or Canadian (W or VE) station:

REPLY TEST MSG DE G/VK/ZL/ZS/F,
etc. (Insert call signal.)

NR 258652 X97. (Insert date reply returned to W or VE.)

----- I AM INFORMED THAT MY NATION WILL NOT BE REPRESENTED AT THIS CONFERENCE -----

(Sign name and address if you wish for identification.)

Rules of Contest

1. The contest opens March 8 at 0000 G.C.T. and closes March 22 at 0000 G.C.T. Work before or following these dates and times shall be disregarded by the award committee. (E.S.T.: March 7, 7 p.m., to March 21, 7 p.m.) (7 p.m. E.S.T., 6 p.m. C.S.T., 5 p.m. M.S.T., 4 p.m. P.S.T.)

2. Although as many stations in each foreign locality as possible can be contacted, U. S. or Canadian amateurs may *each* send and receive just ONE contest message to any particular station worked.

3. Similarly but ONE reply contest message shall be accepted from any one station in a foreign locality.

4. Reply contest messages must contain ten or more words in the texts. Replies are prepared by the contestant himself who must see that each message is differently worded. Reply messages count only when sent to a station in the U. S. or Canada other than the station from which the original message bearing the distinguishing serial number was obtained.

5. Credits: (U. S. and Canadian stations.) Sending the contest message counts *one point*. Receiving a reply contest message from abroad counts *two points*. The score will be augmented regardless of whether a message is exchanged in one or both directions, differing in this respect from our February Sweepstakes.

(Stations in all other localities.) Receiving the contest message counts *one point*. Successfully transmitting a reply test message to U. S. or Canadian amateur station other than the one from which the original message was received counts *two points*.

Total scores in all localities shall be computed in accordance with the number of continents or U. S. and Canadian inspection districts worked, including the system of weighted credits specified elsewhere in this article in the case of U. S. and Canadian stations.

6. A report by mail is required of all participants at the close of the contest. Whether your score is 1 or 100, we want the dope for QST. All reports should be in the mails within three days of the close of the contest. Late logs and contest message files will not receive consideration in the analysis of results to determine the certificate winners or for QST mention. U. S. and Canadian logs and messages will be received up to midnight April 6, 1931. Reports and confirmation copies of messages handled in the tests will be received from stations in other localities up to midnight May 15, 1931. Reports received after these dates will be returned to the senders.

(a) United States and Canadian stations must return the message assignment sheets with the record showing when the message was sent, call of station to which message was given, date and frequencies used in the spaces provided on the special log sheets that will be issued to all who enter in advance. The copies of all messages received from foreign localities must be turned in as evidence of QSO with stations in the different localities. The information on time, call, date, and frequency should also be included directly on each message. If self-assigned serial numbers and messages are used, as in the case of a W/VE participant, not officially entered in advance of the contest, *all the data mentioned herein shall be required and the "log sheet" and "summary of final score" shall be tabulated and reported in the same form set forth in this announcement.*

(b) Foreign confirmations: Copies of all contest messages received and reply test messages must be turned in with the information requested under (a). All reports should be mailed to the following address promptly at the conclusion of the contest: *International Contest Headquarters, Care A.R.R.L., 38 LaSalle Road, West Hartford, Conn.*

7. Evidence of more than one test message to any one station from a single U. S. or Canadian station will make a contestant ineligible for either a certificate award or honorable mention in QST. All stations must abide by the regulations of their respective countries or become ineligible. Other evidence of intentional infraction of the rules will make the contestant ineligible similarly. Also disqualifications positively will result from off-frequency operation, regardless of whether this is wilful or due to negligence or carelessness.

8. The contest message serial number must be used in the reply test message. It is suggested that foreign participants include name and QRA at the end of their reply test messages for identification purposes. This is not a requirement necessary for proper credit, but it is desirable.

A Ham Tragedy

In Which Her OM's DX Fever Wrecked a Romance

By Henry L. Krichbaum, W8BWZ*

NOW you doubtless know that even though a transmitter is hittin' the bottles 'way over 'mongst the Aussies, cracking through drippy QRM seven nights a week on skeds, and making the OB's heart fairly steam with well-placed pride, that every once in a while the call of the moon and the wild gets going and when it does — oh boy! Well, poor old W8BWZ took it on the cardiac the other day, and since his xmttr is hardly as sweet as the one mentioned above, the terrible triangle got isocoles in the direction of the fair. To be exact, hazel eyes and curly hair took him for a ride. And what a ride!

'Twas a beauteous night. The hack was very, very new, with eight big cylinders smoothly sucking in the gas, and booming along at about sixty-five. It was just cool enough so you didn't feel loggy, and just warm enough to be warm. Swell moon, swell stars, swell road. I repeat! what a night! The sum and upshot was — I tumbled. Heels over head and head over heels. Dates for three weeks ahead — as many as I could get — prospects of pawning everything of necessary — just to make life grand for the dear little thing. A great big sorrow for anybody without a girl friend exactly like her. And a boundless love for everybody — even her OM.

There, brethren, is where the trouble started. Ah me, ah my, there's where it started! For, with all intent, purpose, and imminent results, the fond father objected to her many engagements with me. Not because of any personal reasons, but he just didn't think it was very FB to run around with one single lad all the time. Variety was his motto, it appeared. Well, that was only the beginning, though. The same fond father, in addition to having this absolutely treasonous yen for variety, was a BCL DX hound — and what I mean they sure are hounds, straight from the land of Beelzebub — who was in a habit of ankling downstairs every three o'clock in the morning for a session with New Zealand — which he very seldom even heard of. To make it worse, the man was using fourteen tubes, not counting half a dozen doo-kickeys which he claimed were marvelous interference eliminators, almost always.

Of course, now, that almost always had a catch to it, too, and all for your own little darling. The hours when it — or they — applied, coincided exactly with the hours when W8BWZ emitted. The male progenitor, might I say, was very

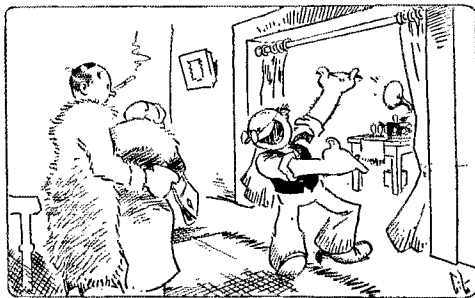
*915 Caledonia Ave., East Cleveland, Ohio.

puzzled about this queer time for non-action on the part of his love-lights. Slightly wroth, also, egad! Hence, consequently, I was maneuvered into a slightly awkward position. One of those places where the only way out is up and I would probably sink.

It wouldn't have been so bad except that I was all hot and cold every time I so much as thought about the YL. If she hadn't been such grade AA cream in my coffee, I could have told the old billy goat to swizzle his fourteen tubes in a barrel of filament oil. (And if you think there be none, come around some time.) But in event of that occurrence, gone would have been the fairest of the fair, the acme of everything, and the plate power for my personal set-up (the very heart of its performance). Perhaps you'll notice my boundless love was simmering down. Well, it was concentrating.

One night, I brought the dear one home at about three clanks of the ancestral chronometer and who should be dancing about on his tiptoes, chortling like unto a hyena and making noises like a jubilant, but anaemic parrot? Or an ape? None other than himself.

"New Zealand! Oh, just listen to that! New Zealand! By the living stars of Jonathan! New Zealand!" The poor man had it! Fourteen tubes



and six doo-kickeys had come across! Ah, but brethren, had I but known! Had I but been wise!

"Horse-feather!" I heard myself saying, the ham burst out in mine noble blood, "I hear New Zealand every night! That's easy! What's really tough is to land a regular sked with some AC who has to duck the cops every fifteen minutes or get juggled! Man! That's DX and TFC what is!" And then maybe he didn't shut up and stare at me!

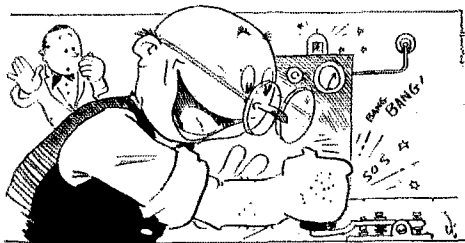
"You go on up!" he suddenly shouted at the girl-friend, who was trembling at my manly side,

realizing what a break I'd made. "Let us be alone!"

"Goo — goo — goodnight," I gasped.

"Goodnight, Henry," said she in a sad, sad voice, "and — goodbye —" I really suppose she burst into muffled sobs after that, but her fond father, the BCL hound, was pushing me forcibly into a big, big chair. At least, in comparison to me, it felt big.

"Now —" and his face was about as kindly parental as a Wall Street bucket shopper — "What was this about New Zealand every night? Do you realize what you're saying young man? Are you by any chance inebriated? Are you in



"TO POUND BRASS HALF THE NIGHT"

your right senses? Come — the whole truth! The achievement of my life is at stake! If what you say is true, I will give you anything — anything — yes — anything for the secret!"

"Why — why —" I was on the verge of passing all the way out, like a 210 with three thousand on the filament — "I really do that. It's — it's — why I'll tell you what! Come over to my shack and I'll prove it!"

There, brethren, is where I made *the big mistake!* Never again for me the sweet bliss of an uninterrupted QSO with a grand old VK bottle-socketer. Never again the joys of DXing all by myself with every comfort of home! 'Twill be the wilderness for me, and maybe no safety then!

"Well, well, well!" he expanded as I showed him the shack. "This is some outfit, youngster! Some outfit! By the living stars! Some outfit! And — say, what does this do?"

The old boy went completely egg-dome over my xmtr, revr, and all. But he wanted to touch everything with the fingers of BCLdom! He tried to turn a stand-off insulator and pushed the key playfully before the tubes were hot. He twanged my lead-in wire and he just about dived at the earphones. He stumbled around like a kid in a fire-cracker factory. What a man! They yell about born hams, but nobody ever tried to express the vicious propensities of a born BCL in a ham shack!

Finally, I got a ZL fone on the loud speaker so it just about rocked the room apart. I hoped that would satisfy the pater. But he didn't leave until nine o'clock in the morning!

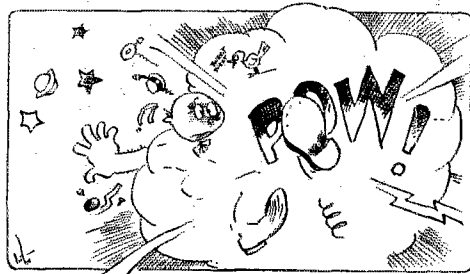
Night after night he came over. Hither and thither did he fly, making things look as if the place belonged to him. And what was worse, since he was at the shack every night, I got no dates with the beloved! It was awful, and things began to work out worse than ever. He learned the code, finally, and decided for me that he would run my transmitter. Outside of forgetting a switch every once in a while, he did very little to pop the two best 852's I ever had in my life. And if you discounted the minor detail of flicking ashes on the comfortable rug which yours in trouble had at much expense provided for his stockinged feet of midnight hours, he did very little except sprawl all over the best over-stuffed chair left from the days of comfortable furniture trends.

Since he had learned the code, and didn't know the difference between his fist and a good one, he insisted on using my electricity to pound brass half the night and also upon my presence despite certain terrible cravings for sleep. He got absolutely wrapped up in the business of running my xmtr without knowing beans about it — not even the Peruvian kind — and before long, matters came to a head — my head — which was rapidly turning gray. Raise or quit.

"Sir," I started very apologetically one night, "I — I wonder — I — I — you know — you know me pretty well. I know you — pretty — very — well — well — we both know each other" —

"Yes, yes, surely!" he boomed, in his great, expansive voice which always rattled my tubes, "by all means. My boy, you need go no further. I'm very, very sorry, but it was all settled last week. She is going to marry John R. Smith, of the New York Smiths! And so you can be spared all your embarrassment!"

That, brethren, was almost the end. But could I be blamed — I ask you now, just in case any of you get on the jury — could I be blamed for accidentally shorting five thousand volts across the key? Could I?



Strays

W1CPH nearly lost his only QSL from New Zealand. It came with the postmark "San Francisco, Calif. — Recovered from S.S. *Tahiti*, lost at sea." That card is on the wall in a special frame!

Standard Frequency News and Schedules

Better Cooperation Needed to Reduce QRM During S. F. Transmissions

ALMOST every one of the hundreds of monthly reports on s.f. transmissions register complaint against the QRM that a number of apparently thoughtless operators cause during the Friday evening transmission periods. The interference is worst at the low frequency end of the 3500-ke. band, being caused largely by 'phones operating all the way from above 3600 ke. to below 3500 ke., but is also had at times in the 7000-ke. band. The obvious relief for this nullification of the efforts of the s.f. stations is some genuine cooperation on the part of those stations operating on or near the affected frequencies. It would be fine if some of the leading 'phone stations would send out a QST during the five minutes immediately preceding the transmission of a 3500 ke. A schedule, requesting the rest of the gang to stand by for about fifteen minutes or so. A few 'phones are doing this now, and their efforts are already bearing fruit. Perhaps some of those 'phones that persist in wandering clear down into the airways channels could be persuaded not only to stand by but also to make use of the transmissions and calibrate something that would show them where 3500 ke. really is. Incidentally, any 'phone man who can actually receive c.w. at the ten words per minute the regulations call for will have no difficulty in getting the s.f. transmissions. The slow keying speed, the continuous repetition of the station's characteristic letter, and the exact timing of the transmissions make it possible for one having but a speaking acquaintance with the code to make full use of the standard frequency signals. In fact a recent letter from an enthusiastic short-wave b.c.l. informed us that he had made use of one of W1XP's transmissions to calibrate his receiver although he couldn't copy a single letter in code. He identified the various frequencies by the time at which they were transmitted and identified the station by the repeated "dah dah dit" which a code chart showed to be W1XP's characteristic letter, G. Anyone who can tune a receiver can make use of the standard frequency transmissions.

Irregularities in skip-distance effects are affecting the coverage of 7- and 14-mc. transmissions, particularly those from W9XAN and W6XK, making reports on the transmissions on these two bands particularly desirable.

Harold Peery's duties took him to San Francisco during February — Ernest G. Underwood being in charge of W6XK in his absence — temporarily interrupting a program of improvement which is steadily in progress at the Pacific Coast Station. The transmitter at W6XK uses four

Type '52 tubes in a push-pull-parallel t.g.t.p. circuit with a plate input of 375 watts which will be increased to normal as the experimental work goes on. Various radiating systems are being tried to find the best type for the station's purposes.

The new transmitter was put in service at W1XP during January, and reports on its performance are being watched with interest. Two views of the Round Hill station are now on hand for distribution to those reporting on W1XP transmissions (see page 36, January QST, for details), and more will follow. Their schedule BB, 7 mc. on Friday afternoons, is proving useful over a large territory and can be used by many who find the evening transmissions on 7 mc. unsatisfactory. Transmitted at 4:00 p.m. E.S.T., it was picked up in Australia on November 28. At this season it is generally useful over the eastern half of North America and is received well in Europe and Africa.

The three A.R.R.L. Standard Frequency Stations will transmit during March and April according to the following schedule. Keep it handy.

DATES OF TRANSMISSION

Mar. 1, Sunday	BB	W9XAN
	C	W6XK
Mar. 6, Friday	C	W6XK
Mar. 8, Sunday	C	W1XP
Mar. 13, Friday	A	W1XP
	B	W9XAN
	B	W6XK
Mar. 20, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
Mar. 21, Saturday	BX	W6XK
Mar. 22, Sunday	C	W9XAN
Mar. 27, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
Mar. 29, Sunday	BB	W9XAN
	C	W6XK
Apr. 3, Friday	C	W6XK
Apr. 5, Sunday	C	W1XP
Apr. 10, Friday	A	W1XP
	B	W9XAN
	B	W6XK
Apr. 17, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
Apr. 18, Saturday	BX	W6XK
Apr. 19, Sunday	C	W9XAN
Apr. 24, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
Apr. 26, Sunday	BB	W9XAN
	C	W6XK

THE TRANSMITTING STATIONS

W1XP: Massachusetts Institute of Technology, Round Hill Research, South Dartmouth, Mass., Howard A. Chinn in charge.

W9XAN: Elgin Observatory, Elgin National Watch Company, Elgin, Ill., Frank D. Urie in charge.

W6XK: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

STANDARD FREQUENCY SCHEDULES

Friday Evenings Schedule and Frequency		Friday and Sunday Afternoons Schedule and Frequency		
Time (p.m.)	A	B	BB	C
	kc.	kc.	kc.	kc.
8:00	3500	7000	4:00 7000	14,000
8:08	3550	7100	4:08 7100	14,100
8:16	3600	7200	4:16 7200	14,200
8:24	3700	7300	4:24 7300	14,300
8:32	3800		4:32	14,400
8:40	3900			
8:48	4000			

Saturday Morning Schedule and Frequency	
Time (a.m.)	BX
	kc.
	4:00 7000
	4:08 7100
	4:16 7200
	4:24 7300

The time specified in the schedules is *local standard time at the transmitting station*. WIXP uses Eastern Standard Time, W9XAN, Central Standard Time, and W6XK, Pacific Standard Time. Schedule BB transmitted by WIXP is intended particularly for European amateurs and starts at 2100 G.C.T. Schedule BX is transmitted especially for amateurs in Oceania and the Far East. It is transmitted starting at 1200 G.C.T. by W6XK. Reports on these special schedules are particularly desired, not only from overseas hams but from those in the Americas also.

Although the frequencies of the transmitting stations are not guaranteed as to accuracy, every effort is made to keep to within 0.01% of the announced frequencies. The frequency standards are calibrated against the National Frequency Standard. Frequent checks on the transmissions are made by laboratories equipped with accurate frequency standards and the transmissions are also checked by the U. S. Department of Commerce monitoring stations.

TRANSMITTING PROCEDURE

The time allotted to each transmission is 8 minutes, divided as follows:

2 minutes — QST QST QST de (station call letters).

3 minutes — Characteristic letter of station interrupted by call letters and statement of frequency. Characteristic letter of WIXP is "G," of W9XAN is "D," and of W6XK is "F."

1 minute — Statement of frequency in kilocycles and announcement of next frequency.

2 minutes — Time allowed to change to next frequency.

REPORTS

Handy blanks for recording and reporting the transmissions can be had for the asking. Just drop a card or send a message to Hq. asking for s.f. report blanks and they will be sent post paid. When you receive a transmission be sure to send in a report addressed to the A.R.R.L. Standard Frequency System, QST, West Hartford, Conn. After a record of the report has been made at this office it will be forwarded to the proper transmitting station.

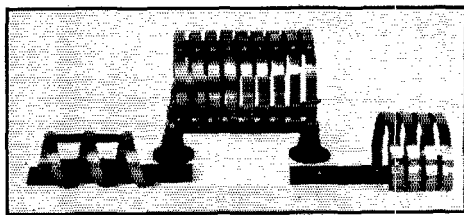
5000-KC. TRANSMISSIONS FROM WWV

Accurate 5000-kc. standard frequency signals will be transmitted from WWV, the Bureau of Standards, Washington, D. C., on the following dates during March and April: March 3rd, 10th, 24th, and 31st; April 7th, 14th, and 28th. These transmissions will take place for two two-hour periods on each of the above dates; from 1:30 to 3:30 and from 8:00 to 10:00 P.M., E.S.T. The frequency of the transmission is 5000 kc. and is accurate to a few parts in a million. More complete details of this standard frequency service will be found on page 39 of January QST. Reports on WWV transmissions may be sent to A.R.R.L. Hq. whence they will be forwarded to Washington.

— J. J. L.

New Transmitting Inductances

THE coils shown in the photograph are designed to be used in High-C circuits with transmitters of fairly high power. The conductor is half-inch copper strip of sufficient thickness to be very stiff mechanically, and the turns are supported by three longitudinal strips of quarter-inch bakelite. Each turn is fastened to the in-



ulating strips by machine screws, resulting in an extremely rigid coil. The insulating strips and the coils themselves are lacquered to preserve the finish and keep out moisture. The diameter varies with the different coils, the largest being $4\frac{1}{2}$ inches.

The mounting consists of a pair of porcelain stand-off insulators supporting a bakelite strip of the same length as the coil assembly. Two heavy brass bolts, each provided with several

(Continued on page 76)

EXPERIMENTERS' SECTION

A Home-Made "Bug"

By C. E. Hedrick, W3WO*

THE semi-automatic key to be described is very easy to construct and the materials may be found in almost every ham's junkbox. It is similar in principle to the "Ten-Cent 'Bug'" described in *QST* some time ago but is smoother in action, and the extra trouble

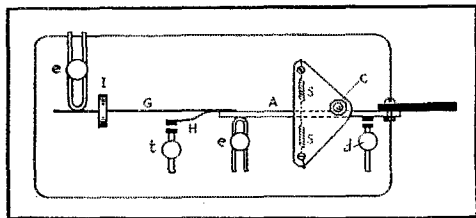


FIG. 1

necessary to build this model is justified by the results.

A top view of the key is shown in Fig. 1 and a side view in Fig. 2. The pivot on which the arm works is the most important part — the top bearing C is held by the bakelite end plate from

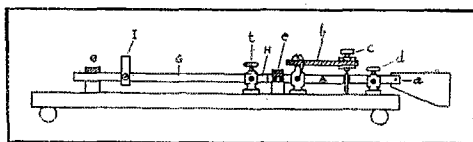


FIG. 2

an old variable condenser after being cut as shown in Fig. 3. This is held up by two binding posts, and a recess for the other end of pivot is made in the base.

The arm A is a piece of 1/4-inch square brass rod about 5 inches long. The pivot and dash contact are soldered to it as shown and the dot assembly, consisting of the vibrator arm G, weight I and dot extension H, are soldered on the other end.

The vibrator arm was made from a very thin corset spring and the dot extension and silver contact soldered on. The weight is adjustable and was taken from an old telephone pole changer.

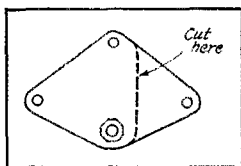


FIG. 3

The springs S-S are fastened to a ring soldered around the arm just forward of the pivot, in line with the binding posts holding the bakelite plate. Details of this are shown in Fig. 4. The

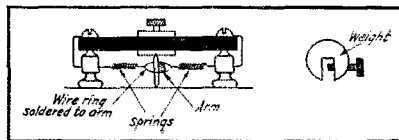


FIG. 4

springs are fastened to this ring and the other ends run through the holes in the binding posts and fastened to the screws holding the bakelite plate. This method makes a good contact with the arm through the supporting binding posts.

The outside keying contacts are made from two-inch pieces of No. 8 copper wire — the pieces of coin silver being soldered to one end. These contacts are slipped through the holes in the posts, making them very easy to adjust.

The stopping posts are made of short binding posts with pieces of No. 12 copper wire bent around them, as shown in the diagram.

No dimensions are given since they will vary with the material used, and it is quite likely that the individual builder will have some ideas of his own which he will want to incorporate. This key is a very neat-looking affair and works even better than it looks.

Neon Tube Oscillators

A neon bulb is useful in many ways in an amateur station, but there are undoubtedly many amateurs who are not aware of the fact that the device can be made to oscillate at either audio or radio frequencies. Fig. 5, supplied by Ralph Damon, W1AJ, shows how a single bulb may be hooked up as an audio frequency oscillator. The L-C circuit is formed by the headphones and a condenser, C, and by varying the capacity the circuit can be made to oscillate at frequencies from a few cycles per second up to the highest audio frequencies. The variable resistor in series with the bulb and battery controls the strength of oscillation, and also controls the frequency to some extent. A .001- μ f. variable condenser will be sufficient to cover most of the audio range. The circuit in Fig. 6 may be used when an r.f. oscillator is to be modulated at audio frequencies. The transformer, T, may be an ordi-

* Box 125, Fincastle, Va.

nary audio transformer, the primary being connected in the oscillator circuit.

The push-pull oscillator shown in Fig. 7 was devised by Joseph C. Hanhauser, Lansdowne, Pa., for operating a radio

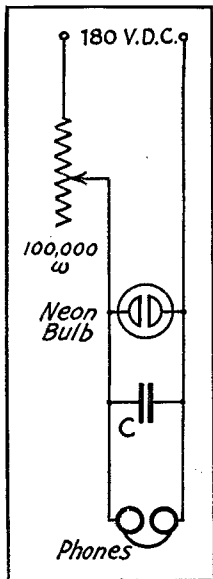


FIG. 5

Discharging Tongues — a New Tool

High-voltage high-capacity condensers retain charges of considerable magnitude — often sufficient to deliver severe jolts several days after the power has been shut off. It becomes neces-

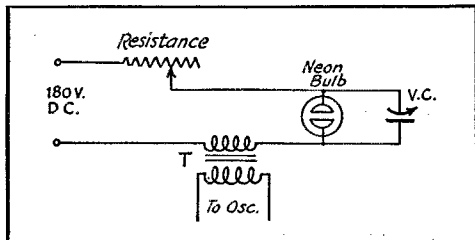


FIG. 6

sary, therefore, to discharge these reservoirs of energy before delving into the set. A slender bladed screwdriver provided with an insulating handle generally serves this purpose, but the screwdriver doesn't have the knack of getting in and about bus wiring, wiggling finally to live terminals.

The tool described here comes nearer to finding the points with which contact is to be made. The tongues open up to accommodate widely spaced terminals, or close much after the manner of scissors to take care of the closely spaced ones.

Whenever a quick short circuit is needed the discharging tongs are invaluable.

The tongs take the shape of a pair of scissors

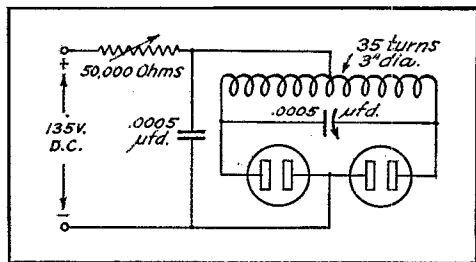


FIG. 7

built of stiff wire. The writer built his up from a wire coat-hanger, but the reader's ingenuity will direct him to other sources of stiff wire. The handles are insulated with the usual varnished cambric tubing or spaghetti so the tool will serve its prime purpose of doing away with shocks. The tool is manipulated in exactly the same way as a pair of scissors, the "blade" tips being opened or closed to accommodate the spacing of the terminals to be discharged. Its slenderness

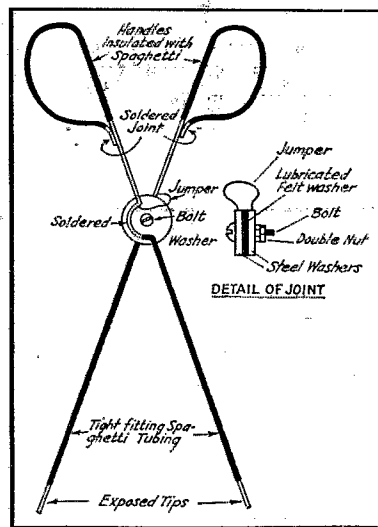


FIG. 8

makes exploring in the immediate vicinity of crowded or semi-crowded wiring possible, and the slight angular shape of the tips, aided by the length of the blades, allows fifty-seven varieties of reaching.

Fig. 8 shows the discharging tongs. Two thin, flat metal washers and a small bolt make up the joint. The blades are curved at their central portions to coincide with the circumferences of the washers and are soldered to the latter. It is

desirable to provide the two washers with a jumper as shown in the drawing, since lubricating oils used in the joint may have some insulating tendency. One amateur who was made a present of a pair of discharging tongs improved upon the writer's plan by placing a lubricated felt washer of small thickness between the two metal washers of the joint, depending entirely upon the jumper for connection. This made for smoother scissors action, and is recommended.

Discharging tongs may be constructed in a few minutes, require only a few odds and ends easily found about the average shack, and are well worth the time spent in assembly.

— Rufus P. Turner, W1AY, W9FZN.

Antenna Coupling

The diagram in Fig. 9 was sent in by Carl Martin, UO1CM, Vienna, Austria. The reason for using the resistors as shown is best explained by quoting part of his letter:

"Here in the city of Vienna QRM from motors, street cars, etc., is very bad, and in an effort to improve reception I tried the 'T circuit' which

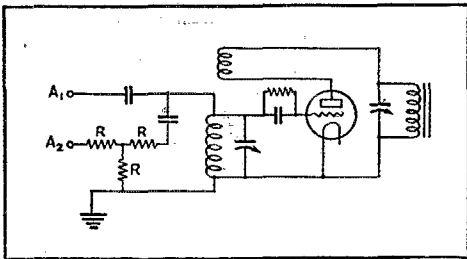


FIG. 9

is used in a Telefunken short-wave receiver. In Fig. 9 is the ordinary regenerative detector, coupled through a small condenser to the antenna at A₁. At A₂ there are three non-inductive resistances, each 300 ohms, arranged in T form.

"With this form of antenna coupling no hand capacity effect is observed on 15 meters, although it is impossible to avoid hand capacity on that band with the usual condenser coupling. I have also found that the ratio between QRM and the signal is better. If motors are running in my house it is impossible to get any signal with the antenna at A₁, but at A₂ the QRM is reduced considerably. The strength of the signal drops only one point in the R scale."

UO1CM would be glad to hear from experimenters trying this type of coupling.

Keying the Power Amplifier

The keying system used by W8BQD, A. E. Alger, Lorain, Ohio, is shown in Fig. 10. It is a variation of the "blocked grid" keying method,

but an old Raytheon "B" substitute is used instead of "B" batteries.

A Clarostat is connected in series with the key across the eliminator, as shown in the diagram.

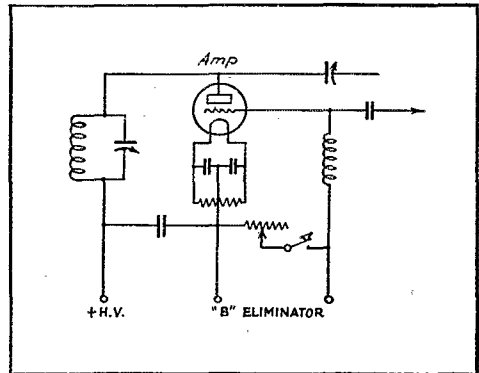


FIG. 10

With the key open, the voltage furnished by the eliminator should be sufficient to completely cut off the plate current to the amplifier tube. Most eliminators have enough voltage taps to make this possible. With the key down, the Clarostat is adjusted until the output and plate current on the amplifier tube are normal. The system operates by virtue of the fact that the voltage regulation of most "B" substitutes is very poor, consequently the bias on the amplifier tube will drop to the working value when the output of the eliminator is shorted through the Clarostat.

W8BQD points out another advantage of this keying arrangement, which is that the Clarostat furnishes a very smooth control of the power output of the tube by regulating the bias. Clicks and chirps are absent.

End-Loading the Antenna

Fig. 11 is a drawing of the 3500-ke. antenna in use at W3AQR, built in an endeavor to make

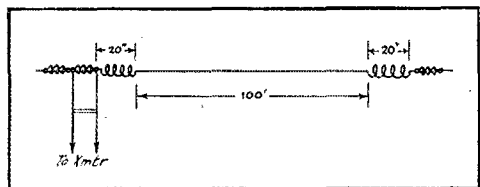


FIG. 11

what should be a 130-foot wire fit into a 100-foot space. Each of the loading coils consists of 27 turns of antenna wire on a three-inch form, the turns being spaced so that each coil is 20 inches long.

One method of adjustment which suggests it-

self is to lay out the antenna a short distance above ground and try different sizes of coils until the desired fundamental is obtained.

Although this type of antenna may not have quite as good radiating qualities as the full-length wire, it works very well for W3AQR and is worth trying if space is limited. The same principal may be applied to other bands as well.

More on Filament By-Pass Condensers

Our recent request for more dope on the usefulness or uselessness of filament by-pass condensers was evidently well received, because quite a few fellows have tried the experiment and written in to tell us what happened. As might be expected, the results are quite variable. Here are some of the reports:

W6BIK: Note and output unchanged when condensers were removed. Transmitter uses a Type '10 tube with a d.c. plate supply.

W4AGL: TNT transmitter using a Type '10 tube on 14,000 kc. Note with condensers in circuit was d.c., but when condensers were taken out the note changed to rather rough r.a.c. Different sizes of condensers were tried and the note was d.c. with any size, but could not be cleared up without them. However, in a separate 7000-kc. transmitter using the t.p.t.g. circuit removal of the condensers improved the note immediately, and although several sizes of condensers were tried the note was always better without them.

W6BUZ: High-C t.p.t.g. transmitter using a Type '10 tube. Note exactly the same with or without the condensers, but efficiency slightly better with condensers in circuit.

W8RD: "About a year ago while experimenting with key click filters I blew my paper filament by-pass condensers on a High-C Hartley of fairly high power. Not wishing to have a similar experience I replaced them with a pair of high-voltage .002 condensers which I happened to have handy. The note, both before and after the change, was usually reported good to pure d.c. and the monitor says it is fair to good. Upon reading W3ATJ's note I disconnected these condensers and found no change at all except a certain detuning of the circuit. No heating had been experienced on any of the four frequencies used."

W8DX: Condensers made no difference in a transmitter using r.a.c. plate supply, but in a later transmitter using a Type '50 tube with d.c. plate supply the note was rough r.a.c. without the condensers and good d.c. with them. Experiments with different sizes of r.f. chokes and different adjustments of the transmitter all gave the same result.

W3RG: Type '10 tube in t.p.t.g. circuit with 500-volt r.a.c. supply. Note better without the condensers on 14,000 kc., but better with the condensers in the circuit on 7000 and 3500 kc.

A 50,000-ohm bleeder resistance is used across the output of the power supply, and with the resistor removed the condensers seemed to be necessary on all bands.

W3GS: "Experiments here have shown that a well-constructed circuit of any type requires no filament by-pass condensers. By well-constructed I mean a circuit in which the r.f. chokes really choke and one in which r.f. current does not flow in places where it does not belong. On the other hand if there is a choke which does not choke some r.f. line properly, the filament by-pass condensers are quite an asset in quelling the stray radio frequency current. I have eliminated filament by-pass condensers in various types of circuits on all frequencies and could not notice any change at all. I do however consider these circuits all well constructed from an electrical standpoint."

VE1CC: "While experimenting with a High-C Hartley outfit using a single Type '10 tube I found it impossible to get the set to oscillate in the 14-mc. band. With the filament by-pass condensers removed the set worked perfectly. Probably in this case the two .001 condensers and the 100-ohm c.t. resistance were forming a tuned circuit resonating near this band. With the same outfit on 7-mc. removing the condensers changed the note from r.a.c. to p.d.c. On 3500 and 1750 kc. the condensers made no noticeable difference."

W2CJP: "Am using a TNT circuit with a Type '10 tube. Plate voltage is 750 and plate current about 60 milliamps. A brute-force filter consisting of two 2- μ f. condensers and a 30-henry choke is used. The by-pass condensers were originally built into the transmitter, but following the reading of the article about omitting them they were removed. Two radio-frequency chokes are used in the set, one in each high voltage lead. When using the set the filter is usually connected in full. But by cutting out one of the condensers and the choke I was getting r.a.c. reports and said to be rough. Since removing the by-pass condensers the reports are crystal d.c. or pure d.c. with full filter and very smooth r.a.c. with one 2- μ f. condenser across the high voltage line."

W6CKS: On removing the filament by-pass condensers r.f. got back into the power supply and blew two protective lamps (see November X Section). A small choke consisting of a two-inch winding of No. 30 on a half-inch form placed in the negative high-voltage lead right at the filter stopped the feedback and made the note d.c. Oddly enough, the same choke placed in the negative line at the transmitter made the note worse. The transmitter was working on 14,000 kc.

W3MC had some unusual experiences with filament by-pass condensers, and since it is an interesting story we are printing his letter:

(Continued on page 76)

AMATEUR RADIO STATIONS

VO8MC

THIS station is owned by W. P. Stoyles, Mt. Cashel School of Industry, St. John's, Newfoundland. The station first went on the air as an experimental broadcasting station in 1925. The following year the Institution was destroyed by fire, which caused a cessation of radio activities for about eighteen months. After resumption of activities several types of equipment were tried, resulting finally in the station shown in the photograph.

The entire station is housed in an old piano. The transmitter is behind the left-hand panel, and the monitor and receiver are built into the



VO8MC

The entire station is built into a piano.

section at the right. The small panel on top holds the antenna ammeter and a lamp which can be used to indicate antenna current instead of the ammeter.

The transmitter uses a UX-852 in a High-C Hartley circuit. Coils are provided for 7000, 14,000 and 28,000 kc., and are made of 5/16-inch copper tubing. The tuning condenser is a home-

made double-spaced affair built up from an old 43-plate condenser.

The power supply is built into the lower part of the piano. There are two high-voltage transformers, one supplying 1200 volts and the other 2200 volts. Either may be connected to the rectifier and filter by a double-pole double-throw switch. The 1200-volt transformer is used for local work and the other for DX. A 48-jar chemical rectifier, connected in the bridge arrangement, changes the high-voltage a.c. to d.c. The filter consists of two 2- μ fd., 1500-volt condensers connected in series across the line next to the rectifier, followed by a 50-henry choke and a 2- μ fd., 2000-volt condenser.

The receiver is a three-tube outfit, with a regenerative detector and two stages of audio amplification. The detector is inductively coupled to the antenna, and condenser control of regeneration is used.

The monitor was built along the lines suggested in the Experimenters' Section in the February, 1930 issue of *QST*. It is entirely contained in a 6" x 6" x 9" metal box. A WD-11 tube, requiring only one dry cell for filament supply, is used as the monitor tube.

The antenna is a Hertz, 134 feet long, with a single wire feeder connected 18 feet, 8 inches from the center. It runs in an east-west direction and is supported by two concrete chimneys, one of which is about sixty feet high and the other seventy. The same antenna is used for both transmission and reception.

VO8MC has quite a few "firsts" to its credit. It was the first Newfoundland station to win a WAC certificate, the first to win an international contest and the first to reach Canada and the United States on voice. More than forty countries in all continents have been worked during the past year.

W6CNX

THIS station, owned by F. L. Johnson, Ephraim, Utah, first came on the air in February, 1927. Like most amateur stations, W6CNX's transmitter used a Type '10 tube, but with a desire for higher power a Type '52 was installed. About this time the results of the League's Technical Development Program were being published in *QST*, and the station was rebuilt along modern lines. A second '52 was added to the transmitter and a new receiver and monitor were installed.

The station layout is shown in one photograph, while the construction of the transmitter is

detailed in another. The receiver, transmitter and power-control panel are on the bench, with the power supply on the floor at the right. The

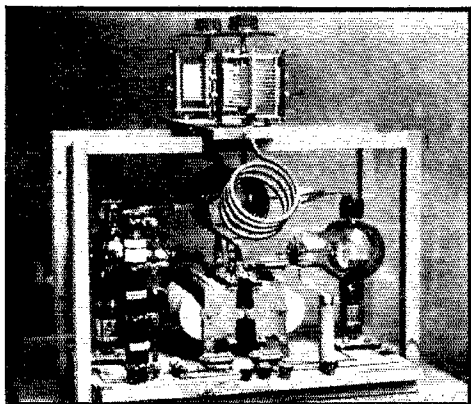


W6CNX

monitor and frequency meter are not shown in the station photo.

The transmitter is a push-pull Hartley outfit, and works on all the commonly used amateur bands. The method of mounting the coils depicted in the photo has been found very effective in eliminating vibration, and allows the use of very short leads. The push-pull circuit, when properly adjusted, results in a very steady signal. The note is reported "near d.c." even when no filter is used after the rectifier, and with a single 1- μ f. condenser in the filter is repeatedly reported pure d.c.

A mercury-arc rectifier is used in the power supply. The high-voltage and filament transformers are all home-made, and are of generous



THE PUSH-PULL HARTLEY TRANSMITTER AT W6CNX

proportions. The plate transformer delivers 2000 or 2500 volts each side of the center tap, either voltage being selected by a switch. Two 2- μ f. condensers constitute the filter. A 100,000-ohm resistor is shunted across the output of the rectifier-filter to improve regulation and prevent peak voltages from building up across the filter condensers.

A separate a.c. line was installed to supply the filament transformer for the '52's. Before this line was put in the filament voltage on the tubes varied as much as half a volt with keying, and caused a bad chirp in the note. With the separate supply line the voltage change is negligible and the chirp is gone. The key, through a pair of relays, breaks the center-tap of the filament transformer and the primary of the plate transformer simultaneously. A resistance is shunted across the relay in the high-voltage transformer primary and is adjusted until the voltage across the filter condenser is the same whether the key is open or closed.

The receiver is a superheterodyne, built along the lines of the set described in *QST* for March, 1929, with the modifications described in September, 1929. Loud speaker reception is possible on all signals that are strong enough to be heard above the noise level.

A combined monitor and absorption frequency meter, designed to give full dial coverage on all bands, completes the station equipment. Both monitor and frequency meter have been carefully calibrated and have been found to hold calibration very well. The output of the monitor is fed into a two-stage audio amplifier and loud speaker, and the signals are continuously checked in the loud speaker whenever the station is operated.

Two transmitting antennas are used to cover all bands. A half-wave 7000-ke. Zepp is used for work on 7000, 14,000 or 28,000 kc., and a single-wire fed antenna takes care of 3500 kc. A tuned 7000-ke. doublet is used for receiving, and its use makes a noticeable increase in signal strength without increasing the noise level.

W6CNX is located in a specially constructed "shack" about 100 feet from the owner's home. In the winter months the set is operated by remote control from a room in the house, using a control system modelled after one described in *QST* for July, 1929. Time delay relays are used, and the transmitting key controls the entire operation of the transmitter.

VE5AW

VE5AW, owned by Lyle Geary, Whitehorse, Yukon Territory, is located one hundred miles north of Skagway, Alaska. The station is situated on a silver fox farm about two miles below Miles Canyon and Whitehorse Rapids, famous since the days of the Klondike Gold Rush. The station first came into being in 1921, with a spark coil and loose coupler on 200 meters. The present station is shown in the photographs.

Lack of adequate power supply has always been a big handicap. After trying batteries, spark coils and dynamotors without much satisfaction, the owner finally erected his own power line to hook on the local power company's lines — the company refused to make any extensions. The local power is nominally 220 d.c., but is often

something much different when the load fluctuates. This drives a 60-watt motor-generator set which furnishes 500 volts for the plates and 10 volts for the filaments of the tubes in the transmitter.

The transmitter uses two Type '10 tubes in the split Colpitts circuit. It is built up on an oak

The filament voltmeter, control switches, and the tuning controls or the oscillator are mounted on the two lower panels. The transmitter works on either 7000 or 14,000 kc.

The motor-generator is placed in an adjoining room and is enclosed in a shielded box to eliminate vibration and reduce commutator hash in the receiver. A filter is used to smooth out the commutator ripple and further cut down QRM. After much experimenting with r.f. chokes and filter condensers a combination has been found which results in a pure d.c. note for the transmitter and no interference in the receiver when the generator is running. The control equipment for the m.g. set and the filter are mounted on the frame to the right of the transmitter.

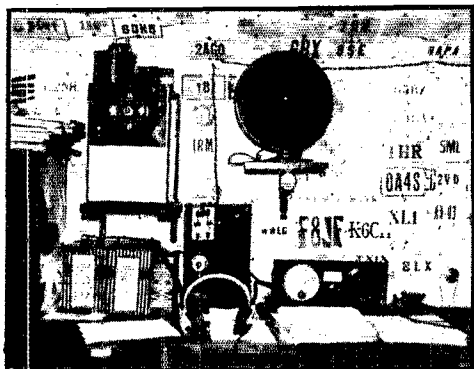
The receiver is a simple detector arrangement using the tuned-plate tuned-grid circuit. A tuned antenna (see p. 39, October 1930 *QST*) is used for receiving, and excellent signal strength is obtained. VE5AW is the only active station in the Yukon, consequently there is no particular trouble from QRM and no need for unusual selectivity in the receiver. The coils are basket-wound, and a set is available for each band. The receiver has two audio stages.

A 7200-kc. Zepp antenna is used with the transmitter. The feeders are 46 feet long, and the horizontal portion of the antenna is 52 feet above the ground. It is worked on the second harmonic on 14,000 kc.

A High-C heterodyne frequency meter (described in November, 1929, *QST*) is used both for frequency measurement and for monitoring the transmitter. It has been calibrated from Standard Frequency transmissions and is checked at regular intervals.

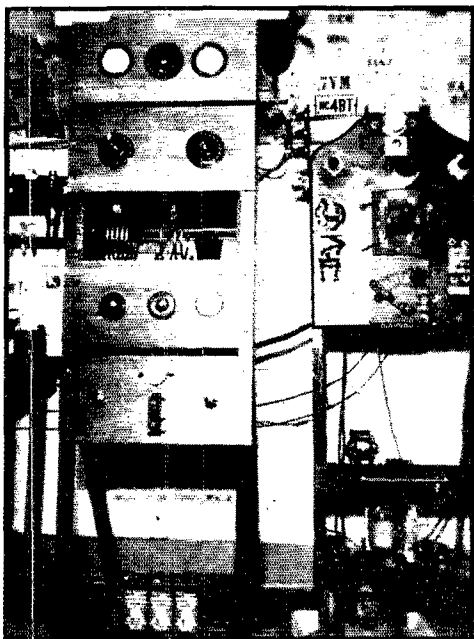
A broadcast receiver and a long-wave honeycomb outfit are used occasionally, although they are not visible in the photos.

The power input to the transmitter rarely exceeds 48 watts, and with this power VE5AW has communicated with 40 countries in all continents; this in spite of the fact that radio conditions are often bad in far northern latitudes because of Aurora discharges. A good deal of traffic from the interior of Alaska and Yukon is handled, and schedules have been kept with foreign countries and ships.



THE OPERATING TABLE AT VE5AW

frame with several panels, as shown in the photograph. The top panel contains the two ammeters which read feeder current and a condenser which is used when parallel tuning of the feeders is



VE5AW'S TRANSMITTER AND POWER CONTROL PANEL

necessary. The panel below it holds the series feeder condensers, and just below this panel is an open space through which the coils can be seen.

Strays

A ham catalog recently distributed lists some Weston Push Type meters. To be used with transmitters installed in the living room, no doubt.

When knocking out alternate plates in a receiving condenser which is being double-spaced for transmitting use, care should be taken not to loosen the remaining plates. A loose plate can cause a jumpy or rough note.

— W3CAB

• I. A. R. U. NEWS •

Devoted to the interests and activities of the
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 Wireless Institute of Australia
 Wireless Society of Ireland

Conducted by Clinton B. DeSoto

ONCE again we have another addition to make to the growing list at the top of this page, where the largest and most active amateur organizations of the world are set forth as the members of this great amateur union. It is that of the *Rede dos Emissores Portugueses* (R.E.P.), whose official address is 93 Rua Senhora da Gloria, Lisbon, Portugal. The R.E.P. was declared elected a member of the Union as the result of affirmative votes being received from a large majority of Union members. We extend welcome and best wishes on behalf of all Union-societies to this, our 19th, member.

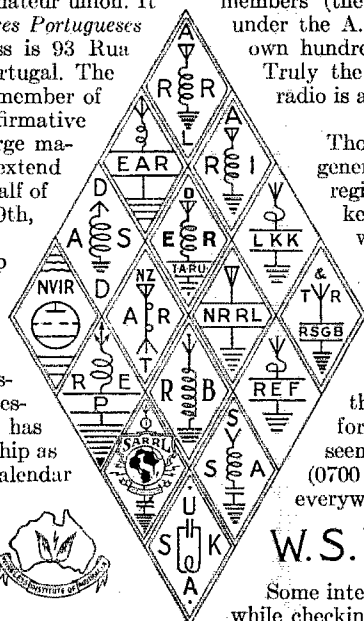
Application for membership has been received from the Suomen Radioamatööriliitto r.y. (S.R.A.L.) as the amateur organization for Finland. This application has been duly investigated, and together with necessary additional information, has been submitted to the membership as a Headquarters Proposal in Calendar No. 5, issued in January. It is hoped that the result of this vote will soon be available.

Occasional reports from the R.E.P. have appeared in these pages in the past, and we hope to be able to publish them regularly in the future. Reports from the S.R.A.L. will be welcomed, as well as notes from any country or amateur society concerning their activity, membership, and principal amateur events.

What do you think of the big I.A.R.U. Diamond on this page? Some Gargantuan proportions it is attaining, is it not? Sixteen brightly shining facets and a two-section base. Nineteen members (the Canadian Section is included under the A.R.R.L. emblem). Each with its own hundreds and thousands of members. Truly the organized strength of amateur radio is a mighty thing.

Thoughts are more than ever turning generally to that old proving-ground region, 3.5-mc. W3GS has been keeping a schedule on this band with G6WY at 0700 G.C.T. WIHD has worked D4UAN. W1WV successfully answered PA0QQ's "CQ U.S.A." Details are lacking as to other distant contacts, but it is certain that more occurred during the past month. The best time for foreign work here on the East Coast seems to be about 2 a.m., E.S.T. (0700 G.C.T.). Reports from amateurs everywhere concerning their international activities on this band are definitely solicited.

Some interesting statistics were uncovered while checking up on the issuance of the new I.A.R.U. WAC Club certificates at the end of the year. A total of 170 certificates were granted during the twelve-month period, 166 of these being for c.w. and four bringing down high honors with 'phone. As much of the list as space will permit will be printed at the end of the



monthly national reports in this issue. But right here let us create a little honor roll for those to whom WAC-for-Phone certificates were issued. They are:

Paul de Neck, ON4UU, March 11, 1930.
 H. Ray Carter, VK2HC, April 28.
 Hilton L. O'Heffernan, G5BY, June 13.
 Frank R. Neill, GI5NJ, October 11.

L. Kalmus, Secretary of the International Amateur Radio Cards Archives, writes to tell us of the enterprise he represents. He solicits cards from amateurs everywhere, having in mind the study, examination, and classification of the (is it?) somewhat lagging art of QSLeration. The address is: Zehetnerg 40, Vienna XIII, Austria.

Norwegian amateurs are, for their numbers, one of the most interested and active groups to be found anywhere — and enjoy a favorable relation with their government as regards the licensing situation. This is pointed out in a letter from G. H. Petersen, N.R.R.L.'s active president. As a matter of fact, the N.R.R.L. practically dictates the issuance of licenses in Norway, testing the applicants and passing on their applications. The attitude of the organization is such that an illegal Norwegian amateur is an anomaly, and is ostracized.

Through W1WV we hear that EI8B has a new 28-mc. transmitter, a push-pull M.O.P.A., with reflector antenna. He desires reports, not having heard or worked U.S.A. on this band for more than a year. Now that the R.S.G.B. tests are past, we hope to hear some interesting news from him, and others.

S. H. Walters, 37 Church St., Worcester, C.P., writes on the non-appearance of South African notes in the news. He fears that other folk think amateur radio in Africa a sport to be indulged in largely by blacks; as a matter of fact (he says) their black culture does not yet rise to transmitting. While admitting that South Africans do serve a useful purpose in providing W friends with WAC, he thinks they can serve in other ways.

The latest issue of QSO, the sprightly little organ of the International Amateur Radio Association of China, lists Chinese calls (exclusive of Hongkong) to the number of 48, a pleasingly large group. As stated in February *QST*, cards to AC stations can be forwarded through the A.R.R.L.

We were very much interested in the following editorial, reprinted from the December, 1930 issue of QTC, the official organ of the S.A.R.R.L.

From various signs and portents in the ham world it is evident that the several bodies which exist to safeguard the interests of the amateur are girding up their loins in preparation for the next Convention of the International Telegraph Union, to be held in Madrid in 1932. There is little doubt



PROMINENT NORWEGIAN AMATEURS ON A RECENT VISIT TO THE OSLO RADIO STATION, LCH

From right to left: LA1W, LA2I, LA-M-007, LA1D, LA1G, LA2C, LA2B, LA1Y, a member LA2V, LA1H, LA2M, LA2Z, LA2F, and three members LA2K.

that commercial interests will endeavour to repeat their tactics of 1927 and put up a very strong fight against the existence of amateur operation on the higher frequencies, and, needless to say, amateur societies the world over are equally determined to put forward the strongest possible case in opposition. Already we hear of "fighting funds" being started to bear the expenses of delegates, and of conferences between the various amateur bodies. Certainly the Madrid Convention promises to provide an interesting spectacle!

The fourth Calendar of the I.A.R.U. outlines the various issues involved from the amateur's point of view. Our chief hope would appear to lie in our ability to convince the various Governments of our potential usefulness, which, in times of stress and national disaster, are undisputed. While in South Africa the fraternity has never had the opportunity to show what it can do in such crises, one has only to turn to America, with its series of floods, hurricanes and similar cataclysms, to realize just what a fine part has, on occasion, been played by amateurs and their hobby at a time when all other means of communication were completely interrupted.

(Continued on page 68)



GI5NJ, FOURTH WAC ON 'PHONE, OWNED BY FRANK R. NEILL
 "Chesterfield," Whitehead, Belfast, Ireland. The first station in Ireland and second in the British Isles to hold communication with six continents on 'phone.

• CALLS HEARD •

ST6HL-SU6HL, I. E. Hill, Wireless Section, 47
(B) Squadron, RAF Khartoum, Sudan

7000- and 14,000-kc. bands
QRA: Houkir, Egypt

cm2xd ct1aa d4opg d4afm d4fv d4uan d4abr d4vr d4fux d4gnq d4go ej7x ear722 es3jr f8uga f8cgv fm8mst f8yy f8aly f8rot f8er g2vq g2gf g2gm g2op g5pj g6gx g6qb g6vp g6ot g6dh g6cn g6wn g6wt hclfg haf3a k4kf la2b on4gu ok2op ok2rm on4ie on4gn oh5nz oz7t ok3sk oh2nm on4or ok2pa pylbf paomm paopf pylah sp3iv splak spllx st2c splae sp3ai ts4sac uoljh uowg vq4msb w2jn

14,000-kc. band
QRA: Khartoum, Sudan

ct1aa eu2hs ei7c eu2es f3whg f8ca f8tex f8phg f8es f8taj f8zg f8fo fm8cur fm8cfr fm8asm g2ao g2cj g2cx g2ol g2vq g2zw g2zp g5bz g5by g5ml g5bq g5bj g6rb g6vp g2nm g6wt g6xq g6wn g6qb haf4p haf6b k4kd oh7nf oh3na ok2op ok2ce on4vo on4vu on4je on4ff on4oc on4dj on4jb on4fk on4bz oz7y oz7li d4mfm d4abr d4po pa0hp pa0qf pa0op pa0oo pa0mm pylax pt1ch pt2ab su8ra su8wt sp3ar uoljh ve2ap vp9er vq2xa vq6re vq4cfr vq4msb vqsnk vs2ap vs7ap ti6kr w7mo w7np w2ccc w2at w2ff w2aoc w2arb w3ajd w8adm zs2n zt2e zs4m

F. L. Postlethwaite, 41 Kinfauns Road, Goodmayes, Ilford, Essex, England

w1abg w1bin w2acd w2ait w2bbp w2bon w2bqy w3aog w3bm w4id w5kx w6das w6let w6eop w7aoo w7ajw w7amg w8rl w8bud w9an w9um w9dfy ce5aa ce7aa ct1aa ct1bv ct1db ct2aa d4hi d4hm d4xy d4aj d4ip d4fmm d4qb d4db d4uj d4hv ear16 ear20 ear94 ear110 ear203 ear104 eu2kcl eu2gt itlme ilco k4kd oh6ng on4bx on4el on4gq on4gu on4gw on4nd on4oz on4po on4rv on4uy on4vu on4jq oz2h oz7k ozlk ozli pa0ga pa0jr pa0ik pa0xu sm4qj ts4skl ts4sup

Leo Olson, 835 South First Street, DeKalb, Ill.
1750-kc. 'phone band

w2gj w3ac w3ev w3rp w4hi w4lt w4oh w5aaz w5asl w5aso w5axl w5bab w5bbh w5bdc w5bdq w5bhf w5bkq w5cl w5ej w5gb w5gg w5lm w5lx w5tl w8cpl w8cul w8dow w8nx w9aax w9ala w9app w9awe w9bje w9bki w9bpb w9bpc w9buw w9clw w9ckw w9elz w9emp w9eni w9ens w9dax w9dev w9dez w9dha w9dky w9doz w9dri w9dsi w9dvi w9dvq w9ehd w9esl w9eyf w9fbl w9fey w9fdb w9fgi w9fhf w9fir w9fjl w9fle w9fls w9fms w9fot w9fuo w9fiw w9fwo w9fxv w9fyf w9gcu w9gdb w9gft w9gip w9gkd w9yi

3500-kc. band

ve3bt ve3er ve3wm w1aby w1ajt w2aih w2aie w2aow w2asq w2azy w2bhl w2bza w2cbe w2cyp w2gj w2iu w2uk w3ac w3acp w3aex w3agq w3aif w3b w3bfz w3cep w3cgm w3gd w3oi w3za w4aby w4lu w4qz w4rw w4tm w4uu w5apw w5awg w5awp w5bi w5ej w5kx w5tabf w6bcq w6car w6dvd w6ahz w6aos w6arw w6aug w6ayg w6azo w6bau w6btq w6buw w6bxm w6bxw w6bys w6bza w6cja w6cjb w6clh w6cqh w6cul w6czk w6dbq w6dce w6ddr w6dew w6dpg w6kl w6qy w6rd w6rk w6vf w6wft w6wm w6wo w6aai w6aif w6ala w6ata w6auv w6az w6bht w6bhk w6blr w6bwi w6bwt w6bwt w6hxt w6ybt w6yay w9ocd w9odi w9eii w9emp w9eni w9enj w9eny w9err w9cwk w9dbj w9dgd w9dpg w9dre w9dzm w9eai w9edw w9een w9efr w9egq w9ehd w9eia w9eng w9emf w9es w9esl w9eux w9ewc w9ewd w9ewx w9evh w9eyv w9ezq w9fbf w9fidm

w9fdo w9fin w9fke w9flz w9fne w9fp w9fpp w9fua w9fuj w9fvo w9fy w9gr w9gcd w9gdx w9gim w9gjm w9gju w9hv w9iv w9jr w9pv w9rv w9sn

VK7CH, C. Harrison, Bellerive, Tasmania, Australia

w1abn w1anx w1axv w1axv w1asf w1awf w1bds w1bwm w1sz w1sw w2ajp w2aof w2arb w2are w2ake w2bai w2cxl w2jn w2uk w3aaz w3anh w3bbq w3dd w3lu w4aaq w4aef w4abh w4ct w4ft w4ne w4oc w4pz w4qv w5aae w5aqy w5bbc w5bcb w5ms w5td w5ww w5zav w5zaw w5alv w5am w5ame w5ad w5aaz w5bck w5bdz w5bmo w5bax w5bfh w5bzl w5bz w6aby w6cxw w6cwh w6cix w6cuh w6ce w6cis w6czk w6chw w6cf w6dwm w6dzm w6dtd w6djp w6dwi w6dpf w6dgg w6eva w6elm w6evf w6epz w6efo w6erq w6ns w6jy w6sc w7acd w7aat w7ajw w7aix w7ao w7bb w7be w7bd w7mo w7qf w7sl w8ajm w8acd w8aup w8azq w8bau w8bwv w8bwk w8bnt w8bkp w8bwc w8bwc w8bai w8byn w8bg w8cpm w8dld w8djb w8ded w8oy w9aok w9azy w9bbj w9bpl w9bqe w9bvn w9cya w9eph w9dku w9dgz w9eap w9emr w9eez w9ef w9eet w9fdj w9pu w9um w9yc ac1bd ac1bx ac3fr celah ce2ab cm5uf ct1aa ct1dt d4by ear94 f8da f8dli f8ef f8ex f8fl f8gdb f8gyf f8kz f8lbg f8pec f8whg f8xz fa8bak fi8lrp eu2kbh g2lz g5bz g5by g5qv g6bd g6vp haf8b haf3b haf9af hb9mq j3fz kalaf kaldj kalhr kalza k6avl k6boe k6bra k6bjj k6bc k6cru k6cxo k6ewe hu3pa oa4l oa4q oa4r oa4s oa4z om1th on4bc on4di on4dj on4ip on4kg on4vu pkicx pkijr pk3bm pk3pr pk4az pk4bo pk4pa sp3wr pa0dv un7ww vu2ev vu2dr vs3ab vs6ab vs6af vs6ae vs6ag vs7ap ve2hd ve2ea ve2hg ve2hc y1aac y1llm yu2u yu2k vms4d zmbg oxd ckn wsq szlaz

ZT2E, W. Jack, 14 Cuyler Crescent, Port Elizabeth, South Africa

7000-kc. band

cm8yb eu9be f8kwt f8ej j1dv j3cr kalae kalce kalza n23y sp3lk vq4msb vs1ab vs2af w4tg w6ary w6akf w6lbn w6bbp w6blx w6cih w6cyb w6dzg w6drl w6dzm w6eb w6ete

14,000-kc. band

d4po f8taj f8zb f8zbv g2vq g6gd g6qb g6wt on4bz ok2op on4jc su8rs vu2zx

W7KT, W. D. Reuter, 1723 North Oakes, Tacoma, Washington

7000-kc. band

as2 celah cm5fl jiqb kfr5 k1ph k3jr k6avl k6bra k6cib k6cmc k6cog k6cru k6erh k6dmm k7abs k7aop k7km k7zp pylah ve3et ve3qt ve3zv ve4cb ve4dy ve4dj ve4ei ve4fr ve4fx ve4kg ve4jt ve5eb ve5ba ve5ca ve9av vik2ek vk2hl vk2hu vk2hk vk2mh vk2oj vk3at vk3ax vk3cj vkd3x vk3ka vk3pa vk3ra vk3ve vk4ak vk4bh vk4rj vk5dq vk5hb vk5wr vk5q vk5k vk6mo vk6vu vplvs wfy rx4x wlaep wlukm wluab wluax wluay wlibj wlibk wlibl wibg wicq widv wlme wlmk wlow wlpw wlat wliw wlz w2ai w2ak w2api w2bak w2bok w2cix w2cqx w2ig w2lp w2md w3adm w3ant w3aws w3blt w3jd w3qd w4aen w4agi w4akg w4alm w4ad w4mm w4sg w4tt w4uc w4uw w5ab w5afs w5atf w5awe w5aux w5bek w5bh w5bwm w5bmp w5cl w5de w5rg w5zl w6aao w6aah w6atj w6awd w6bdz w6bfm w6bfh w6bpb w6bss w6bxi w6car w6cgp w6cii w6cjm w6cob w6cox w6cxw w6dsh w6dzt w6dob w6dvw w6dyb w6ebe w6ecw w6ef w6ei w6etj w6etr w6ets w6etv w6eve w6exa w6ezp w6zpw w6zzz w7aae w7aax w7aao w7ab w7abi w7acd w7ach w7afo w7ajj w7apf w7aqg w7au w7aud w7ava w7ba w7bb w7bh w7dm w7ek w7fl

• CORRESPONDENCE •

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Our New Dress

224 E. Coll St.,
New Braunfels, Texas

Editor, QST:

My compliments to you on the new QST! It is fitting that the most modern and forward-looking magazine of a modern scientific avocation should wear a modern dress.

QST is my only contact with radio at the present time. My active days in the game hark back to the days of the old rock crushers just after the war. While I was in high school I was partly instrumental in the acquisition of old 5YK, and one of the most glorious moments in radio for me was the erection of the masts on top of the high school building. My first official act in this station was the misplacing of the regulating plug for the old Thordarson 1 KW. Oh, the fuses we blew with that old voltage-converter! My second, and more official act, was to find same plug again.

SCM E. A. Sahn, now retired, learned about radio on that old set. At first he came to me for advice, but, after the first month, I was glad to learn from him. Mr. Sahn has done much for amateur radio in this section; it is a pity that his present duties leave him so little time for active work.

I myself am unable to do more now than read about the newer developments, but, as long as I have the money, one of my most prized possessions will be my A.R.R.L. affiliation. Add my vote to the number asking for all the technical articles you can get in QST. Any serious amateur should be anxious to learn more than traffic handling, and the technical articles are the best way to teach the fundamental science of radio.

May the year 1931 bring happiness and prosperity to the headquarters staff and all of A.R.R.L. in as great a measure as A.R.R.L. has brought progress to amateur radio.

— Frederic Oheim

Comments on the High-Power Holiday

Packard Proving Grounds,
Utica, Mich.

Editor, QST:

I have been interested in Fred Schnell's letter with reference to a "High Power Holiday" in January QST.

As the owner of a station using moderately high

power (200 watts) it would not be seemly for me to object to a reduction. At the same time I want to take issue with his suggestion that no limit be placed on power input except that it be handled by a Type '10 tube. I believe there is no question that more rotten notes and unsteady signals have been produced by overloaded tubes than any other single cause, and this practice still continues although probably not to such an extent as was common a few years ago.

In my opinion power should always be measured by input to the final amplifier (or oscillator if self-excited) and if limited should be specified in watts rather than in tube size. This would probably encourage the use of larger tubes operated conservatively instead of small tubes badly overloaded.

Frankly there is a lot of doubt in my mind as to whether consistent communication can be carried on with the Type '10 tube operated at rated wattage, but if a majority of amateurs want to try such power I am perfectly willing to lay my large tubes on the shelf and give the smaller fellows a chance.

— C. H. Vincent, WSRD

167 Carter Lake Club,
Omaha, Nebr.

Editor, QST:

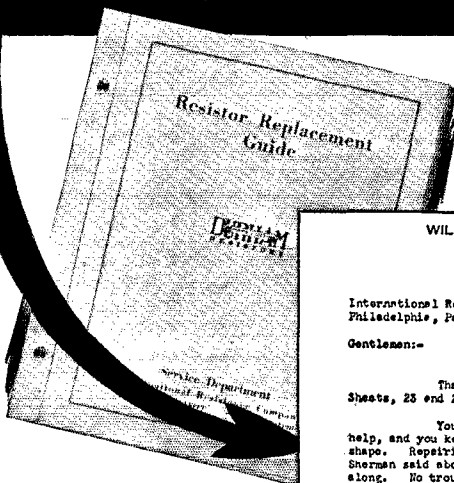
Schnell's article calling for a holiday in high power for amateurs is fundamentally sound, and only in detail do I disagree with him.

The argument he advanced is logical and certainly offers the average 1931 amateur something to think about. To carry it out, I believe, would result in the greatest good to the greatest number. There probably will be a loud yelp from the comparatively small number of amateurs who do employ high power.

We amateurs have had a hard fight to retain what rights we have on the air, and I would suggest we go slow in voluntarily giving any of them away. It might not be so easy to get them back again, if our noble experiment should fail.

As an alternative, I would suggest this: Instead of declaring a three-year holiday in high power on all of our bands, that we declare it for one year on one band. A year would give us time enough to find out whether it will work and by confining it to a single band, those amateurs who have high-power equipment and who would not desire to junk it, could use it on those bands where high power would be legally OK.

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1422 CHESTNUT STREET
PHILADELPHIA, PA.

Nov. 8th, 1930.

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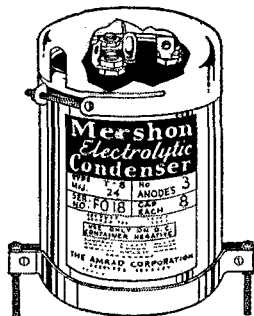
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Inasmuch as most of our QRM is on the 7000-ke. band, I would suggest that our high power holiday be placed there. Wouldn't it be a grand race in that band, with all transmitters limited to one or two 210's? Everybody starting from scratch and the goal an equal distance away for all. Then, too, one high-power outfit wouldn't crowd a hundred small ones off the air!

So I say, let's carry out Fred Schnell's idea in modified form for a year, on one band.

— W. H. Graham, W9BNC

1318 Clara Ave.,
St. Louis, Mo.

Editor, *QST*:

This is in reply to "Giving the High-Power Radio a Holiday," so to speak. My reaction to this article is that we are apparently getting stagnation in the amateur ranks by such comments. You know as well as I do that 75% of the amateurs are not even interested in high power because they have some respect for their pocket-books, especially so in this period of so-called depression. However, men who have been in radio practically all their lives and have devoted their time to it know that it takes high power for consistent signals. Why is it that R.C.A., W.E., two of the largest manufacturers of transmitters up to now, have boasted the necessity for high power as a means of partial freedom from static and more consistent transmission? Bigger and better high power equipment is here to stay.

Instead of all this tommyrot about low power I think it would be well for those who have it to try and iron out their a.c. ripples from their so-called a.c. rectifying equipment. The order of the day would be audio oscillators and oscillographs to check the purity of frequency in tone and sharpness; audio oscillators for the 'phone hounds and oscillographs for both the ham c.w. operator and 'phone hound. Well, what's the use! Cheerio.

— A. L. Bergtold, W9DOE

210 N. Knox Ave.,
Topeka, Kans.

Editor, *QST*:

Second the motion!

Three cheers! Let's have that High-Power Holiday.

Here's my attitude: Amateur radio is a game. A game wherein the fellow with the most money holds all the aces is — well, you say it.

It is certain that this idea, if put into effect, would result in definite advancement of the radio art. I believe that a majority of A.R.R.L. members would vote in favor of the idea. The minority could then yowl its little self black in the face.

So many cards will reach our directors that they shall be forced to take up the matter at their next meeting. There they can vote to, or not to, authorize a vote of the membership on the question. Fellows who care which way their directors vote had best get their cards in early.

My interest in radio has been flagging for two or three years. Mr. Schnell's letter was like a snappy, cold shower. (Thank you, Mr. Schnell, I feel great!)

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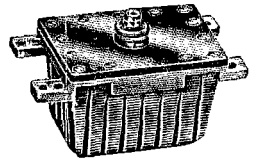
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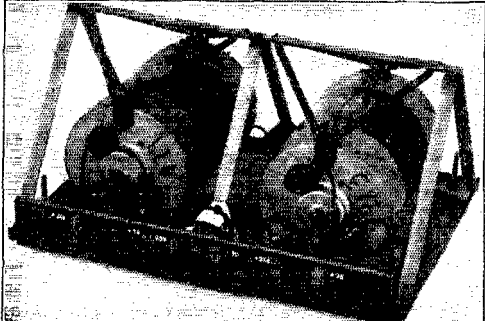


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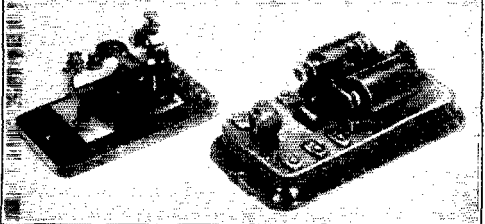
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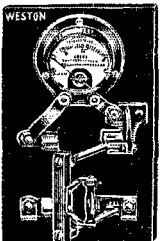


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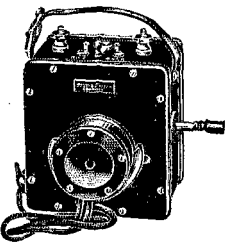
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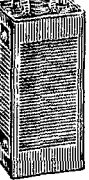
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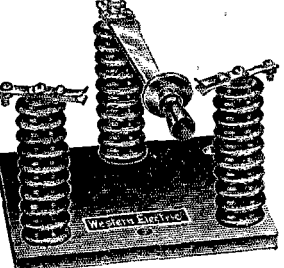
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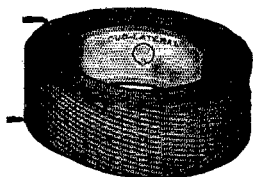
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Editor, *QST*:

As a subscriber to *QST* and as a former amateur station operator, may I heartily endorse the proposal of F. H. Schnell for a "high power holiday"? With a reasonable power limit I could get back into the transmitting game on an equal footing with the rest at a non-prohibitive cost. I believe more fruitful circuit experimentation can be done with lower-power, lower-cost, more flexible arrangements than with the very expensive and elaborate outfits so many seem to be using.

Another thing about lower power: There would be less chance of amateurs getting into trouble with a low power set "off wave" than a high power one.

Distance is relative, and if we use high enough power to work regularly every point on earth, we would have attained the goal of commercial communication, but lost the fun of amateur work, which, to me, would consist in doing the most with a given equipment. And this equipment should be such that only with the most expert operation would 12,000-mile transmission be achieved. It wouldn't be any fun to go fishing if the biggest fish in the sea would come and climb in the boat whenever they were whistled for.

I hope you will organize a 10-watt club or a "210 tube" club that will be so "élite" that all amateurs will flock to join it.

— Walter van B. Roberts, ex-3XU

227 N. Fourth St.,
Rockford, Ill.

Editor, *QST*:

Fred Schnell started something when he wrote that letter about cutting U. S. amateurs down to low power for three years. In fact, immediately after I read it I was all set to grab up a hunk of sheet iron, a jar of acid and a pyrex pen and write a real hot reply. But after some reflection and consideration I've decided the idea is all right.

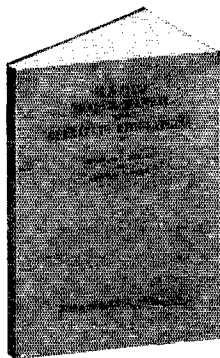
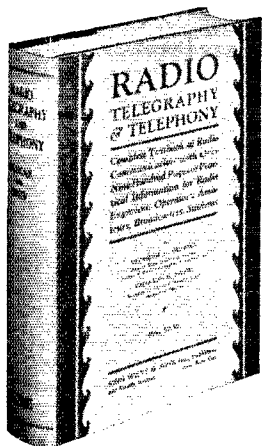
Immediately a howl arises from the amateurs that long-haul traffic will be killed, DX will cease, high-power experimentation, which has added much to our knowledge of high-frequency work, will cease, etc. There is something to be said on that side, without doubt, but on the other hand, the high-power holiday will reduce all amateurs to the same footing, so far as power is concerned. It will require again the spirit of coöperation in relay work, which is sadly lacking nowadays. A few big traffic stations garner the majority of the traffic, and skeds of thousands of miles are easily handled. How much better it would be if we could get in a large number of amateurs handling traffic, improving their operating, providing easier distribution, and really showing the worth of amateurs in handling messages.

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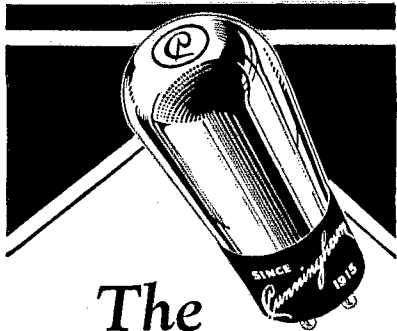
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DX will not stop, not by a jugful. (No, let's see, a jug is a 250-watter, and we're not using high power; let's say, a bottleful.) It certainly hasn't stopped our foreign friends from working the globe time after time. The Aussie you hear socking in isn't using over twenty-five to forty watts input, unless he is considerable of an exception, and we can do the same. There is a general inclination on the part of foreign amateurs to discount U. S. work on the basis that anything is possible with high power. Let's show them what we can accomplish with low power.

I'm willing to give up my pair of fifty-watters, and my projected transmitter with a pair of '52s, and take to the one and two 210's I have used for three years. Fifty watts input as a limit should make it possible to accomplish everything we are doing now, and more too. There is too much of a tendency to overcome faulty construction and poor antennas with a bigger tube and more input. Let's remove the barriers with skill, instead of blasting through with high power. What do you say?

— Eugene A. Hubbell, W9ERU-CDC

1750-Kc. 'Phone

Lansing, Mich.

Editor, *QST*:

Just got through talking with a local ham, and he was telling me of some agitation to promote the moving of 'phone transmitters back up to the 150- to 175-meter band, and that we ought to write you about it. Don't know whether he will or not, but here's mine. I've just got my outfit completed; wanted a pretty decent one so hired a man with experience to make it for me. It is a three-stage affair, Type '10 for a modulated amplifier, modulated by a 250.

Now that I've got it, what am I going to do with it? One short listen on the 3500- to 3550-kc. 'phone band answers that—there isn't room there for another 'phone if you crowded it in edgewise. I have tried several receivers, and the best I can see is to wish and imagine one that would separate those crowded 'phones.

If enough talking and writing is done about it, maybe the move will take place. I'm ready to move mine at any time enough others will do so that are not too far separated geographically. Otherwise one has to have so much power that the cost is prohibitive.

Now you can throw this in the wastebasket, pin it to the wall, or publish it in the Correspondence page, whichever is the best according to your opinion; it's off my chest and maybe I'll sleep better for it.

— A. B. Scribner, W8CSN

(In connection with the 1750-ke. band, it is interesting to note that the DX possibilities of the lower frequencies probably will increase during the next few years. See Editorial in February *QST*. — EDITOR.)

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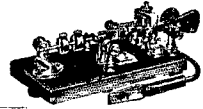


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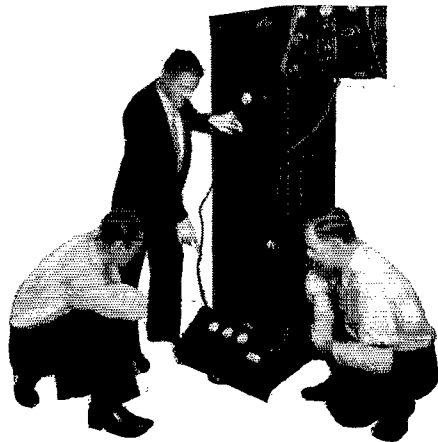
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Those Technical Articles

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Editor, *QST*:

It is to be regretted that *QST* should receive any complaints from members criticizing it for publishing articles which are "too technical." It would seem that the writers of such criticisms are taking the wrong attitude toward radio. After all, radio is not a kindergarten subject, and generally its principles cannot be explained by A-B-C methods.

Amateur radio is an ever-advancing art. The so-called amateur who ignores every article that has the appearance of being at all theoretical will never get anywhere. He will still be wearing short pants and rolling a hoop, as far as radio is concerned, when the real, serious-minded amateurs have graduated to long trousers. When a member registers a kick about an article being "too technical" he is just showing that he is already in the rut and wants to keep everyone else there with him. He does not want to go to the trouble of trying to understand what is going on in a radio circuit, and he doesn't want anyone else to understand it, because he cannot or will not. If everyone had taken that attitude we would still be using coherers and spark-gaps.

When one looks back over the record that amateur radio has made for itself, one cannot help but feel thrilled. Surely the pioneers who helped to bring amateur radio up to its present state of advancement did not pass up the theoretical side of it and read only the articles that said, "and now that we have the wires attached to the proper binding posts, we turn on the tube until it is about half as bright as a flashlight bulb, and are ready for the thrill of tapping the atmosphere for some of the signals which even now are passing overhead."

Fortunately, not all amateurs have taken this narrow viewpoint. It is believed that the majority of the members really want to know more about what makes this and that take place when such and such is done to the set. The only way to find out these things is to read articles which explain them, and that does not mean steering clear of technical articles. Get into the spirit of the amateur. Dig into those tough-looking articles. After you have read a few of them you will be surprised how much easier the following ones will come to you. Before long you will wonder how you ever came to make a complaint about those interesting and instructive articles.

Admittedly, it is rather discouraging to some of us to glance over an article and find it generously peppered with strange-looking symbols and flocks of integrals. Don't turn away though. Maybe you don't really have to know all those things. Begin reading. You will most likely find the symbols explained in the article, and you will also find that you do not have to be a "wiz" at "math" to gain all sorts of very useful information from those "too technical" articles.

— Arthur M. Braaten, W2BRS, ex-W9EFW

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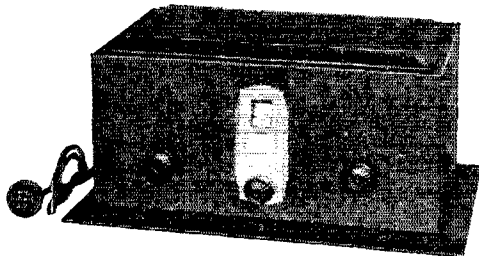
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Editor, *QST*:

I am answering "that urge to dash off something that ought to be in *QST*." As the major problem of the amateur at the present time seems to be frequency control, I will make that the subject of the sermon this evening, though I may ramble a bit.

Firmly believing that there is *some* good in everything, I set about to discover just what good could be gotten out of the "ether busting" 1930 model rock crushers, i.e., the commercials who pound out "ABC ABC ABC de XXX XXX XXX" by the hour and *ad infinitum*, in the "public interest, convenience and necessity." As far as I can see, the reason that these stations stay on the air when traffic is nil is just to keep the tubes warmed up or possibly so that the operator on the receiving end of the circuit can keep them tuned in. In the first place, there is part of the Radio Act which says that stations must use only the minimum power to establish the necessary contact. How much power is necessary to QSO ABC? At any rate ABC never seems to come back at them. Secondly, dummy antennas could be made which would work on commercial stations as well as on amateur stations. Thirdly (and this is supposed to be the meat of this epistle), why couldn't the stations state their frequencies along with their ABC's? In this way marker stations would be marker stations and would help keep the several thousand amateur stations within the confines of their allotted parts of the spectrum.

After the amateur has calibrated his receiver and monitor from the S.F. signals it would be possible for him to spot a few commercials, and if they would give their frequencies he would be able to check his calibration any time he turned the receiver on. Varying a small condenser parallel to the main tuning condenser until the marker station coincided with the calibration curve would then assure him that the set was in calibration. Two or three such marker stations would enable a very close check to be made.

Let's put a little seasoning in the alphabet soup, gang!

— F. A. Saxon, W4AAY

This Is Encouraging

1085 Yale Station,
New Haven, Conn.

Editor, *QST*:

There have been numerous complaints and criticisms written all along about long CQ's, also about the practice of testing a transmitter at a time when it would cause QRM. Besides trying to follow the suggestions given, I have listened in quite frequently just to see how much, if any, ham operating was improving. Let me say right

(Continued on page 68)

RCA RADIOTRON

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*An excellent
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amateur phone
transmitters.*



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Filament Volts	10	Plate Current (m.a.)	75
Filament Amperes	3.25	Plate Resistance (ohms)	2100
Normal Plate Volts	1000	Amplification Factor	5
Normal Grid Bias Volts	-150	Max. Plate Dissipation (watts)	75
Oscillator Input Watts for each UV-845 (Mod. Factor 0.6)			120

NET PRICE \$33.70

We invite the amateur to write us for prices and characteristics of other types in which he is interested.

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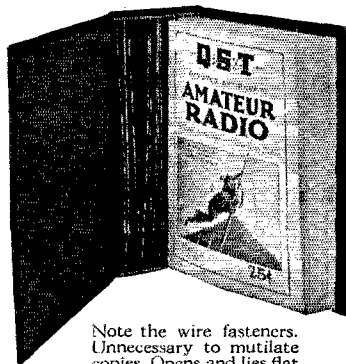
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in a

QST Binder



Note the wire fasteners. Unnecessary to mutilate copies. Opens and lies flat in any position.

\$1.50 each
postpaid

QST

West Hartford

Connecticut

(Continued from page 84)

now it has improved almost beyond expectation. The days of chaos and haphazard sending have gone. True, there are still a few deviations from good operating rules but it is an extreme rarity during busy hours to hear some fellow sending out a series of v's or forty or fifty CQ's in a row, either down on the 7-mc. band or on 3.5 mc.

Thanks to the drive undertaken by the A.R.R.L., we hams are at last really taking pride in our hobby and are keeping amateur radio up where it belongs. May we keep it up.

— K. A. Fichthorn, W1BGJ

The Right Spirit

16 Everett Ave.,
Dorchester, Mass.

Editor, *QST*:

As your records doubtless show, a short time ago I wrote to the A.R.R.L. for a list of volunteer radio code practice stations and their schedules. Upon receiving the list I 'phoned the station nearest me, W1AKY, owned by Edward Myrbeck, Quincy, Mass.

At this time he was a perfect stranger to me and I was more than impressed by the helpful attitude with which he answered me when I told him I was an old radio man but had not learned the code and wanted to do so. It is impossible to express the wholehearted cooperation that he afforded me. Immediately a schedule was arranged for me as my work prevented me from hearing the regular sked. We went to work and in a short time I was down to the Custom House for an examination, and I am now the owner of W1BII. You may be sure that each time W1AKY's call is heard at my shack there is a thought of the most friendly nature.

To my mind, this is a perfect example of what an amateur and his station should be, and I would appreciate it very much if you would publish this letter in your Correspondence Section, as it is through that method that I wish to express my appreciation to W1AKY for his work.

— George G. Chandler, W1BII

American Legion Broadcast

2914 North 53d,
Lincoln, Nebr.

Editor, *QST*:

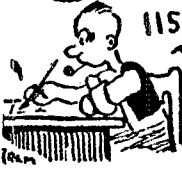
Reporting on first American Legion Broadcast:

Received the message from W9CYQ at Indianapolis at 7:06 p.m. and telephoned it to Mr. H. H. Dudley, Department Adjutant, at 7:08 p.m. I have reported to W9CYQ.

Mr. Dudley was just leaving his home to attend a Legion meeting. He was so well pleased with the service that he drove five miles out of his way in a hurricane to pick up the message so that he could present the matter to the legion meeting last evening.

Mr. Dudley also remarked that he intends to get a feature story in the Sunday papers, showing

UNCLE DAVE

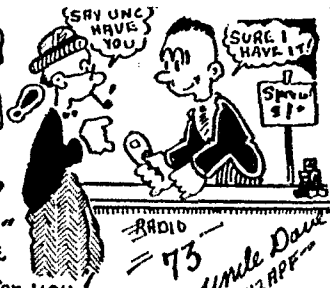


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Koiler Smith 0-2 1/2 amps Radio Frequency anemeter	2.69
Broadcast Station Crystals 500 cycle plus or minus, including calibration, guaranteed	30.00
200 cycles plus or minus including calibration	45.00
Manhattan null wave high voltage rectifier tube, 90 mills, 470 volts, No Filament type. Ideal for 210 supply. List at \$12.00, special.	1.50
Double button microphone cable 10 ft., three wire unshielded at	.75
Tested and functioning, not guaranteed, type 210 and type 250	.95
Used Wheatstone bridges	25.00 and 45.00
10 Wire A.C. Cable with Jones plug and receptacle, 6 ft.	1.00
Sub Panel four or five strong socket \$10 each, dozen	1.00
85 M.F. R.F. coils, unmounted, each	2.25
Victor thirty Henry 150 mill chokes tapped	1.35
Power Crystals, specify anywhere in the 3500 K.C. band, guaranteed to oscillate	5.25
Crystal blanks, finished and oscillating	2.75
Crystal blanks, unfinished	1.75
Calibrated Monitors, built for two uses: Oscillator and Monitor. These are individually calibrated and are checked against Piezo Oscillators. With batteries and three coils for 20-40 and 80 meter	9.35
Wave Meter for 10-40 and 80 meter band with individual charts complete with indicator and coils	6.25
Ward-Leonard 10,000 ohm 50 watt trans. leaks	.50
Ward-Leonard 5,000 ohm leaks	.39
Dongan power transformer, 300 watt, 1000 volts each side of center and with the following voltages: 3 C.T., 10 C.T., and one ten and one twenty volt not C.T., fully mounted. Weight fourteen pounds	5.95
Microphone cases, special	2.25
Flechthelm 2 mfd 1500 volt pore. ins. condensers	4.50
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Slightly used Western Electric 212A or D tubes, guar.	35.00
Slightly used Western Electric 50 watters, guaranteed	15.00
Slightly used R.C.A. U.V. 211 or 203A tubes, guar.	17.00
Slightly used R.C.A. U.V. 851 1000 watters, guar.	175.00
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New CeCo 230 — 2-volt (199 type) non microphonic	1.25
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New CeCo 232 — 2-volt screen grid D.C.	1.90
Used U.X. 852 tubes, guaranteed	20.00
Sangamo .00025, .0005, .002, .001, 5000 volt condensers R.F. chokes for receivers and transmitters	1.12
New National A.C. short wave live. List at \$79.50. Net	46.00
National power pack for same, list at \$34.50. Net	19.65
Factory wiring net \$3.75 extra	
Above set when ordered complete with power pack and wiring, special	70.00
Microphone stands. Adjustable floor model, brass parts, adjustable to 78 inches, stately bronze finish	9.25
50-watt sockets for 203A or U.V. 211	.95
250-watt sockets for 212D tubes	3.50
204A — 250-watt sockets, set	1.95
U.X. 281 tested and functioning	.85
Latest Amateur Call Book	.85
Thordarson 30 Henry 250 mill filter choke 104 ohms resistance mtrs. model insulated 2000 volts	3.75

Arborphone A.C. amplifier two units power pack with binding posts strip uses one 227 ahead of two 171A push pull. Beautiful job. Ideal for speech amplifier. For pair	\$10.00
Cardwell .00044 three thousand volt trans. condensers Electrad large 50,000 ohm bleeder 45 mill 100-watt list \$5.50. Net	3.00
Stand-off insulators. Each \$1.10. Dozen	1.00
Enamelled No. 12 aerial wire, 100 feet	.90
Two hundred feet coils	1.65
New type Sprague 8 mfd 430-volt Electrolytic condensers. Net	1.10
Genuine Baldwin type C phones, latest type. Pair	4.50
Pilot or Silver-Marshall coil forms. Each	.39
National S-101 screen grid couplers	3.25
New Jewell meter 0-1 mill bakelite case	6.65
New Jewell 0-1 1/2 mills	6.25
New Jewell 0-2 mills	5.88
Victor power transformers 650 volts C.T. 2-1 1/2, 2-2 1/2, 1-5 volts C.T. windings. Special	2.50
New Design National R-3 mercury vapor rectobulbs prepaid. Mercury vapor K-4 for high power rectobulbs \$20.00 prepaid. And here are the R-81 rectobulbs. Ideal for rectifiers up to 1000 volts. Special	4.40
Thordarson single button microphone transformers	2.95
Thordarson double button microphone transformers	3.70
Universal double button microphone transformers	6.35
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R.E.L. transmitting inductances for 20-40 and 80 meter (specify band wanted). Each	3.50
Metal Cans for Monitors 3 x 6 x 7 1/2" with removable cover	1.20
New Cardwell midway transmitting condensers 70 mfd	2.35
New Cardwell midway trans. condensers 150 mfd	3.50

OUR LATEST BUY

Stromberg-Carlson 2 Henry 300 mill 20 ohm resistance choke, 14 lbs., special while they last	\$1.75
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Kolster Columbia phonograph pick-up 5000 ohm list at \$32.50. Special	4.95

ARSCO CONDENSERS

400 volts	600 volts	800 volts
1 mfd. \$15	1 mfd. \$20	1 mfd. \$30
2 mfd.30	2 mfd.25	2 mfd.40
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4 mfd.35	4 mfd.40	4 mfd.60
2 mfd 1000 volts		.70
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Above all unmounted but sealed in paraffin. Sturdy leads.		
2 mfd 1150 volts sealed in fiber box. Beautiful job		1.50
4 mfd 1250 volts oil impregnated condenser		3.25
All above condensers are working voltage, not D.C. rating. hi.		

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1 mfd 3500 volt transmitting filter condensers	\$8.50
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4 mfd 2000 volt transmitting filter condensers	8.50
8 mfd 2000 volt transmitting filter condensers	12.50
16 mfd tapped at 8 mfd 1250 volts D.C.	8.50
1 mfd 1500 volts	2.00
2 mfd 1500 volts	3.50
4 mfd 1500 volts	5.75

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1715-2000 kilocycle band	\$10.00
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One inch oscillating blanks	4.00
Plug-in dust proof mounting as illustrated above	6.00
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Grinding instructions furnished with crystal blanks.

550-1500 kilocycle band — calibrated at any temperature plus or minus 500 cycles desired frequency complete with plug-in dust proof mounting — \$45.00. Constant temperature heater oven less crystals \$150.00. We do any kind of special crystal grinding for any frequency.

We build dynatron oscillators and monitors.

Just the thing for frequency precision in monitoring that self excited transmitter.

Prices quoted on request.

Introducing a new line of FREQUENCY METERS. High grade instruments for any one amateur band only. These meters are calibrated from accurate standards. Split-stator condenser guarantees maintenance of calibration and generous dial spread means easy reading. In ordering specify the amateur band desired. A curve checked every fifty kilocycles with each meter. Price \$10.00.

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FREE Send name, no obligation, for full information on crystals, holders, blanks, heater ovens, etc.

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Consult us on your problems.

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Rating	Max. Amps. Load	Instrument Fuses 1"x3/4"	1000 V 3"x3/4"	500 V 3"x3/4"	10,000 V 10"x3/4"
1/100	5 M A	20c	Not made	Not made	Not made
1/32	15 "	20c	Not made	Not made	Not made
1/16	65 "	20c	40c	70c	\$1.00
1/8	110 "	15c	35c	70c	1.00
1/4	200 "	15c	35c	65c	.95
3/8	300 "	15c	35c	65c	.95
1/2	400 "	5c	35c	65c	.95
	1 amp.	10c	40c	75c	Not regular
	2 amp.	10c	40c	1.00	Not regular

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the cooperation between A.R.R.L., amateurs and the Legion.

Not bad.

Another touchdown for A.R.R.L.

73.

— A. Gaylord, W9GAG

Off Freaks

331 William St.,

Key West, Fla.

Editor, QST:

Can't you induce The Old Man to come forth again with a series of scathing tirades against off-frequency operation? I copied the Army Amateur message at 7 p.m. Eastern Standard Time from WLM, but did it by reading WLM through QRM from four 3's, two 2's, and a 9. Tried to get it at six o'clock, but 'twas impossible due to, not only d.c. notes that could be copied through, but W8-fervidly CQ-ing for DX with an R7 r.a.c. note just above (wrong side of) WLM. His r.a.c. was broad enough to blanket WLM though W8-was on about 6980 or 6975 kc. I can imagine what 8's in his vicinity were able to get of the message.

Get The Old Man out before the Radio Inspector breaks some of the fellows' hearts — and incidentally their licenses too!

A.R.R.L. and QST forever!

— W. H. Olson, W4WC

I.A.R.U. News

(Continued from page 51)

There are, of course, other lesser issues which should help to strengthen the amateur's plea. He is, for example law-abiding and, through the medium of his organizations, self-governing. It is seldom one hears of a case where the authorities are called upon to intervene and take disciplinary action against an amateur for breach of regulations. Even in the larger cities in the States, where general lawlessness is said to be rife, the amateur is devoid of criminal tendencies. He QSO's, QSL's (at times), and, like the rest of the fraternity, appears to be a most charming individual. To the radio trade the world over he must surely be an unmixed blessing; and, while this consideration is not likely to weigh very heavily with those who will decide our destinies at Madrid, it is as well to bear in mind that at least one section of the commercial world is very solidly for us.

Finally, the amateur, with his daily contacts with distant lands and the real friendships thus established, is, unconsciously perhaps, one of the greatest factors for the promotion of world peace and international goodwill that has yet appeared. For him none of the stilted diplomatic phraseology or the ponderous deliberations of a League of Nations; no politely-veiled intolerance of a "foreigner." He probably counts among his greatest friends men he has never seen, men of a different race, creed and, perhaps, colour. What matters it? They are hams and therefore human; and in his own small way he will move heaven and earth to prevent hostilities between the nations he and his friends represent.

What the amateur needs most at the moment is a skillfully-conducted publicity campaign, in the course of which no opportunity must be lost in bringing home to the Governments and the citizens of the countries of the civilized world just what the amateur is and just what he can do should the need arise.

Fortunately for us in South Africa the attitude of our own Postmaster-General has always been one of sympathetic and helpful interest. The danger would appear to lie further afield in the various countries of Europe, and it is at a time like this that the amateur can be thankful for the existence

THE

Amateur's Bookshelf

GOOD TEXTBOOKS and operating manuals should be on every amateur's bookshelf. We have reviewed practically all the books in which the amateur would be interested, and have arranged to handle through the *QST* Book Department at A.R.R.L. Headquarters those volumes which we believe to be the best of their kind. Take pride in a small but good radio library; buy a few good books and get into the habit of reading them.

Principles of Radio, by Keith Henney. This book is chock-full of meat for the experimenter. The subjects treated range from the fundamentals of electricity to the most modern concepts of modulation and detection. 477 pp., 306 illustrations \$3.50

Elements of Radio Communication, by Prof. J. H. Morecroft. This is a new book by the author of the "Principles" listed below. It is about half the size of the larger work, and the subject is treated in more elementary fashion. Simple algebra is sufficient. An excellent book for the "first-year" student. 269 pp., 170 illustrations \$3.00

Principles of Radio Communication, by Prof. J. H. Morecroft. An elaborate general textbook, and one of the recognized standards on theory for the engineering student. A working knowledge of mathematics is desirable for the reader who expects to get the greatest benefit from this work. 935 pp., 5 $\frac{3}{4}$ x 9 \$7.50

Radio Engineering Principles, by Lauer and Brown. While not as voluminous as "Morecroft" this excellent general textbook on radio principles is the favorite of many students. A moderate knowledge of mathematics is desirable. 300 pp., 5 $\frac{1}{4}$ x 9 \$3.50

Experimental Radio, by Prof. R. R. Ramsey. Revised Edition. A splendid book for the experimenter. This is a laboratory manual, describing 128 excellent experiments designed to bring out the principles of radio theory, instruments and measurements. 150 illustrations, 229 pp., 5 $\frac{1}{4}$ x 7 \$2.75

Radio Theory and Operating, by Mary Texanna Loomis. Although giving a moderate amount of theory, it is essentially a practical handbook for commercial and broadcast operators, and as such ranks among the foremost publications of this sort. Used as a textbook by many radio schools. A good book for any amateur. 1000 pp., 800 illustrations \$4.25

The Radio Manual, by George E. Sterling. Another excellent practical handbook, especially valuable to the commercial and broadcast operator, and covering the principles, methods and apparatus of all phases of radio activity. Over 900 pp. \$6.00

Radio Telegraphy and Telephony, by Duncan and Drew. Still another work along the lines of a general practical handbook. In size it is approximately the same as the two listed just previously, and the subject matter generally follows along the same lines. A good book in this class. 950 pp., 468 illustrations \$7.50

Practical Radio Telegraphy, by Nilson and Hornung. Written particularly for the student training for a commercial license, and covering theory and apparatus. A practical handbook. 380 pp., 223 illustrations. \$3.00

Radio Data Charts, by R. T. Beatty. A series of graphic charts for solving, without the use of mathematics, most of the problems involved in receiver design. 82 pp., 8 $\frac{1}{2}$ x 11 \$1.50

Thermionic Vacuum Tube, by H. J. Van der Bijl. For many years this has stood out above all other works as a theoretical textbook and treatise on the vacuum tube and vacuum tube circuits. A knowledge of higher mathematics is required. Not a book for the beginner, but for the laboratorian and engineering student it is without a peer. \$5.00

Radio Operating Questions and Answers, by Nilson and Hornung. Revised Edition. This is intended as a companion volume to "Practical Radio Telegraphy" by the same authors. In conjunction with that work it should leave the commercial license applicant well prepared for his examinations. There is a chapter on amateur license questions and answers, too. 267 pp., 5 $\frac{1}{2}$ x 8 \$2.00

How to Pass U. S. Government Radio License Examinations, by Duncan and Drew. Intended as a companion volume to "Radio Telegraphy and Telephony" by the same authors, as a guide to the applicant for commercial licenses. It is not a text in itself. The chapter arrangement follows that of the sections of the commercial theoretical examination, each being made up of typical examination questions and their answers. 169 pp., 92 illustrations \$2.00

Theory of Radio Communication, by Lt. John T. Filgate, S.C., U.S. Army. An excellent book on the theory of receivers, transmitters and associated equipment for those familiar with elementary electricity and magnetism. 250 pp., 180 illustrations \$2.00

Radio Traffic Manual and Operating Regulations, by Duncan and Drew. A book for students, amateurs or radio operators who contemplate entering the commercial field; it will enable you to learn quickly and easily all the government and commercial traffic rules and operating regulations. 181 pp. \$2.00

ABC of Television, by Raymond F. Yates. A practical treatment of television with particularly complete chapters on photo-electric cells, amplifiers and scanning methods. 205 pp., 78 illustrations \$3.00

Manual of Radio Telegraphy and Telephony, by Commander (now Admiral) S. S. Robison, U.S.N. Published by the Naval Institute. Covers both the theoretical and practical fields. 895 pp., 6 $\frac{3}{4}$ x 9 \$4.00

Prices include postage

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1711 Park Street, Hartford, Connecticut

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EMBLEM. A handsome creation in extra-heavy, rolled gold and black enamel, $\frac{3}{8}$ " high, supplied in lapel button or pin-back style. The personal emblem has come to be known as the sign of a good amateur. It identifies you — in the radio store, at the radio club, on the street, traveling — you can spot an amateur by it. Wear your emblem, OM, and take your proper place in the radio fraternity. Either style emblem, \$1.00, postpaid.

THE AUTOMOBILE EMBLEM. $5 \times 2\frac{1}{2}$ ", heavily enameled in yellow and black on sheet metal, holes top and bottom, 50c each, postpaid.

THE EMBLEM CUT. A mounted printing electrotpe, the same size as the personal emblem, for use by Members on amateur printed matter, letterheads, cards, etc. \$1.00 each, postpaid.

THE "JUMBO" EMBLEM. How about the shack wall or that 100-footer? Think of the attention this big yellow-and-black enamel metal emblem will get! $19 \times 8\frac{1}{4}$ ", same style as Automobile Emblem. \$1.25 each, postpaid.

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

of that powerful body, the I.A.R.U., which will be mainly responsible for championing his cause at Madrid.

BRITISH NOTES

By J. Clarricoats, Hon. Sec'y, R.S.G.B.

December produced no outstanding event in the annals of British Amateur Radio, excepting the Annual General Meeting. During this meeting Mr. Gerald Marcuse announced that the British Post Office authorities had agreed to open the 3.5-mc. band for work between 8 p.m. and 8 a.m. daily; this is an important concession and will undoubtedly result in considerable activity on this band. Already some 50 British stations are in operation and several contacts with North America have been established by stations using about 50 watts.

Empire Radio Week plans are now completed, and full details have been sent to many hundreds of Colonial members and other interested persons. During the period 0000 G.C.T. February 22, to 2400 G.C.T., February 28, British Empire stations will concentrate upon working fellow amateurs in other Empire Zones. The B.E.R.U. Challenge Trophy (which has been subscribed for by R.S.G.B. members) will be awarded to the station effecting most Empire contacts, as laid down in the rules. A special award will be made to the winning transmitting and receiving stations in each of the 12 zones.

Many E.L.S. are now carrying out regular schedules with their appointed colleagues in the Colonies, considerable time thus being saved in handling important B.E.R.U. matters.

Following the receipt of the Antwerp Congress report a special sub-committee was appointed to examine the report. The results of their findings have now been issued to all European countries who were participants in the Congress. Comments on their report are awaited by the R.S.G.B.

NEW ZEALAND REPORT

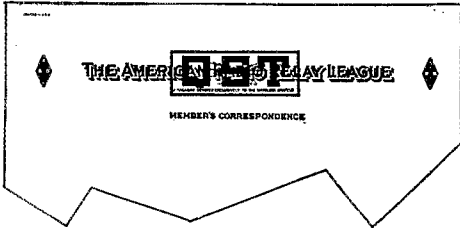
By D. Wilkinson, Vice-Pres., N.Z.A.R.T.

The DX season is back with us once again, and many fine contacts have been established during the past two months on the 7-mc. band, especially with European stations, right through the W QRM. Some of the ZL stations have been fortunate enough to QSO our old friend ZL4AO at G2LZ's shack, and to hear his impression of the Old Land. He was present at the R.S.G.B. Convention, and was very warmly received.

The 14-mc. band has been a disappointment with us this year since about April, and conditions are far below what they were at this time last year when some of our stations were WAC within a week — one or two within 24 hours. Nevertheless, some good contacts have been made but QSO's are not nearly so reliable and signal strength varies very rapidly. Nothing has been done on the 28-mc. band since last March, when signals in this region gradually disappeared. Some of our stations keep regular watch on this band still, but have nothing to report at present. Perhaps with our midsummer approaching signals will reappear.



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THE AMERICAN RADIO RELAY LEAGUE
HEADQUARTERS: HARTFORD CONN. U. S. A.

RADIOGRAM

CITY OF ORIGIN HARTFORD CONN.	STATION OF ORIGIN WVBC	NUMBER 579	DATE OCT 8	CHECK 47
TO: DEEN E MELBAIN WVBC				
FROM: LOUIS R HUBER				
<small>RELAY CHAIN BEING ORGANIZED BY FRIENDS OF ILLINOIS TO OPERATE BETWEEN THE PACIFIC COAST AND CHICAGO CALLS FOR CLOSEST COOPERATION BETWEEN IOWA AND ILLINOIS STOP QST THAT YOU COMMUNICATE WITH WRAPO ON THE SUBJECT</small> LOUIS R HUBER				
Rec'd FROM STATION	LOCATED AT	DATE	TIME	OPERATOR
Sent TO STATION	FORT RADISON IOWA	10/8/28	8:33 p	DP

OFFICIAL A.R.R.L. MESSAGE BLANKS

Most convenient form. Designed by the Communications Department of the A.R.R.L. Well printed on good bond paper. Size 8 3/4 x 7 1/4. Put up in pads of 100 sheets. One pad postpaid for 35c or three pads for \$1.00.

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RADIOGRAM

AMERICAN RADIO RELAY LEAGUE

From	Date
To	At Radio Station

THIS MESSAGE WAS RECEIVED AT

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New book form! No more fussing with binders, or trying to weight down loose sheets when the breezes blow!

New handy operating hints and log-keeping suggestions, put where they are always convenient

AMATEUR RADIO STATION LOG

DATE	FREQUENCY	MODE	CALLED	CALLED BY	STATION HEARD			MESSAGES	REMARKS ETC
					TIME	IC	OR		

THERE are 39 pages like the one above, 8 1/4" x 10 3/4", carefully designed to incorporate space for all the essential information you want and need to record about your station's operation. Thirty-nine blank pages (backs of the log pages) to be used for notes, experiments, changes of equipment, etc. Durable covers of heavy stock with space for your station call and dates over which the log entries extend. On the inside covers and first two pages are complete instructions on maintaining your log, convenient tabulations of the most-used Q signals, miscellaneous abbreviations, operating hints, amateur prefixes and signal-strength scales. The information you want, always at your finger-tips.

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- (2) Reach in pocket, produce U. S. A. \$1 bill, old or new size (we don't care).
- (3) Clip together, mail us.

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West Hartford, Conn.

SEND IT AT ONCE.

(Name)

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(City and State)

A British Empire Week has been inaugurated, initiated by the N.Z.A.R.T. and supported wholeheartedly by the R.S.G.B. Tests will commence and continue each year throughout the last week in February, when it is expected that a great many British station contacts will be established, and a reliable Empire chain built up.

Preparations are well in hand for the Annual Convention of the N.Z.A.R.T. held this year in Wellington, between Christmas and the New Year. A most interesting program has been arranged, and a huge success is assured.

NORWEGIAN NOTES

By G. H. Petersen, Pres. N.R.R.L.

The successful Norwegian 3750 kc. tests during November, and the importance attached to those tests by newspapers and by broadcast lectures, have provoked a large increase in the interest in the high frequencies in our country. N.R.R.L. membership has increased very considerably.

Conditions seem to have improved a great deal, especially on the 14-mc. band, where W QSO's are no longer scarce. LA1G succeeded in forwarding a report to I.A.R.U. Headquarters via W2ZG some days ago during a fine half hour QSO.

We take this opportunity to forward to all associated societies and their members our sincere greetings of good fellowship.

WAC CLUB

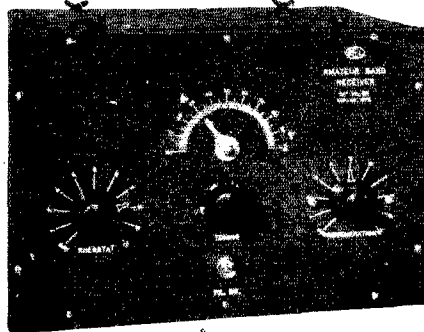
The following amateurs became members of the WAC Club during the year 1930, under the régime of the I.A.R.U., by virtue of having worked all continents with C.W.:

Sam Cantor, W2BOZ; Paul Volochine, OK1FM; Hans Prost, D4JL; Charles Mellor, W8HX; A. S. Mather, VK2JZ; H. R. Carter, VK2HC; E. J. Boucher, W3AJD; University of North Carolina, W4WE; Thomas Stephens, VK3GO; Paul de Neck, ON4UU; Paul E. Holbrook, KA1AF; L. H. Cushman, W6BJD; Donald M. Lawton, W7BE; Georges Corbisier, PY2AD; Richard E. Huddleston, W6DLN; Albert Reiss, W2BN; M. J. Ford, W6DGQ; A. M. Rahim, VS7AP; Charles Perrine, Jr., W6CUH; S. H. Walters, ZUID; R. Van Handle, W2AMR; William N. Short, W9EF; Kenneth Wilkinson, G5WK; Robert Van Steene, ON4DJ; Hans Krautzig, D4AEQ; J. F. W. Jordens, PA0WT; Franz Noerther, D4ABN; Charles W. Drew, VK2CD; J. de Heer, UO1JH; D. Jaime Más, EAR59; E. Erasmus, ZT1R; Van Den Wormer, OH4HC; Pecher Louis, ON4RO; Miss Jane Burchard, SP3YL; J. Brey, D4BY; Howard B. Allen, Jr., W3BJM; G. H. Vitet, PK4AZ; W. Mayo Richard, VK5WR; Captain Pilot Marjan Burchard, SP3PB; W. P. Stoyies, VO8MC; D. Ramon de Lili Galdames, EAR21; Wilson E. Burgess, W1BDS; Kenneth E. Hughes, W6CIS; V. Van Beusekom, PA0VN; Alan G. Brown, VK3CX; T. Nissen, ON4GK; Douglas H. Johnson, G6DW; Norman G. Guldes, ZL1FC; William Garey Wilson, OA4J; Robert G. Wood,

IF... we were ever bitten by the endorsement bug... it would take many QST's to hold the enthusiasm of the users of our famous

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- 3 - Equally efficient for DX, CW or fone reception
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- 6 - Readily calibrated for each band
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ENDORSEMENTS — what a flock of them

have come in from the hundreds of happy Hams who own this receiver! We'd like to publish them all, but in these hard times we just can't afford to buy hundreds of advertising pages in QST (not that they haven't tried to sell them to us!) So instead of cramming a bunch of high sounding names down your throat, we are going to say just this!

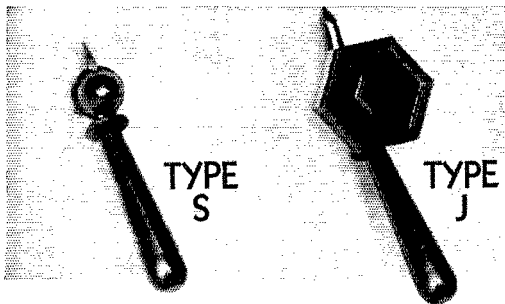
Take a good look at those seven features. Remember that this set is built around REL's famous coils and condenser. And when we say it's a complete kit, nothing else to buy — includes drilled and engraved panel, metal cabinet and three special Amateur band plug-in coils that spread each band over the entire dial — then you have the whole glad story and there's nothing left for you to do except *order!*

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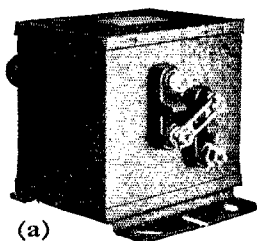
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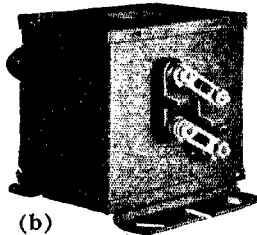
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Our new Circuit Diagram on this equipment will enable you to obtain results not obtainable before. It is free. No obligation. Send for it today.

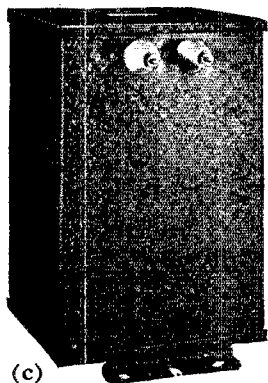


(a)



(b)

Above, Thordarson's Filament Supply Transformers — (a) Primary Coils connected in series for use on 220 volt 60 cycles (b) Primary Coils connected in parallel for use on 110 volt 60 cycle current. At left, Thordarson's Filter Reactor.



(c)

New Transmitting Power Supply Equipment

New capacities . . . New construction . . . New ratings . . . New prices. This equipment is all mounted in completely enclosed cases and sealed with a moisture proof compound. The cases are finished with a high grade crystal baked lacquer. This construction renders our equipment impervious to all atmospheric conditions. Salt sea and humid atmospheres have no effect on its operation.

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Transformer Specialists Since 1895

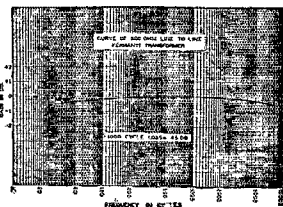
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The New Ferranti Type D Rack Amplifying Equipment gives faithful reproduction of voice and music and is recommended where heavy duty amplification is required. Unit assembly. Combinations may be bought from stock units and added without disturbing existing equipment.

Flat Curve and Output TRANSFORMERS

Designed for the exacting needs of broadcasting stations, public address systems, recording devices, laboratories, and wherever a flat curve over a wide frequency band is necessary. Made in the U. S. A. Shipped in 48 hours.



Curve of 600 Ohm Line to line transformers—typical of this new series of Ferranti Transformers

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Scientifically equipped
 to economically export
 dependable receiving
 and transmitting radio
 apparatus

New Transmitting Inductances

(Continued from page 48)

hex nuts, washers and a wing nut, are used for fastening the coils to the mounting. A large contact area is provided at the connection points.

The inductances are intended to be used on the 3.5-, 7-, and 14-mc. bands with a variable capacity of 440 μ fd. They should be entirely OK for a transmitter using a pair of Type '04-A tubes, and have in fact been used in such transmitters with plate voltages up to 3000. The excellent mechanical construction makes them especially well-suited to self-excited circuits. Wireless Egert Engineering, Inc., New York City, are the manufacturers.

Experimenters' Section

(Continued from page 46)

"In answer to the plea in the December issue of *QST*, thought my results in this line might be of interest. The transmitter used at present is an m.o.p.a. as described in a previous issue of *QST*, built almost exactly as presented.

"I have used a few self-excited circuits and have not had any trouble with by-pass condensers in them. When the m.o.p.a. was first built I noticed that the filaments would increase their brilliancy a slight bit in the amplifier, but thought nothing of this as I had never had any experience with this type of transmitter before. This did not seem to affect anything and as I was then using batteries for plate supply the note was good. After about four months of operation, I put the transmitter on 7000 kc. one afternoon and then decided to come back to 3500 kc., which has been my favorite frequency for quite a while. On tuning the transmitter to the usual frequency of 3700 kc., I could not seem to neutralize it properly and noticed a decrease in antenna current (normal .7 amp. decreased to .3 amp.) and a corresponding increase in plate current of about 50 mls. Also noticed that the filaments were lighting up very brightly. Not knowing what could be wrong, I tested and tested, but couldn't find the trouble so tuned the set to about 3850 kc. However, the antenna was not peaked at that wave so I had to be satisfied with poor results.

"A few months thereafter I noticed the first note on filament by-pass condensers in *QST*. I took them out of the amplifier but left them in the oscillator. The set immediately went back to normal and when a few months later I added another tube in the amplifier, making it two Type '10's in parallel, I put the condensers back again and had the same results exactly. So I again took them out and as I had just put in r.a.c. thought I would see what effect the ones in the oscillator had on its performance. After taking them out, my note was better d.c. than before and the plate current dropped from 60 to 50. The antenna current also dropped slightly but this did not in any way affect the QSA reports on my signals."

"W3AJV recently built a push-pull outfit as

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COMPLETE STOCK
 SHORT WAVE
 TRANSMITTING and
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where, in a space of over 15,000 square feet with a shipping department that has been trebled in size, we are equipped to give you **EVEN BETTER** service than before.

Our increase in space enables us to carry a most complete stock of receiving and transmitting equipment. We carry everything from a microphone suspension spring to a quartz crystal holder which has a device to vary the air-gap on top of a crystal, thereby shifting frequency. In fact, our latest Bargain Bulletin contains a listing of complete parts necessary to build anything from a 210 job to a one-kilo outfit.

The announcement in the Feb. QST that we extend the real **WHOLESALE** prices to all amateurs and experimenters still stands. Only by receiving our latest 64-page Bargain Bulletin can you become acquainted with our new **LOW PRICES**.

Write your troubles to us care of W2WK-W2APD.

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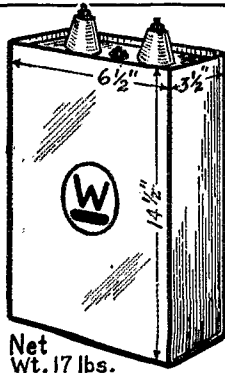
Price \$58.00 Less 60%

Lots of four, \$20.00 net
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Order promptly from this ad. Quantity is limited

E. F. JOHNSON COMPANY

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Type 866 Mercury Vapor Rectifier

\$5.00

Fully Guaranteed
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Tubes Repaired

Send us your burned out power tubes for repair.

203-A.....\$15	211-D.....\$12.50
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All work guaranteed

NEON STICKS, 12" long.....\$2.50
For testing circuits

Extremely sensitive to R.F. Also can be used for locating parasitic oscillations and antenna nodes.

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described in November 1930 QST and tried the by-pass experiment also. He found that on 3500 kc. they did not make any difference in signal or anything else, though on 14,000 kc. they made the note change from p.d.c. to r.a.c. No data is available on 7000 kc."

The conclusion to be drawn from the reports so far received seems to be that, barring some unusual condition, the condensers are not necessary provided r.f. chokes in other parts of the circuit are doing their duty. The effectiveness of the chokes might account for the differences in results encountered in the same transmitter on different bands, since it is difficult to build a choke which will be really good on all bands.

Financial Statement

BY order of the Board of Directors the following statement of the income and disbursements of the American Radio Relay League, Inc., for the fourth quarter of 1930 is published for the information of the membership.

K. B. WARNER, Secretary.

STATEMENT OF REVENUE AND EXPENSES FOR THE THREE MONTHS ENDED DECEMBER 31, 1930

REVENUE	
Advertising sales, QST.....	\$18,003.66
Advertising sales, Handbook.....	2,840.00
Handbook sales.....	8,478.39
Newsdealer sales.....	12,208.09
Beginners' Booklet sales.....	1,347.58
Membership dues.....	12,754.63
Emblems.....	184.00
Miscellaneous sales, net.....	2,182.30
Interest earned.....	428.99
Cash discounts earned.....	320.65
	<hr/>
	\$58,748.29

Deduct:	
Returns and allowances.....	\$3,618.38
Provision for reserve for newsstand returns.....	512.03
Cash discount on sales.....	368.57
Exchange and collection charges..	52.49
	<hr/>
	4,551.47

Net revenue..... \$54,196.82

EXPENSES	
Publication expenses, QST.....	\$13,477.13
Publication expenses, Handbook.....	5,426.11
Salaries.....	18,598.07
Forwarding expenses.....	917.86
Telephone, telegraph and postage.....	1,694.95
Office supplies and general expenses.....	2,728.26
Rent, light and heat.....	954.68
Traveling expenses.....	1,348.01
Depreciation on furniture and equipment.....	267.25
Bad debts, net.....	756.55
Communications Department field expenses.....	70.20
Headquarters Station expenses....	172.45
Loss on sale of office equipment....	21.00
	<hr/>
Total expenses.....	46,432.52

Net gain from operations..... \$7,764.30



W1BL uses a piece of cross-section paper with about ten squares per inch covered with a piece of transparent drawing paper for making clear, accurate free-hand drawings of wiring diagrams, and says it is a decided convenience where a number of schematic diagrams have to be drawn.

Two Way Radio Link Never Interrupted — Capt. Yancey's Radio Makes New Records —

Here's the Story behind These Headlines

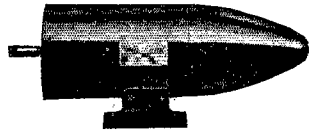
The Yancey plane (ESCO equipped) in its non-stop flight to Bermuda maintained direct two way communication with New York. Darkness forced the plane down a little short of its goal. The plane floating on the sea remained in communication with New York.

Later, on its "Good Will" flight to South America the Yancey plane, on the ground at the Canal Zone, maintained two way communication with New York. Zeh Bouck, Radio Operator, said—"I believe this is without doubt a record for Airplane transmission, and it shows very clearly what we could have done had we been forced down in some of the jungle over which we have flown during the last few weeks."

And on July 1, this last record was broken — the Yancey plane, on the ground at Buenos Aires, communicated uninterruptedly for more than an hour with the New York Times Station, 5838 miles away.

The Yancey plane was equipped with an "ESCO" wind driven generator to supply radio power while flying, and a battery operated "ESCO" dynamotor for ground work.

"ESCO" has a very complete line of wind driven generators, and dynamotors for airplane service. Let "ESCO" Engineers help you with your power supply for communications.



Type NA Airplane Generator

ELECTRIC SPECIALTY COMPANY

225 SOUTH ST.

STAMFORD, CONN.

Manufacturers of motors, generators, dynamotors and rotary converters

5s 6s 7s and 9s!

Why send all the way east for your kits and parts? We have the most complete stock west of Chicago right here for you on the coast. Parts by the hundreds at real prices for the licensed ham. Get our catalog.

Everything for the amateur

RADIO SUPPLY COMPANY

H. A. Demarest, Pres.

912-14 So. Broadway Los Angeles, Calif.

W6FB1 Located in Building

H I L E T

adjustable gap chokes are being specified in many high grade designs. An adjustment in the gap to suit the D.C. flowing in the winding is necessary to obtain the full benefits that a well designed choke can produce. Write for our bulletins on choke design and gap adjustments. CHOKES — 30 Henry — 100 MA. 13 lb., \$9.75, 200 MA. 20 lb., \$11.50, 380 MA. 32 lb., \$16.50, 600 MA. 40 lb., \$28.50, 1 Amp, 105 lb., \$65.00, 1 1/2 Amp, 310 lb., \$88.00, 2 Amp, 530 lb., \$145.00, 20 Henry — 200 MA. 18 lb., \$9.50, 380 MA. 25 lb., \$12.50, 600 MA. 34 lb., \$18.50, 750 MA. 40 lb., \$26.50, 1 Amp, 90 lb., \$48.00, 1 1/2 Amp, 220 lb., \$78.00, 2 Amp, 410 lb., \$115.00. 5 and 10 Henry chokes in stock.

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SPECIAL Colored Official League Emblem

FOR SECTION COMMUNICATIONS MANAGERS
AND OFFICIAL RELAY STATIONS

S. C. M.
Red Background
Pin type only



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Please send me, without obligation, your new issue of "Modern Radio" explaining your advanced course in Practical Radio Engineering.

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Address.....
Position.....

A New Potentiometer

A NEW type of potentiometer has recently been developed by the Allen-Bradley Company, Milwaukee, Wis., to meet the demand for a device which can be used in a number of rôles in the variable resistance field.

The new unit, which is known as the "Bradleyometer," contains a resistance unit consisting of resistance discs interleaved between thin metal strips. A movable contact arm slides over the stepped resistor. There are approximately fifty steps, each of which may have any desired value of resistance, thus making possible the construction of a potentiometer with practically any value of resistance-rotation curve.

A number of Bradleyometers may be used in various combinations, operating with one knob, to form volume controls in which the input and output impedances remain constant, and to provide attenuators in which, in addition to providing fixed input and output impedances, the attenuation network remains symmetrical.

Calls Heard

(Continued from page 53)

kalxo kfu5 rx1aa ve4dj vk2fp vk2hu vk2rc vk3bw vk3es vk3jk vk3pr vk3rx vk4kx vk5wr vk6dh vk7dz wr8yy wibt zl1bn zl2bn zl2bp zl2bz zl2gn zl2gq

W9AEW-W9BRH, Vernon Holmes, 2114 Grand-view Blvd., Sioux City, Iowa

7000-ke. band

k7abs k7ak k7mk vk2bj vk2dy vk2dz vk2jo vk2kh vk2ra vk2vs vk2wu vk2xf vk3ax vk3bh vk3ci vk3es vk3jk vk3jy vk3ml vk3ot vk3pa vk3rg vk3rt vk3vp vk4bh vk4hu vk5aw vk7ch vk7dx vk7wi vprp py7aa ve1as ve1ba ve5ak ve5be ve5co ve5er ve5du ve5fi kd5v kfr5 kfr6 kfu5 ti2fg ti2hv ti2re ti2wd em1az em1by em2co em2jm em2sh em2xa em2yb em5by em5fc em5fl em8ry em8yb em8lc em8uf em8yb ok1na he1dr hv1fg hc1lc hc2jc hc2jm hc2grc f8er f8fg f8pam tg1ce tg2elo k6av1 k6boe k6bra k6bt k6bxw k6ceu k6cib k6cjs k6dud k6eqm k6etf k6eww k6ewb k6oa nj2pa x1ae x1ax x1g x1pa x2r x2x x4a x5a x9a x29a x9de xal xa9d xmd xw1m vo8ae zl1bb zl1fc zl1fg zl1fr zl1ft zl1fx zl2ab zl2bb zl2bg zl2bz zl2bz zl2df zl2gk zl2gn zl2go zl3ae zl3bb zl3bc zl3cm zl3ct zl4bg zn1fx zn1nc zn1ac nn7c nn7xj nncab nrfx rx1aa kalaf kalhr k4wm ct1cp ysl1g ys1x ear21 ear113 ear116 kvd nins sbla wfat

14,000-ke. band

k7mn lu1ba lu1bz lu1eq lu2aa lu2bz lu2ca lu2dj lu2fi lu3de lu3dh lu3fa lu3fk lu3hc lu3oa lu3pa lu4bi lu4dq lu5ac lu5bz lu5na lu6aj lu7as lu8dj lu8dy lu8ei lu8en lu9ce lu9dt vk2hc vk3ab vk5ja uowg on4caa on4bc on4bz on4fe on4fp on4jb on4jj on4pj on4us pylaa pylah pylam pylaw pylax pylca pylcl pylcm pylcn pylcr pylcs pylia pylie pylid pylid py2ac py2ak py2al py2al py2ay py2az py2ba py2bd py2br py2bz py2bk py2ia py2ih py2ii py2ij py2ik py2jq py2rb py2bc py3ah py3aq py3ls py7ab ve1ah velam velam velap velaw velbd velbr velca velce velco velda veldq veldr ve5ak ve5al ve5ao ve5aw ve5bh ve5bp ve5cr ve5ef kfr4 kfu5 celah celak ce2ab ce2al ce3ab ce3ae ce3ag ce3bf ce3bm ce3bs ce3ca ce3ch ce3ci ce3cr ce3da ce3dg ce5aa ti2ea ti2hv em2ar em2jm em2jt em2sh em2xx em2xd em5cx em5fl em8ry em8lc em8uf em8yb ozid oz4j oz7y hc1fg hc1lc hc2jc hc2jm su8rs f8aap f8aw f8bx f8bha fm8crv f8cs f8da f8ex f8gdb f8ha f8hpg f8hr f8hz f8kz f8lx fm8mv f8sm f8swa d4aez d4jl d4wa d4xn g2ak g2cd g2df g2gl g2gm g5bd g5bj g5by g5ml g5mm g5ox g6dh g6dt g6rg g6vp g6wt g6xb te2gr k6bh k6boe k6bxw k6ceu k6egd k6erh k6etf k6ewb k6eze haf3c i1ll nj2pa un7xo x1g x1j x3a x4a x9a x9b x2x cn8ru pa0xg vo8an vo8aw vo8mc z1lan z1lae z1laf z1lfg z1lfr z1lfx z1zab z1zac z1zaw z1zbn z1zbx z1zgh z1zas z1zcm z1zax z1zby oa4c oa4h oa4j oa4l oa4o oa4p oa4q oa4r oa4t oa4x oa4y oa4z k4aan k4aky k4dk k4kd k4kf ct1ae ct1ae ct1an ct1bx ct1by

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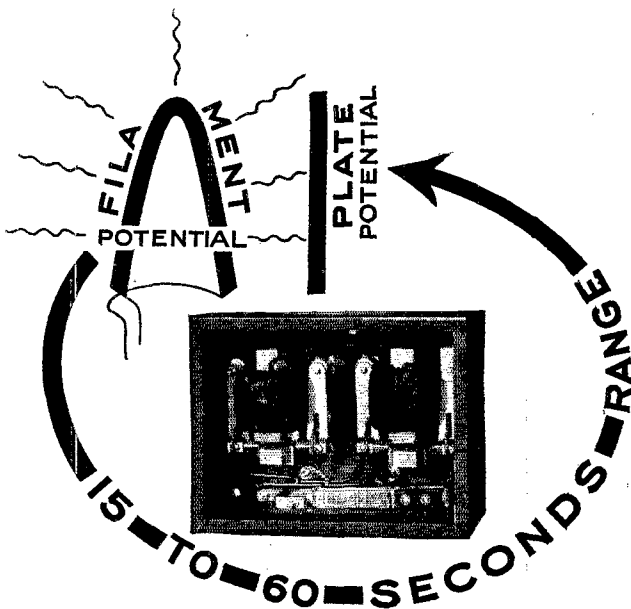
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Send for information on this and other Ward Leonard relays.

Self-Re-cycling

Time Delay RELAY

- SET the time delay . . . for example . . . at 30 seconds
- CLOSE the circuit . . . starting the cycle of operations
- OPEN the circuit . . . before the 30 seconds has elapsed . . . stopping the cycle of operations
- RESTART . . . and the original setting of 30 seconds has not been shortened

WARD LEONARD ELECTRIC CO., MOUNT VERNON, NEW YORK

Do you know that the latest *Radio Amateur's Handbook* is available in bound form — \$2.00 per copy, postpaid.

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POWER CRYSTALS — Guaranteed — excellent oscillators. One inch square sections, ground to within one tenth of one percent of your specified frequency at the following prices.

1715-2000 Kc. band	\$6.00
3500-4000 Kc. band	7.50
7000-7300 Kc. band	15.00
Plug-in dust proof mounting	3.00

Special prices quoted on crystals supplied in quantity lots. All orders promptly shipped.

PRECISION PIEZO SERVICE
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Portable Condenser Microphones



- 2P 2 stage plate output List \$110.00
- 2C 2 stage 200 ohm output List 125.00
- Uses 2 type 230 low drain tubes*
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- 3C 3 stage 500 ohm output List 150.00
- Uses 1 112-A and 2 240 tubes*

These prices are for type "A" unit. For type "B" unit add \$40.00 each list. Comes complete with tubes and 20 ft. cord. Standard finish is black and gold.

Attractive dealer proposition

ASTATIC MICROPHONE LABORATORY
21 OLIVE STREET YOUNGSTOWN, OHIO

OVERSTOCK SALE!

REMARKABLE BUYS

SPECIAL: Unmounted filter condensers. Working voltage 850 D.C. A real quality job. Guaranteed.

1 mid — 35c	4 for \$1.35	8 for \$2.30	16 for \$4.50
2 mid — 70c	4 for \$2.50	8 for \$4.65	16 for \$8.95

LAST CALL: Dongan 250 watt transformers with line ballast resistors. Insures steady voltage regulation. Completely mounted and shielded. Ballast resistors furnished free. Secondary high voltage output is 1500 Volts, center-tapped at 750. Filament output is 15, 7½, 7½ centertapped, and 2½ centertapped. Get your order in fast as there are very few left. Price complete, **\$5.95**

FILAMENT TRANSFORMERS: An efficient, sturdily constructed job. All centered-tapped.

Voltages	12 Watts	25 Watts	50 Watts
2½	\$1.25	\$1.95*	\$2.50*
2½ & 2½	1.50	2.25*	2.75*
7½	1.25	1.95*	3.25*
7½ & 7½	2.25*	3.95*
10			5.40*

*Can be supplied with 220 Volt primaries at 10% additional.

KNIGHT: 150 watt transformers. Ideal for 210 power supply, using half wave rectification. High voltage is 600. Filament are two 7½ centertapped windings, 2½, and 1½ Volts. Reduced to..... **\$2.55**

COLUMBIA: 30 henry 200 mill chokes. A real rugged choke for heavy duty filter power supply. Specially priced..... **\$2.50**

COLUMBIA: 25 henry 300 mill chokes. Just the thing for that heavy duty transmitter. Special introductory price..... **\$4.45**

COLUMBIA: 30 henry, 120 mill chokes. Mounted..... **\$1.30**

GRID LEAKS: Hardwick Hindle, wire wound. For all tubes up to 250 watts, 10,000 ohms, 95c; 5000 ohms, 65c.

HIGH QUALITY TUBES. Made to stand the graft. **FREE** 15 DAY REPLACEMENT. Type X281, \$1.50; X210, \$2.05; X250, \$2.15; Y224, \$1.05; X222, \$1.85; X171A, 70c; X280, 70c; X245, 70c.

COLUMBIA TRANSMITTING FILTER CONDENSERS. Newer and better. Extra heavy duty and with a real replacement guarantee. Note the sale prices:

Capacity	700d d.c.	1000 d.c.	1500 d.c.	2000 d.c.
1 mid	\$1.10	\$1.50	\$2.40	\$3.90
2 mid	1.75	2.40	3.85	6.40
4 mid	2.95	3.90	6.85	10.80

WESTERN ELECTRIC, 1000 Volt condensers, 1 mid., 75c

FREE: Get our latest catalogue for more bargains!

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 500 S. Paulina St., Dept. 31-3K, Chicago, Ill.

Send me your Big Free Radio Book and all details of your Special Introductory Offer. This does not obligate me in any way.

Name.....
 Address.....
 City.....State.....

ct1ew ct2ac ct3ab ct5ad cr4ad yslap ysix zals zslp ztd
 t1j ztlr zszc zsn zsm zsm zsu zt5r zu6d zu6w zu6f
 ear37 ear96 ear136 ear149 sm16l cx1ac cx1af cx2ak cx1oa
 cxeck xfmly inj kvd qq1a wfa wfat wfbt xearn

W1CCM, Elwood W. Brewster, Grafton, N. H.

3500-kc. band

w1abg w1ach w1nep w1aem w1afe w1ajm w1anl w1asd
 w1atb w1atf w1atn w1awm w1axv w1bey w1bdc w1bed
 w1beo w1bfz w1bhv w1bli w1blm w1bmp w1bof w1bsj
 w1bcr w1erd w1ey w1hq w1mk w1ps w1ql w1rs w1wy
 w2bcp w2bjf w2blu w2edq w2ees w2efy w2cip w2atf w2aor
 w8ayg w8cbw w8ere w8enj w8dix w8den w8dsz w8dsz

2550-kc. 'phone band

w1aev w1avy w1cqw w1io w2aoe w2cip w81v

7000-kc. band

w2aer w3adm w3aug w3bbb w3bbp w3boy w3lu w3lx
 w3pm w3zk w8adu w8bbl w8brs w8bsg w8hwc w8bwk
 w8clg w8mq ve3yo

BRS-190, F. Pemberton, 115, Cambridge Road,
 Wimbledon, London, England

7000- and 14,000-kc. bands

w1avf w1cmx w1dq w2afo w2azc w2nm w2rs w3dh w3zze
 w4aci w4paa w4uo w6abp w6aea w7be w8adm w8bnu
 w8ded w8dlf w8dwr w8dxv w8em w8zza w9asl w9ads
 w9amv w9aok w9ahq w9ba w9bba w9bre w9cgy w9csi
 w9cuh w9dpp w9eaj w9ell w9erg w9ef w9ftz w9fur w9flb
 w9gdh w9gdw w9ka w9ml ve3bt ve3ir ve5ao ve9aj k4kd
 k4ww cm8uf cm8yb yslap hh7c rx1aa ny1aa n2pa n8mrc
 ce2ab ce3ft ce3ch ce3cr ce5aa ce7aa cx1af cx1fb cx1oa
 cxeck cxlap cxtt oafj oafz oafz oafz oafz rp2ab lu2aa
 lu5ac lu1ba lu4bi lu3de lu3dh lu2dj lu8dj lu4dq lu9dt ludy
 lu8dy lu7ef lu6er lu3fa lu3fe lu3fk lu3he lu1pa lu2pa
 lu3pa luyw py1aa py1ah py1av py1ax py1bf py1cd py1cl
 py1cm py1cr py1fb py1fd py2ad py2ak py2al py2ay py2aa
 py2ba py2bg py2bj py2bk py2bo py2bz py2bf py2ih py2ii
 py2ik py2ja py2qb py3aq py8ia py8ib py9ad afa8t y1icd
 y16ht yu2dg vs6ab vs6ad vs6af vs6ag vs7al vs7ap vs7td
 zalp zslr zsn zsm zsd z5r zu5b zu6n zu6s fo3sr fo3er
 vq2ba vq2nc vq3man vq4cr vq4erf vq4ima vq4msb fk1lm
 st2a st2c su6hl su8rs su8vy on8rx fb8phi on4caa vk2rx
 vk3cx vk3dx vk3go vk3zx vk3xo vk5bj vk6nk zlifz z1fw
 z1bg z1bz z1aj z1as z1aap kalzc pk2aj pk3bm pk4ax
 k6dd vo8ae ohaeg oyid cr4ad xct2aa xf8map xj3es xeu2db
 xeu2kch slaa

28,000-kc. band

(Previous to June, 1930)

w1cmx w1cow w1bjd w1rw w1ab w1z w2jn w2nm w2bg
 w2acn w2bwx w2bvq w2bpd w2bon w2ku w2aq w2evj
 w3aqj w8adm w8sz w8dj v w8f w9amr w9bba w9azs w9fax
 w9bab nkf ve4bq z4a z4m z5c z5e z5f w2bba w92bh w92nc
 su8rs fmr3it oh1nh oh1nt oh2nm oh2ny oh2og ch2op

W3BMS, G. F. Hall, 535 West Hortter St., Phila-
 delphia, Pa.

3550-kc. 'phone band

w1aby w1azh w1qv w2aih w2ain w2aoe w2aoj w2asq
 w2bhl w2bmw w2btz w2bwc w2bza w2ce w2fr w2gj w2iu
 w2qn w2t w2uk w3aaw w3abn w3adq w3aex w3aqj w3aif
 w3alq w3als w3ans w3ap w3atr w3asq w3bfz w3cgm w3cv
 w3ddo w3dy w3oo w3uw w3vj w3vl w3za w4abt w4el w4lu
 w4pw w5awg w5kx w6dcq w6abf w8aa1 w8aci w8aco
 w8afq w8agn w8agx w8ahz w8ajh w8aky w8aal w8asc
 w8azo w8bap w8biz w8buv w8bvj w8bys w8cdh w8ody
 w8cfu w8cul w8cvz w8cye w8dce w8dtk w8lh w9aea w9ag
 w9ata w9awx w9bei w9bit w9bjw w9bqp w9bpt w9bwi
 w9byp w9cj w9czs w9dek w9efo w9ehd w9fuj w9hj w9pp
 w9mm

W9EOE, L. T. Hockett, Linden, Iowa

3550-kc. 'phone band

w1bcr w2bec w4aja w4tm w5abo w5aem w5alf w5ark
 w5aru w5awg w5awp w5bie w5blw w5bqx w5kx w5pp
 w6bne w8adh w8afq w8afl w8ajh w8bmk w8buc w8bwo
 w8bxx w8bhr w8cbp w8cin w8cmk w8cpk w8cyy w8dib
 w8doc w8doy w8nx w8up w9aag w9acu w9aef w9afn w9aid
 w9ajq w9alo w9amv w9aot w9ata w9auv w9bch w9blr

QST Oscillating Crystals

“THE STANDARD OF COMPARISON”

AMATEUR BANDS:

Winter is here, and no doubt you are going over your transmitter removing those weak links so as to get the most possible efficiency from your set.

One item of great importance is the *frequency stability* of your set. Does it *stay on one frequency*? If not, our *power crystals* will solve that problem. SCIENTIFIC RADIO SERVICE crystals are *known* to be the best obtainable, having ONE single frequency and highest output. With each crystal is furnished an accurate calibration guaranteed to *better than a tenth of 1%*. *New prices* for grinding *power crystals* in the *amateur bands* are as follows:

1715 to 2000 Kc band \$15.00 (unmounted)
3500 to 4000 Kc band \$20.00 (unmounted)
7000 to 7300 Kc band \$40.00 (unmounted)

BROADCAST BAND:

Power crystals ground in the 550-1500 Kc band accurate to plus or minus 500 cycles of your specified frequency fully mounted for \$55.00. In ordering please specify type tube, plate voltage and operating

temperature. All crystals absolutely guaranteed regards to output and frequency and delivery can be made within two days after receipt of your order.

CONSTANT TEMPERATURE HEATER UNITS:

We can supply heater units guaranteed to keep the temperature of the crystals constant to *better* than a tenth of 1 degree centigrade for \$300.00. Two matched crystals, ground to your assigned frequency in the 550-1500 Kc band with the heater unit complete \$410.00. More detailed description of this unit sent upon request.

ATTENTION AIRCRAFT AND COMMERCIAL RADIO CORPORATIONS:

We invite your inquiries regards your crystal needs for Radio use. We will be glad to quote special prices for POWER crystals in quantity lots. We have been grinding *power crystals* for over *seven years*, being *pioneers* in this specialized field, we feel we can be of real service to you. We can grind *power crystals* to your specified frequency accurate to plus or minus .03%. All crystals guaranteed and prompt deliveries can be made. *A trial will convince you.*

SCIENTIFIC RADIO SERVICE

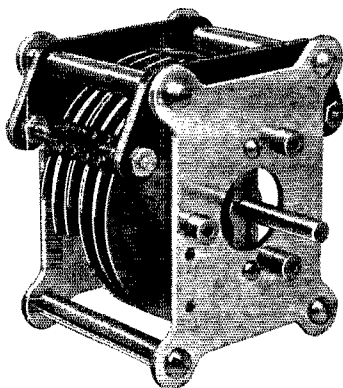
“THE CRYSTAL SPECIALISTS”

P. O. Box 86

Dept. P-13

Mount Rainier, Maryland

Here's a New and Better Band Condenser



Type 556 Condenser
Price \$3.50

which we have designed especially for dynatron frequency meters operating with a fundamental frequency in the 3500 kc. band. The three circular rotor plates increase the zero capacitance so that the band is spread out over the entire 180° of the condenser scale.

The Type 556 Amateur-Band Condenser is an improvement over the earlier model described in this space last month. The circular rotor plates are near the panel where they, with the metal endplate, help prevent body capacitance. The “spread” or frequency ratio is adjustable. The losses are much lower.

Join the procession: build yourself a frequency meter, calibrate it, and use it. Order your condenser today.

General Radio Company

Cambridge A, Massachusetts

FROST-RADIO RELIABILITY

Not an empty phrase, this statement of FROST-RADIO RELIABILITY, but a fact which has been demonstrated during the entire life of the radio industry. As a matter of fact, this habit of building reliability into all of its products extends back more than twenty years beyond the birth of radio, for this company have been builders of precision telephonic equipment for nearly a third of a century. That is why, when you specify FROST-RADIO, you obtain not only the finest possible apparatus, but also the very best possible results in the finished product. If you are not now using these parts in your apparatus, why not become acquainted with them today?

May we send you a copy of our complete catalog of all Frost-Radio Parts and Accessories?

HERBERT H. FROST, INC.
ELKHART, INDIANA, U. S. A.



Rheostats slept for 20 years, too..

BUT we have awakened them. Put new serviceability into them. HH Tubular Rheostats are engineered apparatus: Every part and surface is precision machined. Porcelain tube construction assures ample insulation at highest voltages. A radically new contact system separates the functions of contact and pressure in the shoe — no current being carried by the pressure springs, they cannot lose resiliency through overheating. The heavy phosphor bronze shoe contacts the wire firmly, but cannot tear it. Grasping the slider knob automatically disengages the screw selector mechanism. Releasing the knob engage; the screw for finer selection. These units are built for smoother action and longer life. Let us send you complete information in our Cata. No. 730.

TUBULAR
RRHEOSTATS

HARDWICK, HINDLE, INC.

218 Emmet Street

Newark, New Jersey

w9blx w9bpq w9bpt w9bpz w9bqg w9bty w9bvr w9ccm
w9ceo w9cii w9cju w9cmp w9cng w9cou w9cpg w9crr
w9cru w9dei w9dfq w9dgb w9dgr w9dmx w9dod w9dpg
w9dqg w9dvr w9dxo w9dzm w9eat w9edw w9een w9efz
w9ejt w9eme w9eng w9ens w9epv w9eal w9etz w9ewc w9eyv
w9eza w9fai w9faf w9faj w9fbf w9fyc w9fke w9fle w9flf
w9flz w9fme w9fme 29fne w9int w9fqf w9fqu w9fuj w9fvo
w9fyf w9ga w9ggh w9gmm w9wl

*W. Lockerby, Telegraphist, 4 Mess, H. M. S.
Dahla, Red Sea Patrol, c/o G. P. O., London,
England*

ear94 kfr6 ctibm ctilew su8wy unxyx g6xb g5pi wlrr
wlccz wlxav w2alu w2an w2amr w3cxh w3aic w3aws
w4ia w4ip w4ioh w4iav w4ajv w4agn w4pap w4ft w4agr
w4abt w4if w4la w4ab w4ae w4we

14,000-cc. band

on4ic on4gn on4hp ctlan g6zv g5nl w1no

*G6YL, Miss Barbara Dunn, Felton, Northumber-
land, England*

7000-cc. band

w1bn w1aub w1avl w1bky w1cde w1sz w2akd w2alu
w2ax. w2ho w2jd w2rp w3aoj w3bfd w3bp w3cxl w4fr
w4ft w4pf w5gz w6es w8baz w8cgt w9 wq frear149 fm8bg
fm8cr fm8ev fm8ih fm8lc fm8tng enbeis cn8mb cn8mop
ene io3b cv5ob cv5ow es3lp hc1fg kalce kalc m kaljr kalsu
xoh5an ohcl lofh om1th xon4wm xeu2ek we2ap vk2dy
vk2ns yk3bq yk3tm yk6wi vo8aw vo8mc vo8sz ar8fdy
yi2gm yi6kr zl3aj jbx joaa sdy a sja x4m

3500-cc. band

cv5ow d4rzn d4uan f8sk f8wae d4rab fm8ih g2bi g6fy g6pa
hb0q i3ro ok2ag oz7y eu2lg uo3wb

1750-cc. band

g2ai g2au g2bm g2qi g5jo g6fo g6uj g6zr ok3ak

W7AHZ, D. V. Clack, Creswell, Ore.

7000-cc. band

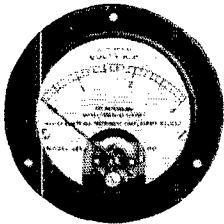
w1mk w1cra w1vy w1af w2atz w2ano w4akm w4akt w4tr
w4kg w4lt w4hd w4pik w4ft w5de w5agg w5aha w5ala
w5tm w5rgg w5uo w5kd w5bjt w5va w5aoc w5cf w5ame
w5fc w5cd w5afx w5bhj w5je w5bob w5bpf w5ajr w5pl
w5gi w5pa w5apy w5acy w5aul w5bam w5aub w5epe
w9afe w9fxq w9doc w9cet w9dti w9cej w9dpa w9gj w9cno
w9ae w9dr w9clq w9gme w9gei w9dtb w9dkl w9bnn w9dxi
w9fdg w9gau w9fpy w9aun w9brv w9bmj w9bke w9dcy
x29a x9a k6acr k6dmm k6cog k6alm k6ed k6odd k6cmc
k6bij k6erh k6cin kaljr kalhr kalpw jidy j1dv z1lbn
z1lao z1lps z1z2z z1z2c z1z2j z1z2ac z1z2bi z1z2f z1z2w z1z2g
z1z3bc z1z3av z1z4bi z1z2be z1z2dd z1z2dr z1z3cm v4ahv v4ego
vk2na vk2lx vk2af vk3jk vk3zo vk3wx vk3wl vk3ab
vk5db bkmf vk7gf

*W6CVZ, DeForest Baldwin, 1991 Oak St., South
Pasadena, Calif.*

all bands

w1mk w2jd w3cqv w5abk w5ao w5ato w5awg w5bx w5hf
w5uf w6aad w6aan w6aaq w6aba w6abc w6abd w6acd
w6afe w6afj w6afk w6alf w6ags w6ahi w6ahs w6alh w6aga
w6aj w6akb w6ao w6aoc w6ary w6asy w6at w6ato w6avr
w6aw w6awe w6awm w6awn w6ay w6bby w6bch w6bcn
w6bcr w6bet w6bdl w6bdn w6bdo w6bed w6bef w6abf
w6abj w6acq w6adp w6aef w6aez w6aih w6aia w6akq w6alg
w6amj w6apr w6aqq w6ar w6awe w6bcw w6bfn w6bgf
w6bgo w6bh w6bhv w6bii w6bis w6bit w6biu w6bjk w6bip
w6bjq w6bkv w6bkw w6bkl w6bnc w6bni w6boc w6bod
w6bp w6bph w6bpi w6bps w6bqr w6bri w6brk w6bs w6bsi
w6btl w6buc w6bud w6bup w6buy w6bvt w6bvz w6bxi
w6bxj w6byb w6bzi w6bzal w6baz w6cac w6car w6cbj w6cjq
w6ccd w6cez w6cd w6cdh w6ceb w6ceo w6cfn w6cfr w6cgj
w6ch w6chv w6cib w6ck w6clb w6clq w6cna w6cne w6cno
w6crr w6con w6cow w6crg w6crh w6crk w6crs w6crz w6caj
w6caf w6cuv w6cva w6cvo w6cwp w6cww w6cxy w6cwi
w6cwx w6cyb w6cyg w6cyj w6cz w6czb w6czs w6dar w6dav
w6daz w6dbh w6dbu w6dbv w6dca w6ded w6dch w6dek
w6dep w6deq w6dee w6ddh w6deg w6deh w6dek w6dep
w6der w6des w6dfl w6dgo w6dlu w6div w6dix w6dj w6djg
w6djw w6dkt w6dkx w6dli w6dna w6dnn w6dno w6dnz

FOR measuring A.C. RIPPLE OF D.C. PLATE POWER SUPPLY of TRANSMITTERS

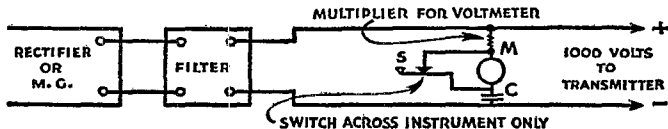


Model 301 — Voltmeter (Rectifier Type)

The A.C. Ripple or Hum Voltage in the plate D.C. power supply from a power pack or motor generator may now be measured directly in volts by use of a Weston Model 301 Voltmeter of the Rectifier type. The hook-up is very simple and inexpensive to install.

The meter may be connected permanently in the circuit, since the D.C. current consumption of the meter is zero. Thus a quick and easy check may be made at any time on the amount of A.C. in the plate circuit.

IN the above diagram, the rectifier type A.C. Voltmeter M measures the average value of A.C. and the 4 M.F. condenser C. Condenser C isolates the instrument from the D.C. but allows the A.C. to pass through it. The D.C. working voltage rating of the condenser must equal or be higher than the peak voltage of the power supply which equals the R.M.S. voltage applied to the plate of the rectifier tube multiplied by 1.41. For the power supply described



above, the working voltage rating of condenser C should be approximately 1,500 volts. The switch should be the push button type which remains closed except when pressed. This is to prevent the initial charging current taken by condenser C from passing through meter M. The push button should not be depressed until the transmitter is in operation.

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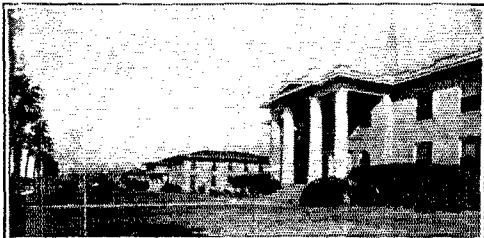
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w6doj w6doz w6dpp w6dph w6dpu w6dqq w6dqh w6dqz
w6dqv w6dre w6dr r w6dty w6dub w6dug w6dvi w6dup
w6dya w6dyh w6dyk w6dwl w6dwi w6dww w6dww w6dye
w6dyj w6dys w6ea w6ean w6eao w6eaz w6ebo w6ebz w6edo
w6eej w6efe w6efe w6efg w6efs w6efu w6ehe w6chk w6cii
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w7rn w7dse w7ep w7nw w7aaq w7bpb w7dgi w7eww w7ewx
w7eyz w7fow w7fqw w7fuj w7la w7us vk2wz vk3am vk3gl
vk4am vk4cv vk5az vk5gh vk5nc vk6cv vk6jr vk6sr vk6wr
vk7gd vk7w vk7dx vk7la ougp ousv ouwg ct2ad 4aa on4az
on4dy vp8r velao velci vel2vw vel2iy vel3am vel3ax vel3az
vel3cb vel4t vel4dq vel4e vel5bj vel5iy vel5ff vel5fi vel5gk
vel5js kfr6 vs7ay ce3bd ce3cr hk9 xal t2hv em2rk em5rv
em6by oz5a oz7z he2jm f8ek d4abj d4ads g2qn g5ck g6ja
om1tb k6avl k6fcq k6rl k6gh j1dg z1aw z1bf z1gk z14ai
k4ni k4kd k4kt zs2o cx1bf au2am k4aan

W6ERS-W6BAK, Vernon Howard, 561 Vienna
St., San Francisco, Calif.

7,000- and 14,000-kc. bands

w1afa w1agk w1ahp w1ala w1agt w1ase w1auk w1awe
w1axx w1bdo w1bga w1bil w1bkl w1bvr w1cwg w1cei w1cft
w1cin w1cix w1cmx w1cws w1diz w1dr w1eu w1id w1ld
w1kd w1km w1kn w1kw w1lmd w1mk w1ok w1rp w1rr
w1rw w1si w1wu w2aaj w2abl w2acj w2adg w2adt w2afz
w2agw w2ajp w2akm w2alo w2alu w2ama w2amh w2amr
w2anr w2aof w2apk w2asg w2auj w2avm w2awu w2axl
w2ayj w2ayz w2bey w2bhr w2bip w2bjg w2bjo w2bky
w2bnx w2bow w2box w2bpn w2bro w2bsc w2bsl w2bsw
w2btw w2bwj w2bxw w2bzu w2cbp w2cxl w2dl w2fn w2gg
w2gx w2ka w2ma w2mc w2oa w2rq w2rt w2uk w2up w2wq
w2wz w3aal w3aaz w3adt w3afi w3aft w3ahe w3alt w3ais
w3alp w3ana w3ant w3aoh w3api w3ard w3arp w3ary
w3awh w3awi w3aws w3bhm w3bpi w3bw w3bww w3cab
w3cdq w3ckl w3cxl w3ee w3hg w3im w3lu w3lx w3mg w3na
w3si w3sj w3tb w3ut w4aaq w4adt w4aef w4aek w4ean
w4aha w4ahl w4ahz w4aiq w4aka w4alg w4ama w4ao
w4aq w4cc w4dr w4ei w4fd w4ft w4gk w4hb w4hd w4he
w4hk w4ho w4hu w4it w4kq w4lj w4lt w4lx w4nb w4nn
w4oc w4oi w4pa w4pk w4pz w4vq w4xq w4rt w4it w4vk
w4vs w4we w4wm w8aab w8acb w8adb w8adg w8adj
w8aed w8agy w8alt w8aid w8akg w8aqg w8arx w8au
w8aup w8axz w8ayw w8aqq w8bas w8baz w8bet w8bet
w8bcz w8bdm w8bgw w8bhu w8bjp w8bk w8bkm w8blh
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w8cgv w8cha w8chb w8cll w8clj w8clm w8cmb w8cml
w8cnc w8cnx w8cpb w8cqa w8cat w8cu w8cvt w8cx w8cyg
w8dcb w8dcg w8dcq w8ddc w8dgb w8dgl w8dgs w8did
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w8dr w8duh w8duq w8duv w8dux w8dvq w8dwm w8dco
w8dyk w8dyp w8ej w8eo w8gl w8hy w8iq w8jq w8kc w8np
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w9eji w9ejw w9ekk w9ell w9els w9ekx w9eni w9eny w9epe
w9erx w9esx w9etd w9eve w9evj w9eys w9exp w9fbw w9fca
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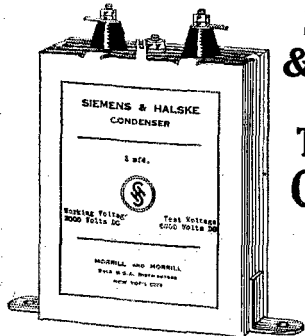
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1000	3000	1	2 1/4-1 3/4-2 1/4
		2	4 1/4-2 -6
		4	4 1/4-2 -6
		1	6 1/4-1 3/4-2 1/4
1500	4000	2	4 1/4-2 -6
		4	4 1/4-2 -6
		1	4 1/4-1 -6
		2	4 1/4-2 -6
2000	6000	4	4 1/4-4 -6
		1	4 1/4-4 -6
		2	4 1/4-4 -6
		1	4 1/4-4 -6
3000	10000	2	4 1/4-8 -6
		4	4 1/4-8 -6
		1	4 1/4-8 -6
		4	9 1/4-8 -6

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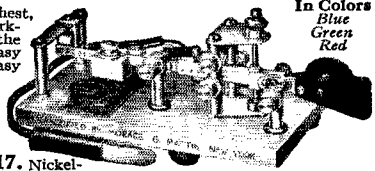
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With the *Easy-Working*
Genuine Martin No. 6
New VIBROPLEX

(Reg. Trade Marks: Vibroplex; Bug; Lightning Bug)

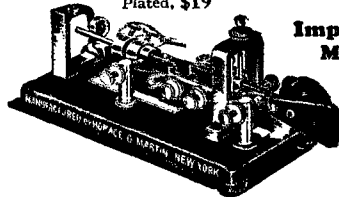
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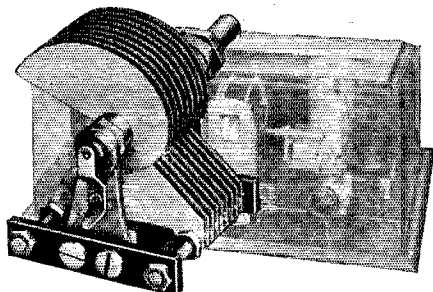
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Cable Address: "VIBROPLEX" New York

NATIONAL SE-100



THE FIRST REAL H.F. CONDENSER

unlike any other variable condenser used in high-frequency work, The National SE-100 was designed for that and no other purpose. A part-metal, part-insulation frame with single insulated bearing eliminates a shorted turn, insuring maximum silence even on very high-frequency bands. The pigtail, unlike the ordinary type, has constant impedance with attendant improved operation. Standard model SE has 270° straight frequency line plates. Model ST has 180° Equitune plates.

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*and its cover is
FIRE DEPARTMENT RED*

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New Improved Revised Enlarged
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A New Voltage-Control Reactor

A VARIABLE impedance for voltage control in a.c. circuits which can be substituted for the resistors commonly used has been developed by Elkon, Inc., Indianapolis, Ind. The new reactor gives smooth control of voltage within the ranges for which it is designed without consuming any appreciable power, the resistance and core losses being negligible compared with the I^2R losses of the ordinary rheostat. It is well suited for use as a primary reactor for control of filament voltage on rectifier and oscillator tube filaments (or in other circuits where rheostats of comparable range are used) giving smooth "step-less" control of voltage. The reactors are designed for use on 60-cycle supply circuits.

The new units are supplied in two types, with six impedance ranges in each type. The lowest-impedance reactor of the "A" series is variable between .406 ohms and 2.14 ohms, with a current-carrying capacity of 3 or 6.5 amperes, depending on the connections. The highest impedance reactor of this series has a range of 20 to 100 ohms with a current-carrying capacity of .5 or 1 ampere. The impedance ranges of the "AA" series are approximately twice those of the corresponding "A" types with the same current-carrying capacity. Intermediate sizes are furnished in both types, and special reactors can be made to order to customers' specifications, within practical design limits.

Either type can be supplied based or unbased. A calibration curve giving the actual impedance at various settings is furnished with each reactor.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

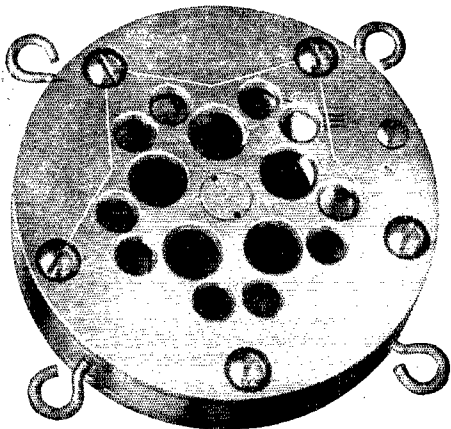
Dr. J. J. Cullings, W4CA, Memphis, Tenn.
Paul Learn, W8BPN, Forty Fort, Penn.
Harley L. Sherwood, W5BH, Albuquerque,
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STAR MICROPHONE

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DOUBLE BUTTON

Designed for the Amateur

Already Accepted as Standard
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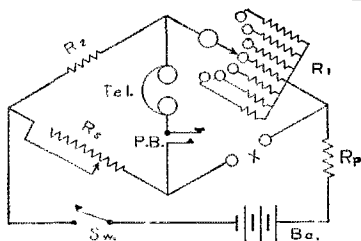
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As a result of many requests, we have developed a kit of specially-designed Super Akra-Ohm Resistors, which makes it possible to construct an inexpensive Wheatstone Bridge for measuring resistances from 1 ohm to 10 megohms.

We manufacture wire-wound resistors of any value from 0.01 to 10,000,000 ohms, having negligible inductance and distributed capacity and calibrated to an accuracy of 1%. Their use is highly recommended for Laboratory Standards, High Voltage Regulators, Telephone Equipment, Television Amplifiers, Grid and Plate Resistors, Electrical Apparatus, and Test Equipment.

Send today for our Bulletin 74-C which describes this special kit and the construction of an inexpensive Wheatstone Bridge



Shallcross Mfg. Company
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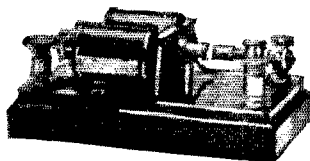


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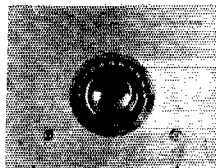
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1. Beautiful Appearance. Aluminum front Panel black case.
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Special Laboratory Equipment, Transmitters. Special Receiver design, and Transmitting station measurements Equipment to order.

GUARANTEED NEW RADIO BARGAINS

International Microphone—Two button for public address, systems and transmitters. Speech or music. \$9.75

Complete Phone and CW Transmitter 15 to 30 Watts, \$39.50 Including tuned plate, tuned grid oscillator with provision for crystal control. Wired for one or two UX 210 tubes. One or two UX 250's as modulators, two stages of speech amplification. Mounted in beautiful two-tone Walnut cabinet. Has ample space for A.C. power supply. Price includes one Stromberg-Carlson microphone.

Power Supply Unit for 15 to 30 Watt Transmitter \$19.75. Will deliver 600 volt 150 milliamperes for plate current. Has filament for 281, 210, 250, 227, and 226 tubes.

World Wide 2 Tube Short Wave Receiver, \$11.75. A two-tube receiver in a beautiful shielded metal cabinet. An ideal all around set which will give loud speaker reception on many stations. Very flexible in tuning. Complete with a set of 6 clip-in coils. Covers 14 to 550 meters. Can be used with any standard base tubes.

Tubes UX Type, 30 day replacement guarantee. No. 210, \$2.25; No. 250, \$2.35; No. 281, \$1.85; No. 280, 95c; No. 245, \$1.25; No. 224, \$1.25; No. 227, 75c; No. 226, 65c; No. 171, 75c.

Low Power Transmitter, adaptable for phone or code. With plug-in Coils. \$14.75

Short Wave Sets, one tube complete with 5 coils, 14 to 550 meters. \$6.45

Auto Radio — Uses 3-224, 2-227 tubes and 1-245 Power tube, single dial, tremendous volume. Compact. Fits any car. We guarantee this set to perform better than sets selling up to \$150. \$20.00

Stromberg-Carlson telephone transmitter on desk stand, \$2.75

B Eliminator, Dry. 180 volts, will operate up to 10-tube set, with 280 tube, fully guaranteed. \$6.75

250 or 245 Power Condenser Blocks, 13 Mfd., 1000 volt A. C. test, tapped 2, 2, 4, 1 and 1 mfd., 1 mfd. \$4.75

2 Mfd. Condenser Packs, 2000 volt A. C. test. \$7.90
1500 volt. \$3.80

Double Chokes, 30 henry each, 160 mls., 1500 vt. test, shielded. \$4.95
130 mls. \$3.75

AG-A, B, C. Power Packs, completely assembled. \$8.75
250 V. B. also has A. C. filament for up to 9-tube set. Can be used as B eliminator. Make your battery set all electric, or build your A. C. set around this pack. 280 tube for this pack, 95c extra.

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Tel. Hancock 8184 Established 1905

The New ELLIS 2-BUTTON HAND MICROPHONE

ELLIS Model 12N Hand Microphone employs the same patented buttons used in our most expensive broadcast models. Diaphragm is a special corrugated, gold plated metal. Especially recommended for home recording, portable public address outfits, home and industrial talking picture machines. Write for specifications. List price without cord, \$25.00.

The ELLIS line of Microphones and accessories also includes a complete range of models for mounting in standard rings and stands. Complete catalog sheets will be sent on request. Write at once stating name of your jobber.

Export: "Simons," 25 Warren St., New York. Cable: "Simontronic."

ELLIS ELECTRICAL LABORATORY
317 WEST MADISON ST. Chicago, Illinois



Model 12N

W9BYE and W9ESE recently worked each other on their harmonics.

During the recent tests, we heard of one station who had a number of frequencies in one band exactly 180 kc. apart.

While experimenting with antenna systems, W9AMK constructed a current-fed Hertz with a fundamental of 14,300 kc. No. 20 magnet wire was the only wire available, so it was used both for the antenna and counterpoise. The "counterpoise" hung vertically with the end of the wire wrapped around the neck of a bottle filled with water. The antenna was horizontal, and was insulated with "six inches of a pocket-handkerchief hooked onto a nail." But the system worked Brazil and Peru with a 7½-watt oscillator tied to it — "B. I. O. N."

The February, 1930, issue of the *General Radio Experimenter* contains some timely information on quartz crystals, the different cuts, and methods of mounting and using them. This article is of great interest and value to any amateur using or expecting to use crystal control. Those of us who have been in the habit of regarding a crystal as a "cure-all" for frequency stability problems will be surprised at the elaborate precautions necessary to make crystals hold a really constant frequency. Copies may be obtained by simply addressing the General Radio Company, Cambridge, Mass. Incidentally, a year's subscription to the *Experimenter* may be had free of charge if requested.

Woody Darrow, the Old Connecticut Yankee, of W3JZ is performing before the microphone at WFI in connection with a series of Saturday night broadcasts put on by the Bay State Painters. QSL's from ham-BCL's may serve to convert Woody back to amateur 'phone!

W6ADQ was explaining a modern superheterodyne to a BCL friend who apparently was taking in all the words of wisdom from ADQ. When ADQ got done, the BCL asked, "Have you one of those second harmonics around the shack? I'd like to look at it."

Maizolith, a material somewhat like hard rubber in appearance and in properties, has recently been developed by the Iowa State College. It is made from cornstalks.

Here is a chance for your Iowa and Kansas hams to cash in on some cheap insulating material.

When making coils from heavy copper tubing, the copper can be made more pliable by heating the tubing red hot and then dropping it in water. To harden copper, it should be heated red hot and allowed to cool gradually.

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 15c per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and takes the 15c rate. Provisions of paragraphs (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

PLATE power for your set, the very heart of its performance. For quietness, DX ability, life-long permanence, absolute dependability, lowest ultimate cost, no other plate source even approaches the achievement of an Edison steel alkaline storage B battery. Built painstakingly; every joint pure nickel, upset, electrically welded. Genuine Edison Electrolyte. Our list describes complete batteries, construction parts, enameled aerial wire, silicon steel. Available immediately, filament and plate transformers for the new 872 rectifier, complete plate power units. Rectifier Engineering Service, 4837 Rockwood Road, Cleveland, Ohio.

THE finest in radio for amateur, broadcast and marine. The most modern short-wave receivers. Four to ten tube designs. Radiophone CW transmitters of any power or type. We make a complete line of apparatus, including speech amplifiers, filter coils, inductances, power units, etc. Any special apparatus, designs, built to order, using your parts if desired. Prices on request. New bulletin lists complete line of apparatus. Write for copy. Ensell Radio Laboratory, 1527 Grandview St., S. E., Warren, Ohio.

WHOLESALE discounts. Approved parts. \$50.000 stock. Over four pounds, catalog, circuits, data — 50c, prepaid (Outside U. S. — \$1.00). Weekly (new items, test reports) bulletins — 20 weeks — \$1.00. Experimenters 56 page house organ — 25c, prepaid. Kladag Radio Laboratories (Established 1920 — over 4000 radiowise customers), Kent, Ohio.

LEARN Wireless (Radio) Morse telegraph. School, oldest and largest; endorsed by telegraph, radio, railway and government officials. Expenses low — can earn part. Catalog free. Dodge's Institute, 7 Wood St., Valparaiso, Ind.

QUARTZ is cheap, but a good crystal is the result of specialized knowledge and expert workmanship. My guarantee is unconditional. 7000 kc., \$15; 3500 kc., \$12; large oscillating blanks, \$3. Panel type dust-proof holders, \$4. W9DRD, Herbert Holister, Edwardsville, Kans.

A.R.R.L. sweater emblems should be worn by all League members. They are yellow and black 5" x 8" diamond, felt letters and embroidered symbol. Only \$1.00. Money order or currency only accepted. Eric Robinson, 135 Jefferson Road, Webster Groves, Mo.

TRANSFORMER rewinding, \$4 to \$8. Guaranteed. Clark Brothers, Albion, Iowa.

SELLING four UX852's used. \$20 takes one, \$75 takes 'em all. WHBU, Anderson, Ind.

EXTRAORDINARY Tube tester and set analyzer. \$45. Kasey Retzlaff, 119 Irwin Ave., Muskegon, Mich.

RESISTANCES, condensers, transformers, choke-coils, etc. Write for sensational low price list. Bronx Wholesale Radio Company, 5 W. Tremont Ave., New York.

TRANSFORMERS — 2000-1500-0-1500-2000-volt secondary, .500 amp. r.a.c., 110-120-volt primary, 60-cycle, 8000-volt insulation, weight 50 lbs. approx., \$17.50. Any size transformer or choke made to order. Write for prices. Baker Engineering Labs., 2131 Curdes Ave., Ft. Wayne, Indiana.

SELL: R.C.A. UX852, 118. Three Weston milliammeters, 0-10, 0-50 and 0-200, \$4.50 each. Everything guaranteed new condition. Don Spender, WIHD.

TRADE — 1802.5 crystal. Fine mounting. Want six or twelve 350 dynamotor. W9CDE.

SELL — Aero automatic tuner, \$12. Ultimate transmitter bug, \$7.50. WGID.

CRYSTALS — 80- or 160-meter band. Near your assigned frequency, \$4.50. To exact frequency, \$9, 1% calibration. Guaranteed. Plug in holders, \$3. Collman & Biley, 34 West 8th St., Erie, Pa.

EVERYTHING guaranteed. Same day shipment. Federal tubes (90-day guarantee), UX210, UX250, UX281, \$2; UY224, UX245, 90c; 10,000-ohm gridleaks for UX210's, 50c; Perryman UX216-B rectifier tubes, \$1; Peerless 150-mill 30-henry mounted chokes, \$2.10; 130-watt transformers. 1200-V (centertapped) and two 7½-V (centertapped). Special, \$5; 3½ Mfd. 1000 working volt unmounted condensers, 80c; 10-watt filament transformers. 8-volt (centertapped), 40c. Postage extra. Hanifan Sales Company, Waterville, Ohio.

TRADE — 3¼ x 4¼ auto Graflex camera for power equipment. W9ASL.

SALE or trade: transmitter, generator, parts. Wm. Hansen, Jr., Niles, Mich.

TELEPLEX complete with six tapes, key and buzzer. Practically new. Best offer takes it. Harry Watts, Matamoras, Pa.

100-ke. Quartz Bars for frequency standards. Accurate. Guaranteed. \$9, with instructions. Holders, \$3. Collman & Biley, 34 West 8th St., Erie, Pa.

QSLs, 100 two-color, \$1. Samples. W9CKA, Corwith, Iowa.

COIL forms, UY bases, 25c each; 6, \$1.35; 8, \$1.75, 250 tubes, \$1.25. Stecher, 605 Wenonah, Oak Park, Ill.

SELLING out cheap — three shortwave receivers, 7½-watt push-pull xmitters, 20A tubes, etc. W9FMP, 504 Leland St., Topeka, Kans.

FILAMENT transformers for 210's, 7.5 volts centertapped. A transformer for your 210 or 250 oscillator, modulator, speech amplifiers. Stock up on these while they last, only \$1 each. 30 henry 150 mil chokes, fully mounted \$2.50 each. 0-100 milliameters, flush panel mount, accuracy guaranteed. New type movement, only \$1.25 each. Genuine General Electric 5-watt tubes, plate voltage 750, filament 7.5 volts, standard base, all new, type CG1182. Only \$1.25 each. All merchandise sent C.O.D. E. Hufnagel, 879 South 18th St., Newark, N. J.

FOR sale — complete 15-watt, crystal-controlled, 100% modulated, latest type construction, radio-phone transmitter, with power supply and tubes. Will sell right for cash. Write if interested. W9FDB, Box 235, Peterson, Iowa.

OMNIGRAPHS, Teleplexes, Wasps, 50-watters, transformers, transmitters, receivers, Vibroplexes, Rectobulbs, meters, crystals, holders. Bought, sold, traded. Ryan Radio Co., Hannibal, Mo.

15-watt push-pull crystal transmitter, \$30. WSAOH, 6409 Reiter, Dearborn, Mich.

SALE — Pilot Wasp, \$12. Traveler portable, d.c., \$15. Both with tubes. R. Babcock, Redfield, S. D.

WANTED — motor generator for 110V 60 cycles. Generator 6V d.c., about 25-watt. No sparking. D. F. Brochii, 4331 Thackeray Place, Seattle, Wash.

RADIOLA 26 portable super. Perfect. Value, fifty bucks. Exchange for xmitting apparatus or photo material. W6LM, 302 Oak, El Monte, Calif.

I buy, sell and trade, tubes, meters. Merle Honey, Kingman, Kans.

SELL — Robbins & Meyers ring-oiled 400V 100W 3450 r.p.m. generator, \$15. W9FJD.

NEW G.E. Mercury Arc Tube, A.C. \$10; New Rectobulb R3, \$8; 1 kw. Pole Transformer, 1100-0-1100, \$7; R.C.A. UP 1016 Transformer, \$10; R.C.A. Choke, 50-H., 300 Mills, \$6; National Transmitting Condenser, .00445, \$8; 2-Edison H's 100V, and 150V., \$3 each; Jewell Thermo-couple Ammeter pattern No. 41, 0-5, \$6. Clark E. Foltz, 610 South St., Findlay, Ohio (W8BQ1).

W.E. parts for 4D and 4B radio sets. Retard and Rep. coils, transformers. Parts for 6025B, 6034A, 6045B speakers, microphone condensers, 101D tubes, 215A tubes. Other tubes. Microphone cables, shielded cords. Sockets for 211 and other sockets and parts. Also meters. E. Radtke, 4027 Wellington Ave., Chicago, Ill.

A.C. short-wave receivers, two tube, \$35, three tube, \$45. Build and rebuild all kinds equipment. Smith, W2BRQ, 65 Glenwood Rd., Montclair, N. J.

SELL Vibroplex, \$8. Trade other apparatus. E. DeFuack, Erlton, N. J.

QSL cards, wall cards, stationery, etc. Hillcrest, Cranesville, Pa.

GENERAL Electric 24/1500-volt 350-watt dynamotor, \$37.50; 24/750-volt, \$27.50. On 12-volt battery delivers 375; 18-500. With shaft extension for external drive, \$3 additional. Westinghouse 27.5/350-volt Special, \$7.50, \$15; 6-15-volt, 500-watt, \$15. Makes a very powerful 6- or 12-volt motor, 110V d.c. to 14 volts, 7.15 amperes, \$22.50. Fine for battery charging. 500-watt 500-cycle alternators with exciters new, \$7.50. WE Headsets with helmets, \$10. 1500-volt fuse, 300 mills, 50c dozen. SE1012 Receiver, \$20. Without condensers, \$5, new. Henry Kienzle, 501 East 84th St., New York.

SELL or trade: WE211E, 212D; R.C.A. 204, 204-A, 852, 865, 860, 861; Power Xtals; 24-1500 V. dynamotor; 500 V. MG; Jewell 199 Set Analyzer; SM Round the World Four; meters; any other apparatus. W9ARA, Butler, Mo.

CRYSTALS: 3500 kc., \$10, 1715 kc., \$7.50, highest quality, guaranteed. Blanks, \$3. Holders; plug in with Monel Metal plates, \$3.50. W9CVT, 702 Shukert Bldg., Kansas City, Mo.

WILL pay good price for any 1915 or 1916 QST's. W9APM, Des Moines.

EXCHANGE—30 caliber Winchester carbine, model 84, for 24/500V motor generator. W9FJZ, Box 162, Faith, S. D.

TRANSFORMERS—repaired and replaced. Special coils wound to specifications—guaranteed. E. M. C. Transformer Co., 1022 Taylor St., Chicago, Ill.

GREBE CR-18 short-wave receiver—complete, new, with coils, \$60. W3NW, William F. Rue, Clearfield Ave., R. D. No. 1, Norristown, Pa.

SELL—complete 60W xtal phone xmtr., filter and all, \$33. Complete R.C.A. shielded cabinet, short-wave S.G. a.c. receiver, \$15. Complete R.C.A. shielded cabinet s.w. screen-grid d.o. receiver, tubes and B batts., \$12. Adams, 1725 Pierce St., Philadelphia, W3ARA.

BEST offer takes 1 mfd. oil condenser; Amazing Stories, June 1926 to May 1928, inclusive; Raytheon B, BH and BA; two Crosley Bandbox cans and one R & M 10" oscillating fan. Joseph G. O'Shea, Darlington, Pa.

100 XMTR. parts at bargain prices. J. Hall, 143 E. 39th St., New York City.

RADIO engineer capable of high vacuum transmitting tube design. Wide experience in broadcast transmitter design, operation and construction. Capable developmental worker. Salary reasonable, Box A, QST.

KENNEDY Universal receiver wanted. 200 to 25,000 meter with two stage amplifier. State condition and price. W1SL, D. S. Boyden, 1496 Commonwealth Ave., Boston, Mass.

SERVICE Men. Accurate 175-ke. crystals for superheterodyne testing, \$9. Guaranteed. Collman & Biley, 34 West 8th St., Erie, Pa.

HIGH quality precision frequency meter and oscillator, 3800 to 60,000 cycles. Mfd. by W. E. Company. Price, \$85, or trade for moving picture camera. 653 Hillcrest Ave., Westfield, N. J.

CONDENSERS—Amsco Bathub Variable 3 gang .00035 mfd., \$1.25. Dynamic speakers—United Reproducer—2500 ohm fields, output transformers for 245 tubes, push-pull. Complete with cable, \$6.50. Baker Engineering Labs., 2131 Curdes Ave., Ft. Wayne, Ind.

SPEAKER rewinding, \$2 to \$2.75. Guaranteed. Clark Brothers, Albia, Iowa.

WESTON Model 547 set analyzer; guaranteed equal to new. Cost \$125, sell \$80 or trade for standard make high-voltage generator or what have you? W6AOE, Moreno, Calif.

50-WATT xmtr., full-wave rectobulb rectifier filters, Jewell meters, receiver, complete station, \$60. P. O. B. W2NP.

QSLs! here they are—finest quality, prices and knockout colors. Write for samples. W2BIV, 477 61st St., Brooklyn.

TRADE super-wasp chassis bat. op. 10 coils. Want Teleplex. Write Charles Matthews, Room 1209, 44 Whitehall St., New York City.

HAMS: Get our samples and prices on printed call cards made to order as you want them. W9APY Hinds, 19 S. Wells St., Chicago, Ill.

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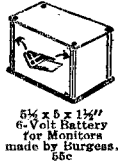
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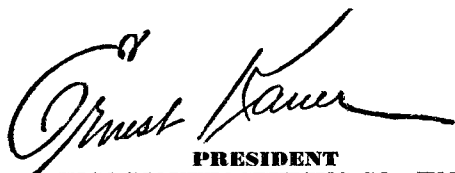
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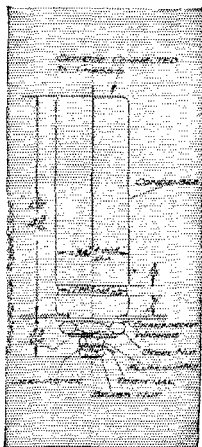
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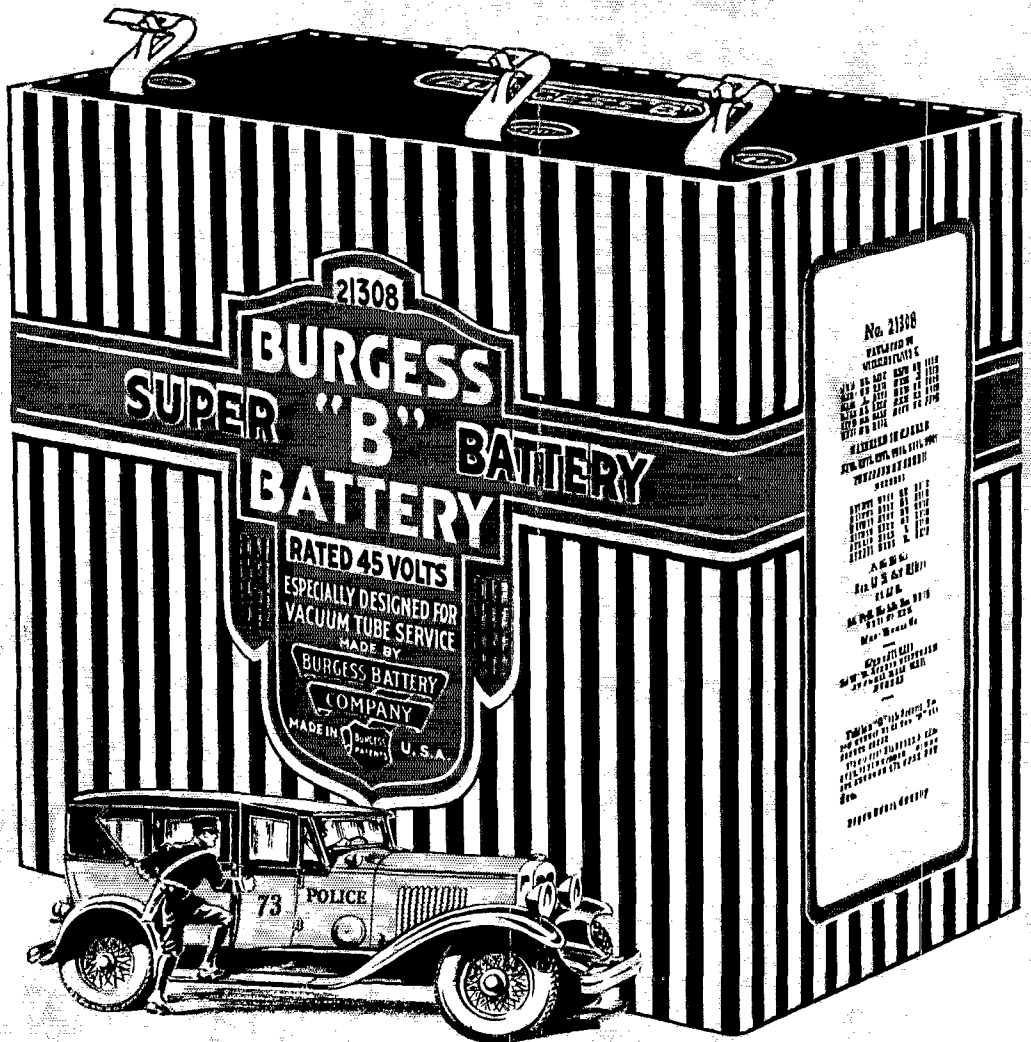
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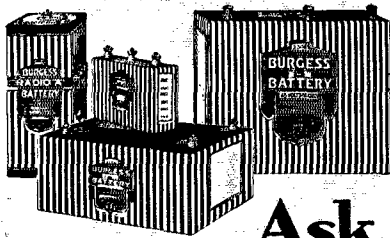
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"Dah dit dah dit—dah dah dit dah!"

By William H. Graham*

In January *QST* we invited contributions on every phase of amateur communication activity, suggesting a wide variety of subjects on which articles would be welcomed. The article presented herewith is the first to receive favorable consideration in connection with our offer (page 1V, Jan. *QST*) and is unquestionably the prize-winning article for this month. In addition to publication of the best articles in *QST*, the author whose article appears to have the greatest value of those received for consideration each month, has his choice of (1) a copy of *The Radio Amateur's Handbook* bound in leather cloth, (2) six pads of message blanks, or (3) six of the new type A.R.R.L. log books. Our offer is good throughout the remainder of 1931.

Mr. Graham hopes that his story will tend to drive home to amateurs the importance of on frequency operation. The tale is no figment of the imagination, but it is truthful in every respect. This can be verified by almost any radio operator along the Boeing Chicago-Cheyenne route, and particularly by Carl Hempel, operator at the Omaha station. The Airways channels, 3172 kc., 3484 kc., etc., are adjacent to our 3500-4000-kc. amateur band, and other important services are near other amateur bands. Read on. Then if you haven't a suitable heterodyne frequency meter and don't yet use the A.R.R.L. Standard Frequency Transmissions, or if you neglect checking frequency each time you open up—resolve that you are going to tend to these matters at once. Let's make our operation a credit to amateur radio, and keep it so.

— COMMUNICATIONS MANAGER.

IT was one of those nights along the air mail route when pilots curse their profession and wonder if it's all worth while.

Fog, most dreaded enemy of the airmen, was beginning to roll in at the Omaha Boeing field and already, at Grand Island, York and Lincoln, points west, the Boeing ground radio station operators had reported visibility "zero-zero." That, in the parlance of the fliers, meant if they could see the tips of their wings, in flight, they were lucky.

On the field at North Platte, some 250 miles west of Omaha, R. L. Wagner, veteran air mail flier, who had just arrived from Cheyenne, was awaiting the word "go" from Hempel, ground radio operator at Omaha, before continuing his journey east.

The ground officials at Omaha called a hurried conference, cast their weather eyes upward and decided to give Wagner the signal to start. By riding high above the fog spots at Grand Island, York and Lincoln, they were confident he could make it into the Omaha airport before the fog became too bad. Hempel took the microphone, clicked on the switch and began:

"Hello, North Platte. Omaha calling. Tell Wagner the fog is zero-zero at Grand Island, York and Lincoln, and that here at Omaha the visibility is yet one-half mile. A nasty looking combination of fog and smoke is gathering here, but if he hurries he can make it o.k."

The voice of the North Platte operator came back clear and strong: "O.K., Hempel. 'Rube' (Wagner) will be away in just a moment."

In "soupy" weather such as this, Boeing pilots are instructed to keep in touch with the ground radio stations every ten minutes. Wagner's single-engined ship was equipped with crystal-controlled transmitter (voice) on 3172 kc. (approximately 94 meters), identical to the frequency being used by the ground stations.

Ten minutes passed and Hempel jiggled the controls of his short-wave receiver nervously, hunting for some semblance of a squeal from Wagner's plane. Only heavy crashes of static greeted his ears.

* W9BNC, 167 Carter Lake Club, Omaha, Neb.

"I don't like this," he grumbled. "Bad business, this fog, and now it looks like Wagner's radio is on the blink. Gad, I hope we can keep this visibility at Omaha for him."

Munson, young, good-looking pilot, who was to take Wagner's ship at Omaha and fly it on to Chicago, walked into the radio room.

"When's Rube due?"

"At 11:30, if he makes it," Hempel replied.

"Yea. Mighty bad business, if you ask me."

"It's 9:40 now and I can still see the stars clearly."

"Yea, but you can't land by the light of the stars."

"Uh huh, that's right, all right."

For the next two hours, there was little conversation in the radio "shack," save the husky voice of Hempel booming into the microphone occasionally:

"Omaha calling Wagner in 189. Hello, Rube. It's getting pretty thick at Omaha. You can still get in if you hurry. Please report your position."

If Wagner heard, he did not respond, and Hempel, Munson and I hoped that it was only his transmitter that was dead.

"He'd been having trouble with his generator before he landed at North Platte," said Hempel, "and maybe he's saving his battery for his landing lights when he gets here."

Munson and I said nothing but, from the lines in his face, it was plainly written that Munson was worried about his buddy "up there" battling fog, with a "dead" radio.

Hempel left the "shack" for a moment to take another look at the weather. It was 11:15 p.m.

"It's just a matter of minutes," he said to us gravely, when he returned. "She's coming in fast." Then he reached for the microphone.

"Omaha calling Wagner in 189. It's pretty thick here now, Rube, but if you're near, you can make it o.k. Try to answer, Rube."

A minute passed. Two. Perhaps three. It seemed like ages. Then, through cannonading of static, came the voice of the man we had so long awaited. It was weak but readable, in spots.

"Wagner reporting x x x 189 x x x generator gone x x x 35 miles west x x x Omaha."

any moment. Will you birds keep your traps shut a moment!" I thundered. They walked away, hurt, and one of them said to the other: "Gee, it must be great stuff to fly the night air mail."

Presently, a muffled roar, away in the distance came to my ears. It sounded like it was coming from the west — the direction from which Wagner was due. I hesitated for just a moment, to make sure, and as he drew nearer, the droning of the plane's powerful motor was unmistakable. I had to almost crawl back to the hangar, following my foot marks.

"He's heading for the field," I yelled to Hempel, who was still fidgeting with the dials on his receiver.

"Then if he's got an ounce of juice left in his receiver battery, he'll hear me this time," said Hempel as he grabbed the microphone again. Munson, in the meantime, had gotten a report from the weather bureau that a hole in the fog was to be found at Adair, Ia., not many miles on eastward. If they could only get that word to Wagner.

"Hello, Wagner! Hello, Wagner!" shouted Hempel into the mike. "You're over the field now. Don't try to land. You'll break your neck. Go on to the emergency field at Adair, Ia., where the ceiling is unlimited and the visibility is two miles. Go ahead, Rube, if you hear me."

Hempel reached nervously for his receiver controls, set them at the assigned frequency of Wagner's transmitter and turned on the volume until it seemed the machine would burst. We strained our ears for the words of Wagner that would tell us he had heard, when there boomed out of the loudspeaker:

"Dah dit dah dit, dah dah dit dah; dah dit dah dit, dah dah dit dah!"

An amateur! Couldn't he pick some other time than this to get on our wave!

The speaker kept on: "Dah dit dah dit, dah dah dit dah, dah dit dit, dit, dit dah dah, dah dah dah dah dit —"

It was a 9 station, but I won't reveal his call, and I think Hempel was too excited to copy it. Munson couldn't read it.

A man's life hung by a thread, to say nothing of a valuable airplane and a cargo of mail, but the loudspeaker mocked on.

"Dah dit dah dit, dah dah dit dah!"

Outside, Wagner was trying to feel his way down. Once, he missed the top of the hangar by inches. Still, another time, he took a "shot" for the runway, not thirty feet up (judging from the roar of his motor), and came singing down right where he should be — only he didn't know, and he zoomed into space again. He was virtually a prisoner "upstairs," without aid from the ground.

I watched Munson. He looked confident and I tried to be.

Finally, Munson broke the silence. Wagner's motor was no longer to be heard.

"He's headed for Ft. Crook (12 miles south) to take a look there," said Munson. "If it's thick there, he'll head east. Wagner knows that route like a book. Used to fly it."

To conclude my little story, Wagner did get down many minutes later, when his gas supply had run dangerously low. He got down on one of the emergency fields east in Iowa — but thanks to NO aid from amateur radio.

With the 'Phones

ACTIVITY on the 3500-kc. 'phone band has been at a very high level during the past month due in part to the large amount of interest shown in the 3500-kc. 'Phone-CW Transcon Relay. As this issue goes to press we are working on the results of the relay for presentation in full in April QST. DX on 3500 kc. has been on the increase with several stations working the coast. On December 24, 1924, Sheldon S. Heap, W1BDT, Atlantic, Mass., and G2KF, London, England, made the first 100% two-way transatlantic voice contact on frequencies near 3500 kc. Who will be first to work two-way with England on 3500-kc. 'phone during 1931?

A number of operators of the more powerful east coast stations are interested in reestablishing 'phone contact with European hams. The Gavitt Manufacturing Company of Brookfield, Mass., is offering one of its double-button "mikes" to the first British 'phone station to contact any amateur 'phone station in the U. S. A. on or before March 1, 1931. A "mike" is also offered any American 'phone station to establish a 100% QSO with two different British amateur 'phones in the same period.

W8IH will have a type '51 linear soon. W2COJ has increased power and expects to have several new sky hooks soon. W1BCR has worked all districts and has been heard

in England several times on 3500-kc. 'phone. W1BIC is building a new 50-watt crystal control outfit. W1CBS will be on soon with a 10-watt crystal 'phone. W1AHB is using a type '12D to modulate a type '03A. W1AUY has received numerous reports from England. FB. W1AVK is using a type '04A as linear. W1BLH is interested in the prospects for trans-ocean work and has a good gang of operators. W7ANT uses a type '52 modulated by a type '12D. W6CNE pounds through to the east coast very consistently. W2FR has improved his outfit. W2ASQ is making arrangements for a meeting of W2AIH, W2GJ, W3BFZ, W1CMP and W3BJ, inviting all east coast 'phone men to attend the meeting in Newark or Jersey City, N. J., at an early date.

What is your designation? Many of the 'phone operators have a snappy slogan of some kind to fit in with some feature peculiar to their particular location, surroundings, call letters, etc. Here are a few — W1ABT, "The Old Abbreviation Station"; W8NE, "The Radiating Clothesline"; W3ALZ, "The Ole Skipper"; W1BCR, "One Broadcast Receiver"; W8DBQ, "General Schuyler — Schuylerville, N. Y."; W1AZH, "Home of Horace, the DX Hound" (QSO and hear him bark); W8RL, "The Radio Lighthouse"; W2GJ, "The Oysterette of Oyster Bay"; W1GW, "The Boston Woodchopper"; W1AUY, "The Friendly Voice"; W9FKE, Richmond, Ind., "The Magic City of Light."

The following is an excerpt from a recent letter from W1BCR: "The Eastern Amateur Radiophone League has changed its name to the 'North American Radiophone League.' Numerous requests and applications for membership from amateurs all over the U. S., Canada and England prompted us to bring the question of a change in name up at our regular meeting over the air a few Sundays ago. The roll call was 100% in favor of the change. We wish to say to those who do not know the purpose of the organization that it will at all times cooperate with the A.R.R.L. and is arranging foreign tests, printing a much needed 'phone call book, arranging organized weekly meetings over the air, establishing traffic routes which would be of immense value in case of disaster, and is trying to do all it can to improve the 'phone situation. It is our hope that every member of this organization either is already or will soon be a member of the A.R.R.L. and will write his Director a personal letter requesting a wider 'phone band and whatever other things he thinks would improve 'phone work. This should be done before the next A.R.R.L. Board Meeting, to be held probably May 1st and 2nd. The following stations are active in our coast to coast hook-up on Sunday mornings: W1BCR, W1AUY, W1AHE, W1AVK, W2BZA, W4WS, W9FKE, W9ESL, W6CNE, W7ANT, W8DCV, W8DRZ and VE3GM. We are particularly anxious to receive schedules for tests from foreign 'phone amateurs and short wave listeners. Address all communications regarding the above to the North American Radiophone League, W1BCR, 92 Keene Street, Providence, R. I., U. S. A."

From W7ATV, Chehalis, Wash., and W7AMA, Spokane, Wash., we receive some dope on 'phone activities in the Northwest. W7ATV says traffic handling by 'phone is developing. He recently gave a 221-word message to W6ANT with no repeats being required. FB! W7AMA reports that on January 11th eight Spokane radiophones held a chain QSO. Each of the following stations went on the air several times during the evening when its turn came around: W7NV, W7GR, W7AAN, W7AAQ, W7AMA, W7ATQ, W7FM and W7WF. QSOs of this kind are not at all unusual on the 'phone band these days, many times even more than eight stations being hooked together at one time. Here's a nice example of true amateur spirit: W7ATV wished to get QSO W6ANT for the benefit of a visitor who wanted very much to talk with W6ANT. Being unable to raise W6ANT, W7ATV worked W6FAM and asked him if he would help. He immediately agreed and called W6WG, suggesting that they both go after W6ANT. They called for quite some time and when it was finally decided that it was useless to try any longer, W6WG offered to walk down town, a distance of twelve to fifteen blocks, to a telephone and give W6ANT a call. That is real cooperation. FB, W6WG and W6FAM.

A second district 'phone station was recently heard sending a "QST" before the Standard Frequency Transmission, asking the gang to "pipe down" for the period of the S.F. schedule so that 'phones could successfully get the 3500- and 3500-kc. points on their frequency meters. It would be a fine idea for several of the high-powered 'phone stations to cover the band with such QSTs for about ten minutes before each Standard Frequency transmission so that 'phone

operators who really want to do the job right will be able to receive the calibration points most important to them (3500 and 3550 kc.). W9FKE's regular frequency is 3500.3 kc. and makes a good marker at the 3500-ke. end of the band.

(Not room for all our phone dope—more next month.)

ELECTION NOTICES

To all A.R.R.L. Members residing in the Sections listed below:

(The list gives the Sections, closing date for receipt of nominating petitions for Section Manager, the name of the present incumbent and the date of expiration of his term of office.) This notice supersedes previous notices.

In cases where no valid nominating petitions have been received from A.R.R.L. members residing in the different Sections in response to our previous notices, the closing dates for receipt of nominating petitions are set ahead to the dates given herewith. In the absence of nominating petitions from Members of a Section, the present incumbent continues to hold his official position and carry on the work of the Section subject, of course, to the filing of proper nominating petitions and the holding of an election by ballot or as may be necessary. Petitions must be in Hartford on or before noon of the dates specified.

Due to the resignation in the Southern New Jersey and Iowa Sections, nominating petitions are hereby solicited for the office of Section Communications Manager in these Sections and the closing date for receipt of nominations at A.R.R.L. Headquarters is herewith specified as noon, March 20, 1931. Reports from ORS in these Sections should be sent to the Acting SCM listed on page 5 of QST.

Table with columns: Section, Closing Date, Present SCM, Present Term of Office Ends. Lists sections like Alaska, Southern New Jersey, Iowa, Western Florida, etc.

To all A.R.R.L. Members residing in the Sections listed:

1. You are hereby notified that an election for an A.R.R.L. Section Communications Manager, for the next two-year term of office is about to be held in each of these Sections in accordance with the provisions of By-laws, 5, 6, 7, and 8.

2. The elections will take place in the different Sections immediately after the closing date for receipt of nominating petitions as given opposite the different Sections. The Ballots mailed from Headquarters will list the names of all eligible candidates nominated for the position by A.R.R.L. members residing in the Sections concerned.

3. Nominating petitions from the Sections named are hereby solicited. Five or more A.R.R.L. members residing in any Section have the privilege of nominating any member of the League as candidate for Section Manager. The following form for nomination is suggested:

(Place and date)
Communications Manager, A.R.R.L.
38 La Salle Road, West Hartford, Conn.
We, the undersigned members of the A.R.R.L. residing in the
..... Section of the
..... Division
hereby nominate
..... as candidate for
Section Communications Manager for this Section for the
next two-year term of office.

(Five or more signatures of A.R.R.L. members are required.)
The candidates and five or more signers must be League members in good standing or the petition will be thrown out as invalid. The complete name, address, and station call of the candidate should be included. All such petitions must be filed at the headquarters office of the League in West Hartford Conn., by noon of the closing date given for receipt of nominating petitions. There is no limit of the number of petitions that may be filed, but no member shall sign more than one such petition.

4. Members are urged to take initiative immediately, filing petitions for the officials for each Section listed above. This is your opportunity to put the man of your choice in office to carry on the work of the organization in your Section.

— F. B. Handy, Communications Manager.

*In Canadian Sections nominating petitions for Section Manager must be addressed to Canadian General Manager, Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

ATLANTIC DIVISION

WESTERN PENNSYLVANIA — SCM, Robert Lloyd, WSCFR — Attaboy, gang — keep the good work; it is a pleasure to see the way the reports come in. W8DLG leads this month by one message. He has a grand array of schedules. W8APQ is a new ORS; he uses a type 'OIA in his transmitter! W8CMP just found out he has been running

IV

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections on or before the closing dates that had been announced for receipt of such petitions. As provided by our Constitution and By-Laws, when but one candidate is named in one or more valid nominating petitions this candidate shall be declared elected. Accordingly, election certificates have been mailed to the following officials, the term of office starting on the date given.

Table with columns: Location, Name, Term of Office. Lists results for Utah Wyoming, Michigan, Ga.-S.C.-Cuba, etc.

Official Broadcasting Stations

CHANGES AND ADDITIONS (Local Standard Time)

- W3HY (7038.1 kc.) Daily 6:37 p.m.
W3ZA (3500 kc.) (phone) Wed., 7:30 p.m.; Sat., Midnight; Sun., 10:30 a.m.
W6BVF (3750 kc.) Tues., Thurs., 9:00 p.m.
W6QA (3750 kc.) Mon., Wed., 7:30 p.m.; Fri., 6:30 p.m.
W8AXV (7290 kc.) Daily 9:30 a.m.
W8BXB (3550 kc.) (phone) Thurs., 1:00 a.m.
W8BGX (3600 kc.) Daily 7:30 a.m.
W8WF (3520 kc.) (phone) Daily 6:00 to 7:00 p.m.; Wed., Fri., 10:30 to 11:30 p.m.; Sat., Sun., 11:00 to 12:00 p.m.; Sun., 8:00 to 9:00 a.m.
W9FFD (3984.4 kc.) Fri., 10:00 p.m., (7180 kc.) Wed., 10:00 p.m.

Traffic Summaries

(DECEMBER-JANUARY)

Table with columns: Location, Station Count. Lists traffic for Michigan, Maryland-Delaware-District of Columbia, Los Angeles, Connecticut, etc.

1038 stations originated 20,050; delivered 14,691; relayed 58,728; total 93,469 (73.3%).

The race for the Banner this month was a fast one. Traffic totals throughout our entire field organization were unusually high. The total for the country is 93,469!! Six sections made substantial bids for the Traffic Banner with totals over 3000, the Maryland-Delaware-D. C. gang leading with 3008. This fine total is partly attributed to the fact that the Washington Radio Club took the initiative to distribute 10,000 message blanks around to the various Washington radio stores in order to collect holiday traffic. They got it — and how! The other sections with totals over 3000 are Michigan 8281, Ohio 5826, Illinois 4166, Los Angeles 3963 and Eastern Pennsylvania 3466. This is the first showing of real fighting for that Banner since its institution. What Section will make the highest bid next month? The traffic summary printed above shows the standing of each Division. Get busy and make yours head the list.



DIVISIONAL REPORTS

his type '52's filaments on his type '10's supply! W8CUG has finally realized his ambition to handle over 500 messages. W8CEO had lots of fun in the Transcons. W8AGO is hunting schedules. W8AJE is constructing a new high power crystal job. W8GI is back again with a push-pull transmitter. W8AVY has a whole new outfit on the air. W8ARC says no news there! W8DUT is on 7 mc. now. W8YA is still

waiting for its license renewal. W8GU is clocking off-wave stations with his 100-cc. standard. W8KD was off the air a week, but he turns in a fine total; he says W8AT, W8BNU, and W8BUG are all active in Erie. W8CRA is handling foreign traffic. W8BSE is a new station in Erie and has a fine total for a starter. W8DGW is a new ORS; he is working in the Navy Net. W8DYL has a new push-pull TNT going now. W8AAQ is building a crystal rig; he reports a brand new YL at W8BFD — congrats, OM. W8DRA is working on 3.5 mc. W8AYH is on both CW and 'phone. W8BXG and W8CBX send in a joint report; the latter is a new station on 3.5 mc. W8ASE is putting up a new Zepp. W8CGT and W8CVT are new stations in the section. W8CFR was active in the 28-mc. tests. W8BYE is building a new MOPA job. W8BYS, the crooning ham, is still the YL's man. Ask W8DNO about this. W8AYH has been bitten by the 'phone bug. W8ADB has finally got his 'phone set going. W8BK is rebuilding for crystal control. W8DFA is working on a new AC receiver. W8AUC will be on soon with a 250 watt job on 7 mc.

Traffic: W8DLG 519, W8CUG 518, W8APQ 222, W8CMP 67, W8CFR 39, W8DGW 39, W8CEO 24, W8AGO 22, W8AJE 20, W8GI 12, W8AVY 9, W8DUT 6, W8ARC 7, W8KD 482, W8CRA 56, W8BSE 55, W8DYL 25, W8AAQ 24, W8AYH 12, W8ASE 2.

SOUTHERN NEW JERSEY — SCM, Bayard Allen W3ATJ — W3SM again takes the traffic honors. His transmitter will be located in the U. S. Naval Armory at Camden soon. W3BEX, our latest ORS, took part in the Transcons. W3ASG has installed a 100-watt crystal controlled outfit. By the time this is in print he will be Acting SCM. Please give him your support. W3BAQ requests an ORS appointment. W3QL has the blues; his bank blew up, as did his oscillator and rectifiers. Hi. W3BEI also has his hands full of trouble. W3BBB complains that out of 12 messages originated *not one was delivered*. How? W3ZI has his old schedules going once more. W3AWV is getting out fine on 3500 kc. W3AID had his antennae cut down by an irate BCL. W3EM is remodeling his shack. W3BBC is working everything on 3500 kc. W3AKV is a new man at Madison. W3JL, W3AWT, W3ANP, W3AKV, and W3ABG, all of the Morris Radio Club, report some traffic handled. W3AWL has built an MOPA which is working FB. W3OH has turned to aviation. W3ATJ is registered with 28 mc. and is closing his SCM activities with this report due to QRM from office and working 'steen hours a day to prepare for the Bar Exams. I want to thank every one for his coöperation, and hope you will support the new SCM and help the SNJ Section.

Traffic: W3SM 116, W3BEX 69, W3ASG 41, W3BBB 31, W3JL 20, W3AWT 20, W3ANP 18, W3QL 14, W3ABG 3, W3AKV 4, W3BEI 2, W3ATJ 2, W3ZI 71, W3AWV 24.

EASTERN PENNSYLVANIA — SCM, Don Lusk, W3ZF — Traffic in this section, with thanks to the RMs, went up by leaps and bounds. Every one is requested to pull hard and try to win that Banner. None other than the famous W3GS himself won the traffic honors for this section this month with W3ZF and W3NF near by. Congratulations, Jack. Who will win next month? Both Ed and George at W3NF tried hard to win that Banner. Their efforts are fully appreciated. W3UX certainly justified the SCM's faith in him and he too is to be congratulated. W3AQQ is living up to his promise to help push things along. FB, OM. W3QP is again a full fledged ORS. W8AWO has been working late every night and couldn't help out much with traffic. W3AVI dropped his schedules. Why? W3AHZ reported a fine total. W3QV handled quite a bit of traffic this month. W3MC was off the air because of license expiration but is back now and lining up schedules. W8DHT rebuilt his AC receiver and is all set for better traffic reports. W8CFI reports Christmas vacations hurt his totals. W3UEH is pretty busy but will be ready for traffic soon. W8EU announced the arrival of a YL operator on Dec. 26th. Congrats, Pat and Mrs. Maneval. W3FY handled a lot of Christmas traffic. W3GS works England regularly on schedule on the 3.5-mc. band. W3AWB also gets out to Europe on that band. W3VD reported QRX for station license renewal. W8CR wants schedules for Tuesday and Friday nights after 8 p.m. (see RM, OM). W8VD handles a lot of Army traffic on the 3.5-mc. band. W3AKB has a new electric receiver and works a four-way schedule (all on same frequency, all at once, in turn) like Navy schedules. W3AID received his ORS this month. W3MG also receives his ORS together with W3AQN and W8EV. The SCM is pleased to welcome these new men and here's wishing you all bigger and better totals, etc. W3LC wants renewal to get busy with traffic handling. FB, Ken.

W3DZ built a new MOPA and has trouble with it. W3OP applies for ORS. W3PB makes his bow in traffic circles. W3BBS is starting to handle some traffic. Better watch that Allentown bunch. They'll be taking the honors yet. Four stations made the BPL. What's the matter with the rest of you fellows? W3AKW is being operated by W3CGC of Baltimore while Smitty is at college. Come on, fellows, pull for that Banner.

Traffic: W3GS 707, W3ZF 587, W3NF 456, W3UX 215, W3AQQ 179, W3MG 157, W3AHZ 151, W3QV 135, W3QP 89, W8VD 83, W3UH 69, W3VB 67, W3EV 60, W3FY 58, W8CWO 51, W3ADE 48, W3LC 52, W3MC 42, W3AKW 40, W8CFI 40, W3AKB 38, W8CR 29, W3BBS 25, W3AVI 17, W8DHT 17, W3DZ 16, W3OP 14, W8EU 14, W3AWB 10.

WESTERN NEW YORK — SCM, John R. Blum W8CKC — The old timers and traffic handlers fell down this month. Some were QRL business and a couple were off the air on account of sickness. We are very glad for the former and extend our sympathies to the latter. W8BYD has been busy with school work. W8DXJ has a new MOPA on the air. W8DSP took part in the Transcons. W8DMJ reports that he is our farthest east station. W8QL has been off the air lately. W8BLP was active during January. W8CVJ is on 3500 kc. most of the time. W8DES has worked all districts with a type '01A. W8BIF complains of the financial depression. So do we all, OM! W8ARX reports again. For years we have been trying to get a note like his. We also nominate him as the best operated station in the district. Do we hear any other nominations? W8DEJ is besieged for requests for 'photos. W8DSS is doing 00 work. W8AUC is a new ORS. W8CRF has an MOPA on the 3500-cc. band. W8BWW claims the 3500-cc. band is the best ever for traffic. There has been a decided increase in 'phone activity. W8GSW and W8CMW are doing good work with low power on the 1750-cc. band. W8CPC has schedules with VORZ. W8BEK ran up his total on Christmas greetings. W8AWN is one of the operators at W8ON. W8DEQ sends in his first report. Among the boiled ones should be included W8BJO. Several fellows report new AC receivers this month, among them W8AFM and W8BFG. "Pat" of W8CYG is putting in crystal control. W8BYO and W8DOH are alternating as Net control Army stations for Western N. Y. W8BJI handles traffic for the SCM. W8DBX keeps twenty schedules a week. W8AYM has a new QRA. New York City radio dealers were honored by a visit from "Howie." W8IH of high powered 'phone fame. W8ADG is on quite regularly now. W8CIL has gone professional working at W0CL. W8TZ reports that he gets R9 reports with his voltage feed Hertz. W8DME is very active with Naval Reserve work. W8DJA is a student at Ithaca and busy with exams. The RM of Buffalo recommends two good men for ORS, both of which were appointed. Speaking of RMs, take a look at W8DSA's report from the frozen north. New certificates have been mailed to all active (get the "active") ORS. The ORS list has been cut from 100 to 45 and our traffic total is steadily climbing. Some of the reports were lost last month or sent in too late to be recorded due to fire in the SCM's shack. W8CKC is back on the air and manages to get over the back fence with a couple of type '60s in the last stage. The Buffalo Radio Club is sponsoring a series of broadcasts from WKBW and has been deluged with requests for dope on how to become an amateur. By the way several 'phone stations are wanted to do official broadcasting work.

Traffic: W8DSA 257, W8AAZ 112, W8DJA 6, W8TZ 51, W8CIL 14, W8AYM 50, W8ADG 8, W8BDY 164, W8BYO 32, W8CYG 174, W8BFG 14, W8DII 33, W8BJO 89, W8DEQ 16, W8BHK 138, W8CPC 29, W8CMW 46, W8BWW 215, W8CRF 42, W8DSS 268, W8AFM 4, W8DEJ 103, W8ARY 77, W8CVJ 9, W8DMJ 61, W8BLP 2, W8QL 84, W8DSP 10, W8BYD 28, W8CKC 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Forrest Calhoun, W3BBW — Wow! What a month this has been. Never in the history of this section have such totals been sent in, thanks to the Washington Radio Club and all its members, who were supplied with message blanks by the club, and who canvassed all the radio stores for Christmas traffic. They got it; and how! Another club has started in this section, The Short Wave Club of Baltimore, W3BBW, President; W3FD, Vice-President; W3BDY, Secretary; W3WY, Treasurer. All short wave fans are invited to any of the meetings. Maryland: W3LA ran up, quite a large total during the holidays. W3AFF is threatening to shut down if the QRN around his town doesn't let up.

W3ON has his MOPA going now. W3AOO built an MOPA. W3BBW can't get much after 1:30 a.m. W3AHQ is on again. W3NY is rebuilding his transmitter and a new AC receiver. W3ZK has his C.C. going FB. Delaware: W3HC is in the A.R.R.L. net for the American Legion. W3AJH has been busy at WDEL. W3ALQ says QRM too bad on 3500-kc. phone. District of Columbia: W3BWT walks away with what I believe is a record total for this section. W3CXL also had an exceptionally high total. W3LX was among the high men. W3OZ was QSO—G6WY on 3500-kc. FB, OM. W3ASO sent in a nice report. W3CAB just made the BPL. W3GT has been busy with plane installations. W3BAT is going to be an ORS soon. W3AKR is busy with exams at U. of Md. W3ACW says he doesn't know his frequency. You had better find out, OM. W3CDQ says the Washington gang are doing their best. W3NR joined the Benedicts. Congrats. Traffic: W3BWT 2892, W3CXL 1603, W3LA 1586, W3LX 838, W3OZ 426, W3ASO 220, W3AFF 212, W3CAB 200, W3GT 180, W3AOO 76, W3BAT 80, W3AKR 56, W3ACW 50, W3BBW 44, W3HC 31, W3AHQ 31, W3CDQ 30, W3AJH 11, W3ZK 7, W3ALQ 3, W3PN 58, W3BAJ 434.

CENTRAL DIVISION

MICHIGAN—SCM, Ralph J. Stephenson, W8DMS—"Whoops," and did the Michigan gang put it over! Thanks a lot, fellows, for your help and also for the many expressions of good wishes extended to me. I'll try to deserve them, and let's keep up our pep and show the other sections that Michigan isn't in the skip district. W8DYH hangs up a big total and will donate his type '10 to any "one"-operator station in Michigan that tops him. W8DOQ blames "low" totals to politics and the drought. W8DCT, W8RP, W8BGY, W8CJZ, W8CU, W8VL, W8AKN and W8VR are all on with new transmitters. The University of Michigan Radio Club has real speakers from Engineering Staff, and invites visitors. W8DFE gives the BCLs a break by hopping up to 28 mc. W8BJ lands in the BPL. W8DNT continues code practice and plays with 14 mc. W8BTK is busy building Graham Paiges, but shoots high. W8DDO is out for DYH's record. The R.I. visited W8FX, but, after seeing the new "Zoooper" and new crystal P. P. under construction, declined to close him up. W8CEP has mercury arc about ready. W8CJZ and W8WG, Coldwater, report nice totals. W8AM is an "Oily Bird." W8GP is very QRL with radio service work. W8JX feels he needs help to hit the BPL every month, so is putting Mrs. JX on the set. W8AUT tried 'phone and blew a filter condenser. W8CKZ is rebuilding. Why? W8ACW has found a key thump filter that stops 'em even in his own AC receiver. W8BQG phenaged W8MV out of their type '04A. Try to get W8DEH's new 1 K.W. rectifier tube. W8BRs's ticket went to Washington for a while, so he improved his time by adding a dynatron frequency meter, audibility meter and new receiver. W9EVB visited Walt and W8BQG played barber to the two of them. W8CRQ reports new radio club in Dearborn with station W8AMI on air, ready to QSP anywhere anytime. W8CST is handling western traffic on 14 mc. W8BPT (OW or YL???) gets a kick out of traffic, and is out for BPL, so watch your laurels, W9GJX. Let's have reports on good signals, well-operated stations, etc., as well as the other kind. W8DMS took a short trip through the southern part of the state and visited W8BMG, W8CVR and W8AJC. W8BMG says he is going to clean up on Sunday mornings now, in anticipation of other visitors. W8MV says "never again" on trading equipment by mail. The multiplying crystals didn't speak up so well. W9CE lost two weeks with rectifier failure. W8DED, Western Michigan R.M., still has time for good DX work. W8BBX visited hams in North Dakota. The sawbones put W8AJC on a milk diet, so he's looking for a supply of milkotrons. W9FPF is coming on with new power supply. W9DRR is busy checking off-frequency stations. W9GJX sends her report for the BPL from sick bed. The gang send sympathy, Helen, and here's hoping. W9HK keeps us well posted on the Michigan mines. Thanks, Ray. Our old friend WYE-W8SL is off the air temporarily for strategic reasons. The O.R.S. reported 100 per cent, and seventeen others made "first" reports. This kind of work will keep Michigan on the map. You don't have to be an O.R.S. to report. Let the rest of the gang know you are on the air by sending in your totals, and any choice gossip, scandal or what have you.

Traffic: W8DYH 1826, W8FX 684, W8DEH 456, W8MV 362, W8DMS 362, W8CAT 356, W8DFE 335, W8DED 303, W8BMG 294, W9GJX 273, W8VR 248, W8BJ 231, W8JX 228, W8BGY 211, W9EQV 211, W8BTK 185, W9HK 179,

W8CLL 173, W8DJQ 173, W8AM 142, W8WG 105, W8DDO 105, W9CE 72, W8AJC 63, W8AKN 62, W9CSI 46, W8CST 46, W8AZQ 40, W8CSG 35, W8CJZ 30, W8COQ 29, W9EGF 25, W8ASO 24, W8RP 22, W8EP 21, W8CU 21, W8AF 19, W8WO 17, W8ACW 17, W8DOV 16, W8BBX 15, W8CRQ 14, W8CFZ 14, W8CEKZ 13, W8BQG 8, W8GP 8, W8AUT 14, W8DNT 11, W8CEP 11, W8DCT 11, W8BDI 9, W8BPT 9, W8BWC 8, W9FPF 4, W8CWK 4, W9AEX 3, W8VL 2.

ILLINOIS—SCM, F. J. Hinds, W9APY—Very pleased to see the big traffic totals, boys. Keep up this good work. We want the traffic banner. Get all your Illinois friends to send in reports and let's get up on top and stay there. The Egyptian Radio Club was entertained at a hamfest by the gang of Centralia, Ill. W9DZG is coaching a few new hams. W9EBX has one of those huge Mercury Arc tubes such as are used in theatre installations. W9BPN is crashing out with a new 852 tube. W9GFU says traffic is on 7 mc. On the new Hartley, the first station to answer W9BSR, was a W7 with a good report. W9GAI (ExW7PJ) has a push-pull and is building a dynatron and monitor. W9ERU is bothered with terrible BCL, QRM. W9FFQ worked two 6's on the 28-mc. band. W9DSS has installed two Rectobulbs. W9EIP blew up a transformer. W9GY worked Chinese AC2BX, and has worked VK5HG over 509 times and VK3PP over 356 times. W9ENC, W9GKH and W9GEG sent W9FUR a blackmail letter in the form of a poem with FUR and a YL as the characters. They signed it "The Three Hams from Hamlet." W9ET is operating on the 7- and 14-mc. bands. W9CNY tuned up the old Hartley on 3500 and says every one he worked had three or four messages. W9CNY is rebuilding the crystal set. W9EC and W9CGC have to split time as they QRM each other. Hi. W9EAL has a brand new S-G receiver going in fine shape. W9FGD is building three transmitters to start the year right. W9BVV works out consistently in all directions, but East best. W9DBE is digging in the spurs for traffic work next month. W9ACE is doing nice traffic work. W9CBK has a new call now in W9GY. W9CFQ promises to be on regularly on 3.5 mc. W9CGC has increased power from a type '10 to a type '11. W9BYL says the only trouble with a crystal is you can't QSY when some bum camps on your frequency. Hi. W9AOL has a new C-C 250 watter. W9BNH works ZL and VK like nobody's business. W9AMO and W9APY handled a couple trancon messages. W9AD has a new National SW5 as has W9BVP. W9KB is back on with 2000 volts on an 852. W9GIV says he delivered 9 messages and 5 came back marked "no such QRA." Hi. W9CUH has troubles with RF in grid circuit. W9FZW has a pair of 866 tubes going nicely. W9BNR is looking for a 3500-KC. station with which to put on an endurance contest. Hi. W9PK uses an 852 with 1500 volts from Rectobulbs. The crystal set at W9CUX is nearly done. W9AFB says he hears more DX with the new receiver. W9BRX is putting in crystal control. W9FO has moved the office to 608 S. Dearborn St., Chicago, Ill. W9DGG is a new ORS and is trying out 28-mc. work. W9ACU is doing good DX with OA4Z on 14 mc. W9AFN worked on 1750, 3500, 7000 and 14,000 kc. all in the same day. Hi. W9BRY is now chief op at KFLV. W9CKM is experimenting with receivers. W9DKF is coaching new hams at W9ETM (Peoria High School). W9CUC is also teaching beginners the code. W9DJ is moving the QRA from Maywood to Chicago. W9DWP is a new ORS. W9AYD has a new screen-grid outfit. W9LL has a new dynatron. W9FKC says women and radio don't mix. Hi. W9FPN was on 28 mc. for the January tests. W9BZO, W9CF, W9DXZ and W9QI report. W9EKZ-DZM leads in traffic and reports a new station, W9GJI.

Traffic: W9EKZ 1045, W9AYD 872, W9DKF 313, W9FGD 232, W9AMO 177, W9DXZ 139, W9BVV 108, W9CKM 101, W9BZO 87, W9ERU 65, W9AD 62, W9BIR 59, W9AFN 56, W9AFB 51, W9PK 50, W9CGC 49, W9CUH 43, W9EBX 42, W9FKC 42, W9ET 41, W9PF 38, W9FZW 38, W9BNR 29, W9BYL 29, W9ACE 27, W9EIP 27, W9BVP 26, W9LL 24, W9CF 21, W9CNY 21, W9FO 19, W9BPN 17, W9DBE 15, W9CUX 13, W9FPN 12, W9ACU 11, W9CMC 11, W9DZG 11, W9KB 11, W9MI 11, W9APY 10, W9DGG 10, W9GY 10, W9IV 9, W9GFU 8, W9ADZ 7, W9GAI 7, W9AIU 6, W9BSR 6, W9DJG 6, W9EMN 6, W9FTX 6, W9GJJ 6, W9BRX 5, W9QI 5, W9EC 5, W9BRY 4, W9BNI 2, W9GIN 2, W9BLL 1.

WISCONSIN—SCM, C. N. Crapo, W9VD—W9GFL is rebuilding for crystal control. W9FAA is a new station, a Sparta and makes the BPL first crack! W9EYH is back on the job with crystal control. W9FAW is going to try 28 mc.

"That's all there is; there ain't no more." See you on the air in and in the BPL next report, 73.

Traffic: W8BGX 1244, W8GZ 874, W8BZB 513, W8CMB 505, W8SG 335, W8MH 242, W8AXV 221, W8BKM 170, W8BAH 168, W8CEI 129, W8DPF 122, W8UW 122, W8ADS 113, W8APG 101, W8CNM 99, W8ATV 96, W8CCK 85, W8DU 73, W8DDS 51, W8TK 44, W8CSS 43, W8VP 40, W8BAC 38, W8NP 36, W8BSR 30, W8EJ 29, W8BZL 20, W8CGS 28, W8CX 27, W8CWA 26, W8CSB 26, W8EH 20, W8CIY 18, W8DMX 16, W8ARW 14, W8US 14, W8FA 12, W8APC 10, W8BEA 10, W8AWS 12, W8BYG 9, W8BCI 7, W8RN 4, W8DBK 9, W8LI 4, W8BMX 4, W8OQ 3, W8CK 1.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, Howard T. Cashman, W9DNS — The SCM dropped in on W9DB and saw a very nice layout! W9DKL keeps an unholy mess of schedules and is showing results, but — but when does he eat? He reports W9CBC, a new ham in Redfield. W9DKJ gets good results with a grid modulated MOPA 'phone outfit. W9ALO is having antenna trouble. W9FLI has a nice new TPTG set. W9CKT reports himself active over W9CKT and W9DUS. W9NM is handling the 3500-cc. A-A work now while W9DB takes the 1750-cc. end. W9CFU seems to be in the transmitting business. W9BAE is a new ham in Huron with a crystal on 3500 kc. W9CIR, W9DRG and W9DNS are busy with their broadcasting stations. W9DTZ is a new ham in Sioux Falls.

Traffic: W9DKL 297, W9NM 62, W9CFU 20, W9DNS 8, W9CIR 6, W9DKJ 4, W9ALO 3, W9FLI 3.

NORTHERN MINNESOTA — SCM, Ray H. Weihe, W9CTW — The old Section surely came to life this month, and another fine bunch of reports received. The Duluth Junior College station is going FB with a staff of good operators. Several new ORS will be appointed this month. W9CUW is coming along nicely after a long illness and appreciates letters. W9FNJ leads the Section this month and is trying to stop key clicks. W9EGU was down to visit BVH and CTW and other hams. W9CWI sends in his 00 report together with a nice message total. W9EGU expects to be on 3500 kc. soon. W9FAQ sure pounds out some fine DX with his little outfit. W9GGQ is on with two stations on 7000 kc. W9YK is building a CC rig and a 3500-cc. 'phone station. W9EOZ reports. W9BBL is working both coasts on 3500 kc. W9GKM applies for an ORS and reports much activity in Duluth. W9BCT has ambitions of becoming a traffic man. W9GCZ is playing with 3500-cc. 'phone. W9BHH wants larger Form 1 cards. Hi. W9EHI is DXing as usual. W9DJW reports no traffic on 14 mc. W9FQI is using the old W9CWN transmitter. W9ADS is still pounding out a wicked signal. W9DOQ has been appointed RM for our Section. Please give him your cooperation. Send him your schedules and other dope that he requests from you. We also have two 00's — W9BVH and W9CWI. WATCH YOUR FREQUENCIES! We want to hear from all other active stations in Minnesota. Send in your news and reports. How about you W9BAY, W9JT, W9DYZ, W9AWM, W9DBX, W9EHO and others?

Traffic: W9BVH 83, W9CWI 82, W9CTW 69, W9EGU 58, W9FAQ 54, W9GGQ 52, W9YK 45, W9EOZ 31, W9BBL 27, W9GKM 23, W9BCT 21, W9GCZ 19, W9BHH 18, W9EHI 15, W9DOQ 9, W9ADS 8, W9FQI 5, W9DJW 1, W9FNJ 86.

SOUTHERN MINNESOTA — SCM, H. Radloff, W9AIR — W9COS is the high traffic man again. He, together with W9AXB, reports some fun in Transcons. W9EFK, the exSCM, has a new type '52 and kindred apparatus to make it "step." W9DRG has an appointment to Naval Academy at Annapolis. W9BTW—ELA puts out a nice crystal signal on 7 mc. W9DGH has a crystal on 14 mc. W9BN has the most extensive list of schedules in the Section. W9BNN had the BPL in sight when illness took him off the air. W9AIR is experimenting. W9BEX is distressed by skip distance effect on 3500 kc. W9DGE had the SCM of So. Dakota as visitor. W9DSH operates much at W9CPM. W9CKU has a new push-pull TP-TG set using 852s. W9EFJ sends his congratulations. W9EYS handles traffic with the best of them. W9EAT changed his power supply. W9EYL uses 7 and 14 mc. as conditions vary. W9EJR is trying AC receivers. W9AKN worked Y16KR during the holidays. W9CY made some changes in their crystal transmitter. W9DBC is harnessing a 50 watt for 7 and 14 mc. W9GHO applies for ORS. W9FLE keeps schedule with W9EEB. W9DRK gets good DX on 1750-cc.

'phone. Redwood Falls is back, W9SF being on daytimes with medium power. W9BQF winds his own AC and DC generators. W9DEP, W9AMK and W9DOP operated at their home stations during the holidays. W9CYA keeps schedule with Minneapolis. W9BNN kicks out great on 3.5 mc. and handles A-A traffic. W9EIP visited the Heron Lake gang during the holidays. W9BHZ does an occasional trick at the key. W9FMB wants to swap power supply. W9EPE is now married. W9FTY does good work. Some good reports undoubtedly failed to reach me because not everybody was aware of the change in SCM. The general response, however, is gratifying and with your further cooperation I'm sure we can have the newsiest and most interesting report in the Division.

Traffic: W9COS 420, W9DRG 27, W9EFK 5, W9BN 247, W9BNN 163, W9AIR 64, W9BKK 60, W9DGE 42, W9DSH 33, W9CKU 17, W9EJF 6, W9EYS 5, W9EAT 5, W9EYL 4, W9EJR 2, W9AKN 1.

NORTH DAKOTA — SCM, Guy L. Ottinger, W9BVF — One of our last year's traffic handlers, W9IK, had the 'phone outfit going and did a little business. W9DOY has a type '10 on the air now. W9CRL is second high in traffic. Our old stand-by W9DGS now keeps 13 schedules a week. A dynamotor is now in service at W9DYA with MOPA. W9EGI, one of our new ORS, handled a big bunch of traffic this month. W9DM is unable to get the outfit perking on 3500 kc. The SCM's station has been keeping a few schedules. A clean-up of non-reporting ORS is going to be made. A word to the wise is sufficient.

Traffic: W9DGS 308, W9CRL 116, W9EGI 115, W9BVF 110, W9IK 7, W9DYA 6, W9DM 4, W9DOY 2.

DELTA DIVISION

ARKANSAS — SCM, Henry E. Velte, W5ABI — Slowly but surely we are steadily forging to the front. Our traffic totals exceeded that of last month. Fine work, fellows. Let's make it even larger next month. W5BMI is our Banner Station this month. W5IQ has a schedule with W9BNT every Monday night. W5BKB has been building a 3.5-mc. 'phone set. W5HN is on both CW and 'phone. W5BRI is still on 7 mc. and is going to 14 mc. soon. W5BPE has been QRL with school work. W5ABI is on 3.5-mc. 'phone most of the time. W5LK has been too busy to be on much. W5SI is forming a unit of the Naval Communication Reserve in Pine Bluff. W5LV has been reappointed ORS and is rebuilding his 3.5-mc. 'phone to c.c. W5BDB is building an AC receiver. W5BT' at Boydell is on 3.5-mc. 'phone and reported by radio. Well, fellows, let's see who will be our Banner Station next month. So long till then.

Traffic: W5BMI 238, W5IQ 82, W5ABI 76, W5BKB 49, W5HN 29, W5SI 26, W5BRI 7, W5LV 6.

LOUISIANA — SCM, Frank Watts, Jr., W5WF — Well, fellows, everything is running fine for the best season yet. Several new stations are reporting and more reports are being received than ever before. What is the matter with the Alexandria gang? We never receive a report from them. Many of the fellows are taking interest in 'phone transmission. We are also handling a pile of traffic and, in general, this old section is picking up. W5NJ is still pounding. W5ML and W5AKI are on the air with 'phones on 1750 kc. W5KZ has a 'phone on 3500-cc. band. Ditto for W5AXU and W5QJ. W5YW says things are on the bum with them. W5ACY is keeping several nice schedules. W5BJA must have lost his writing power as his card contains no news. W5MH is QRL from moving his residence. W5KC is operating on 7000-cc. and 14,000-cc. bands. W5EB is keeping schedules with W6QP and W3HY. W5BPL and W5HR are building push-pull crystal transmitters. W5BKL has QRM from the Y.Ls. W5RR has a mighty fine signal on the 7- and 14-mc. bands. W5WF visited W5ML and W5AKI and a set of 'phone stations to compare with them would be hard to find anywhere. W5AKI uses a pair of type '52 tubes. W5ML is using one type '52. Well, boys, let's have more dope next month. Make a schedule, keep it, and the consequences will be the BPL. Don't forget to send in your application for ORS or OBS. We can use several more OBS in this Section.

Traffic: W5WF 521, W5EB 151, W5ANQ 139, W5ACY 130, W5RR 67, W5YW 51, W5NJ 34, W5BRR 11, W5BJA 10, W5KC 6, W5ANA 2, W5BPL 2, W5AWA 1.

MISSISSIPPI — SCM, William G. Bodker, W5AZV — W5AZV is parked on 3500 kc. with a pair of type '10s. W5BOT takes the prize for blowing largest number of rectifier tubes. W5ANI is pushing out with a TNT push-pull on 7000 kc. W5BNN is well pleased with his single wire feeder Hertz, having worked 51 stations in five days.

W5BHL finally got his 'phone perking and is knocking 'em dead. W5BBX is pounding out on 7000 kc. W5BHL broke his new 50 watter. The Jackson Amateur Radio Assn. has moved to its new quarters on the fifth floor of the Century Bldg. All visiting hams welcome. W5BNX is on with a type '10 QSOing a few stations on 7 mc. W5AYE will be on 3500 kc. with 'phone soon. W5AED is undecided as to what to do. W5APP gets on now and then. W5BUI is getting his ORS transferred from the 26th District.

Traffic: W5AZV 219, W5ASB 12, W5ANI 10, W5BOT 10, W5BNW 6, W5BUI 9.

TENNESSEE — SCM, James B. Witt, W4SP — Congratulations, gang. I believe this is the largest and best report Tennessee has ever had in QST. W4RP gave a type '10 tube to the station handling the most traffic in Memphis and W4GX, a non-ORS, won it. FB, OM, W4AFM handled a message from KA1AJ going to Terre Haute, Ind. The message was to notify family that party was out of typhoon and well. FB, W4OI sends in application for ORS appointment. W4OV sends in his first report. W4ACT has sold his transmitter to a new ham, and is building new M.O.P.A. outfit. W4AAO is only using a 5-watt tube in Hi C Hartley and reports fine DX on 3500 kc. W4ABQ is using one type '45 with 225 volts on plate and is getting out FB. W4ADI is off the air at present. The upper East Tenn. gang are planning on having a big hamfest at Johnson City in the near future. Anyone wanting more information on this get in touch with W4RO.

Traffic: W4RP 140, W4GX 136, W4OI 16, W4AFM 86, W4RO 70, W4FR 33, W4CW 32, W4SJ 31, W4SP 30, W4AAO 27, W4ACT 24, W4AFS 18, W4OV 17, W4FX 8.

HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND — Acting SCM William J. Warringer, W2BPQ — Manhattan: W2SC once again makes the BPL both ways. Will some one please tell W2BDJ what makes a choke thump? What with moving, school exams and recovering from a cold W2AYK has not had much time for his ORS duties. W2BQK wants to get in touch with some old-timers. Bronx: W2BGO leads the boro and makes BPL. W2BPQ has his hands full with ORS, RM and acting SCM duties. W2CYX has a weekly schedule with V08AW. W2FF has a schedule with ZSIP. W2AIH is laboring over a new crystal rig. W2LW reports. W2VG is back on 6000 kc. W2AQQ reports inability to raise stations outside N. Y. C. with his xtal job. Brooklyn: W2PF has a schedule with W2APV, who has gone down to see NJ2PA. W2BIV is trying to organize an all-RM traffic route. W2APK reports his second operator has signed on as operator for DAIV, Count Von Luckner's schooner yacht *Mopelia*. W2BEV is off the air waiting for F.R.C. to send his ticket back. W2LB is doing good work in U.S.N.R.F. W2CCD wants newcomers all chased up to 1750 kc. till they learn to send. W2AZV is spending quite a bit of time getting W2BEG gang in operation. Long Island: W2AYP reports working 517 stations in 1930 as compared with 596 in 1929. W2AIQ has a Dynatone Osc. working for use in his OO work. W2BVL, Nassau Radio Club is still going strong with W2ASS at the Helm. W2HO and W2BDN have made ORS applications.

Traffic: Bronx — W2BGO 214, W2BPQ 63, W2CYX 45, W2FF 41, W2AIH 33, W2LW 13, W2VG 7, W2AQQ 6. Brooklyn — W2PF 120, W2BIV 36, W2APK 35, W2BEEV 29, W2LB 21, W2CCD 11, W2AZV 10. Long Island — W2AVP 60, W2ASS 51, W2AIQ 38, W2HO 18, W2BDN 17. Manhattan — W2SC 382, W2BDJ 37, W2BQK 4, W2AVK 2, W2BHY 8.

EASTERN NEW YORK — SCM, H. Rosenthal, W2QU — The Pioneer Radio Club held its elections on January 9th, and an entire new set of officers promise the same advancement during the coming year that was made during the previous one. The Schenectady Amateur Radio Association is forging ahead rapidly. W2LU as usual leads the list. W2RD with his new crystal transmitter ran a close second. W2BJA is the latest ORS to enter the ranks in this section. W2CJP reports sending follow-up cards to see if messages were delivered and found a big percentage had arrived in record time. W2BER reports the air was flooded with holiday messages. W2BWB handled six messages from the Philippines and one to China. W2CL is negotiating with his neighbor at present for the use of a tree for a new 3500-kc. antenna. W2BAI reports working ZT and ZS with only his crystal oscillator going. W2AJD, our new observer, reports moving eight stations into the band by actual QSO. W2AGR worked England and Denmark on 3500 kc. W2FN

has his K4KD schedule going again. W2BKN reports very little doing. W2BIB has been temporarily placed on the inactive list. W2CBB is using his old stand-by, a Hartley, while trying to get a crystal going.

Traffic: W2LU 228, W2RD 312, W2BJA 108, W2CJP 91, W2BER 70, W2CL 22, W2ACB 22, W2ALI 19, W2BAI 17, W2AJD 9, W2AYK 9, W2AGR 4, W2CBB 46.

NORTHERN NEW JERSEY — SCM, A. G. Wester, Jr., W2WR — Traffic has taken a big jump, which is very encouraging, and also your SCM wants to shout to the world that the ORS reported 100%, a real record breaker. Non-ORS are handling plenty of traffic. Your reports are just as welcome as those of an ORS. W2JF is a good clearing point for traffic to WIMK. W2AOS handed in his largest traffic figure in eleven years. W2CWK was QSO G5BY on the 3500-kc. band. W2AGX is helping a Perth Amboy Radio club getting started. W2CJX handled all his traffic with K6's and VK's direct. W2AMR reports 7 mc. is fine for European QSOs from 6 to 9 p.m. E.S.T. W2CPD has left for the Mediterranean putting his ORS on ice. W2DV has applied for membership in the Naval net. W2CFQ heard IPH. W2BPY originated a message in the Transcon Relay. W2MQ handled some messages that were originated by Dr. Lee DeForest and his wife. W2MQ reports on his first month as an ORS. W2BKE station change is in process. W2CFY had a visit from some N. Y. hams. W2CPA sent in his initial report. W2BW, our Director, reports after a long period of silence and hopes to make the BPL. W2AIF applied for an ORS. W2CMI wants traffic for Toms River and Ocean County. W2AUP complains of QRM on the 7-mc. band. W2BJZ has some fine message deliveries. W2BHW has crystal going on 3500- and 7000-kc. bands. W2CDQ received verification of QSO with JIDV. W2CHZ is putting out very loud signals. W2CEX says business has kept him off the air. W2BME handed in a very fine traffic total. W2CVY, our Official Observer, is working hard and reports a number of off-frequency amateurs. W2WR is working hard to be on the air for the Sweepstakes.

Traffic: W2JF 65, W2AOS 76, W2CWK 14, W2AGX 7, W2CJX 30, W2AMR 13, W2CPD 40, W2DV 33, W2CFQ 21, W2BPY 21, W2MQ 162, W2CFY 6, W2CPA 10, W2BW 8, W2AIF 10, W2AUP 13, W2BJZ 10, W2BHW 26, W2CDQ 23, W2CHZ 19, W2BME 56.

MIDWEST DIVISION

NEBRASKA — SCM, S. C. Wallace, W9FAM — W9BOQ takes the high honors this time. W9FAM managed to snag a total of 241. Look out, W9BOQ, W9BHN is after your hide. He reports 222. W9EHW has a bunch of schedules. W9EQR says OM Skip is raising hob with things. W9DTN is going to 1750 kc. for the A-A net. W9EEW comments on the FB emergency work of W9BBS and W9EXP, and says let's all get ready and get some of this notoriety in cases of this kind. W9DFR starts to come back for his second wind, and how! W9QY reports 26. W9DI says the gang at Lincoln is building a community outfit and will be on soon. W9BLW says too much school. W9BBS has portable station, W9CMY, and is all set. W9CHB says he has notified several off-frequency stations, who give him the horse laugh; better look out, fellows, it may not be so funny as he has a very expensive frequency meter and knows what he is doing. W9DFE turns in a nice total of 48. W9EDI reports. W9BNT, the U. S. Army-Amateur Net Station, sure turns in an FB traffic report. Who said Nebraska was dead? Why not own an ORS? W9GDL reports; looks like Lincoln was on the map. W9DZK sent his report via Air. W9BBI reports 37 handled. W9EGC comes banging in the last minute with 94 total. How about that ORS, OM? W9FUW makes some of the ORS look small; handled 95. W9DPT wires his report.

Traffic: W9BOQ 267, W9FAM 241, W9BEN 222, W9EHW 41, W9BQR 17, W9DFH 6, W9EEW 3, W9DFR 25, W9QY 26, W9DI 30, W9BBS 24, W9CHB 18, W9DFF 43, W9DI 35, W9GDL 52, W9BNT 377, W9BBI 37, W9EGC 94, W9DZK 17, W9FUW 95, W9DPT 91.

IOWA — SCM, H. W. Kerr, W9DZW — Resigning as SCM to assume the duties of Director of the Midwest Division, GP wishes to commend the faithful work of the Iowa gang in handling traffic and backing up your SCM and RM. This report shows W9EJQ, our RM, far in the lead and proves conclusively what a few consistent schedules together with a love for the ham game can do. And coming to the front is W9ACL with FB total; he reports two new Davenport stations, W9CEN and W9BJP, who kicked right in with a traffic report the first month. W9CEN's activities were curtailed by arrival of a new daughter. W9FLK has a

nice total; he reports W9BYJ, a new station in his town. W9BCA says he has a hot schedule with W1MK. W9FFD shifted to 3984-ke. crystal and sports new rectobulbs. W9BPG is after an ORS and reports W9AJT back with the gang on 3.5 mc. and W9DOI and W9DKF ready to go. W9FVY and W9BFL ring up some nice totals for Des Moines. W9FZO can't see his feet for his chest since QSOing ZL2GK. W9GP sports a Rydberg-Doty receiver thanks to the former for construction. W9EIV is after ORS. W9AWY entertained W9DVS and W9DQE at an all-night hamfest on the 2nd of January. W9DNZ has our pardon for inactivity on the air — Mrs. Austin presented him with two sons, i.e. Coach Austin and Roadster Austin — coming hams. Welcome to W9GDN. He was QSO X3A on 14 mc. at 9 p.m., Jan. 13 — unusual so late in evening. W9EHR shifts his ORS to W9AG, his station at Ottumwa. W9AHX now has Hartley on 3.5, 7 and 14 mc. W9EOP is QRL exams and waiting for 50-watter. A new SCM will undoubtedly be chosen prior to next report and my activities in the Communications Department cease so far as saying a word here each month. Nevertheless, as your Director, I want to hear from you with your complaints and problems so that I may the better represent, not Iowa alone, but the entire Midwest. W9GP will probably be heard more often than W9DZW hereafter. W9EFH reports, 73, gang.

Traffic: W9EJQ 650, W9ACL 249, W9FLK 150, W9DZW 149, W9BCA 145, W9FFD 132, W9BPG 84, W9FVY 64, W9BFL 59, W9FZO 47, W9EIV 47, W9AWY 33, W9DNZ 26, W9GDN 25, W9FWG 20, W9BJP 13, W9AG 8, W9AHX 7, W9EOP 1, W9EFH 17.

MISSOURI — SCM L. B. Laizure, W9RR — St. Louis: W9ECT and W9FTA top the traffic score this month for St. Louis. W9FVN resumed work for two months on the shelf. W9DXY reports moving QRM. W9DYJ is sporting the WDDE cup he received for regularly contacting the expedition. W9BMU sent in a "ham blues" letter. He is marooned on WYDE tied up at Fayetteville, Ill., for the winter; not a ham in the town, and worse yet, the R.I. won't let him set up a ham set on WYDE. Ex-W9EDK is now W5BUI of Vicksburg, Miss. W9PW is busy with USNR work. W9DZN is back home from the Barge Line and his new ORS is on the way. W9ZK-W9AAU kept in harmony by building a "Hard Times" transmitter (the label is his own) to do the job of three former sets. W9ATX reports still QRT until more equipment can be picked up. W9FFFJ at Jeff Barracks is an active traffic station. Kansas City: W9BMT's December report (217 messages) went astray somewhere, which cost us first place in the section for December. W9BMA and W9BMT stand first and second in K. C. this month. W9DQN resigned ORS and OBS due to moving. W9AKZ had a blowout in the set but is again working. W9AOG reports that he lost his hearing temporarily due to listening in on New Year's with 14 hams within 10 blocks of his station. W9CFL was tied up with U.S.N.R. work almost the entire month, spending a few minutes to welcome a junior op., and grab a First Class Comm. ticket on the run. Hi. W9RR engaged in the usual winter sport of enjoying (?) being laid off work. W9DLL is going into the wholesale crystal business. Reports at large: W9CJB is handling A-A net schedules. W9GBA is rebuilding the works. W9DHN kept three schedules going in good shape with plenty of traffic. W9BGN, again the only St. Joseph reporter, has a 250-watter going on 3.5 and 7 mc. Ex-W9BYY at Marceline is still awaiting call assignment. W9ASV had a good month with lots of traffic. W9ENF had the misfortune to dispute right of way with an auto, and is still laid up at home. W9CJR is a new station in Mount Vernon. W9CDU reports some traffic. W9GAR sent in a double barreled report; he annexed a new operator via the benedict route. W9BJA reports a revival of the 1750-ke. band with many stations again coming on. W9FVM reported by radio. W9EYG also reported regarding ham progress and activity for S. W. Mo. W9BGW reports. W9GBA worked W1MK.

Traffic: W9BMT 333, W9BMA 244, W9FTA 130, W9ECI 145, W9GAR 90, W9ASV 131, W9DHN 110, W9ENF 76, W9FFJ 80, W9PW 49, W9ZK 29, W9DZN 18, W9BGN 52, W9CDU 13, W9CJB 23, W9AKZ 11, W9BJA 177, W9AOG 31, W9RR 20, W9CFL 38, W9GBA 2, W9FVM 5, W9DYJ 3, W9BGW 25, W9GBA 11.

KANSAS — SCM, J. H. Amis, W9CET — W9FXY is on with two transmitters and leads the state with a nice total. W9CKV has a new Zepp which he is going to use with his new crystal rig. W9HL has a new station going at the power house under the call of W9FLI. He will continue to operate W9HL at his home. W9DEB is still under the influence of

the YL. W9FLG is all up in the air because your SCM called him on the 'phone and razzed him about key clicks. Hi! Hi! W9GHI is bothered by a power leak but turns in a nice total and worked some DX. W9ESL is control station for the 7th Corps Area and is organizing the A-A 'phone net. He reports Kansas 100%. W9BTG tells us that the call of the KSAC ham station is W9JA. A new U.S.N.R. unit has been organized at Sabetha with W9DWG as acting unit commander.

Traffic: W9FXY 113, W9FLG 70, W9CKV 64, W9HL 63, W9GHI 57, W9ESL 49, W9CET 45, W9BTG 17.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Fred A. Ells, Jr., W1CTI — Increased reports of renewed activity have been received from all over the section. Five stations make the RPI, this month — W1MK, W1CJD, W1HD, W1BEO, W1UE — fine work, men. The Connecticut Brass Pounders Association has recently been formed with W1FL as President. Club house is on the Boston Post Road in Noroton; business meetings are held the first Sunday in every month. Code and theory classes are well under way and meet each Thursday evening at 7:30. A cordial invitation is extended to all hams to drop in and pound brass at the club station, which should be on the air by the time this is read. "RP" reports traffic on increase and that W1MK is operating regularly on 14,300 kc. as well as the other frequencies! Besides making the BPL W1CJD finds time to work the west coast regularly. He was reported in Europe on 3500 kc. W1HD with 34-watts input QSO'ed D4UAN and W7ACH. W1BEO doesn't say anything about himself, but figures speak louder than words. W1UE tried for 100 deliveries and nearly made a bull's eye. W1FL can QSY anywhere in the 3500-ke. band but his regular QRH is 3735 crystal. W1AMQ has crystal on 3805 kc. and had the following visitors this month: W1CJD, W1BEO, W1TD and W1BAV. W1BBU is using the AC receiver described in Dec., 1930, QST. W1ADW didn't get on until 11:30 CTNITE. W1BNB has been bothered with skip effect on 3500 kc. W1AVS is on with a type '10 on 3500 kc. and reports a new station, W1AEY, in Northford. W1BDI was also a bit late for CTNITE. We will have to get going soon after 7 p.m. before the skip sets in. W1AOI, RM, has resumed activity and has one of the best DC signals in the section. W1HQ is coaching a couple of new hams. W1AWS had a good total for his first report. W1BVW would like to hear from stations interested in A.A.R.S. to act as District Stations in New Haven District. W1NE found time to handle a few. W1TD reported by radio CTNITE. W1BOD was sick in bed CTNITE — very sorry, OM. He reports formation of a Radio Club at Yale with members from practically all districts and one from France. W1BWM has been having trouble with a local power leak. W1AMG received his renewed station license. W1ARB, an old timer, has started up in Ansonia and is pushing out a nice DC note on 3500 kc. W1AFB was in on the Transcons. RM, W1BHM, has schedules with three RMs and started a Transcon on its way west. W1RP keeps a sked with "55K" each Wednesday at 10 p.m. W1CTI is glad to note increased activity at CTNITE parties. W1CLH is working all kinds of DX with his type '10. Traffic total this month: 2545, an increase of 954 over last month. Good work. Let's double it next report.

Traffic: W1MK 568, W1CJD 545, W1HD 253, W1BEO 230, W1UE 227, W1FL 108, W1CTI 97, W1AMQ 84, W1BBU 50, W1ADW 48, W1BNB 44, W1AVS 29, W1BDI 27, W1AOI 26, W1HQ 22, W1AWS 18, W1BVW 24, W1NE 14, W1TD 8, W1BOD 6, W1BWM 5, W1AMG 4, W1AFB 62, W1BHM 36, W1RP 10.

MAINE — SCM, G. C. Brown, W1AQL — Most of the Maine gang have applied for their new ORS tickets but there are still a few of the old timers who have not. Get busy, fellows, and let's boost our Section. Traffic took a jump this month with several making the BPL. FB! Let's keep up the good work and put Maine at the top of the Division. The Queen City gang recently held a theatre party and dinner with about fifteen members present. It sure was a lively party. W1ATO is top liner this month. FB, Lew. W1BLI also makes the BPL. He reports a very reliable schedule with W1WV. W1ANH reports traffic picking up all through the Section. W1BIG reports a good schedule with Portland. W1CDX has a good total and works plenty of DX. W1QH says conditions are much better. W1APU received some publicity recently by copying a QST relative to a bank hold-up in the western part of the state and handing it to the police department in his town.

WIACW reports having been sick but going FB now. WIAFA has a fine list of schedules with Canada. WIBGZ is boosting his power and expects to have a fine total next month. WIAHY is putting in a push-pull with a couple of type '10s. WIACV expects to operate a new Broadcast station in Aroostook County soon. We have a newcomer this month in the person of Bracy, W1BFA, in North Berwick. He reports his age as fourteen years. Can any other Section boast of having a younger "ham?" W1BCD is taking a trip to Florida, 73 for a fine trip, OM. W1BX is on the air at Belfast. W1AUC will be away from home for a month and a half.

Traffic: W1ATO 282, W1BLI 249, W1ANH 162, W1BIG 97, W1CDX 55, W1QH 51, W1APU 37, W1ACW 36, W1AFA 30, W1AQL 18, W1AIK 4, W1KQ 4, W1BFA 3, W1BGZ 1, W1BEU 20.

WESTERN MASSACHUSETTS — SCM, Leo R. Pelouquin, W1JV — This is by far the best traffic month since last winter. The ORS are doing a fine job and two of our stations make the BPL. These are W1ASY and W1NS. There are still a few good relay stations who have not applied for an ORS ticket. They are invited to communicate with the SCM. All stations that handle traffic, whether ORS or not, are requested to report the number of messages handled on the 15th of each month. Report cards for this purpose will be furnished on request. W1BIV is on regularly and handles his share of traffic. W1AJD showed a nice increase in his traffic total this month. Messages relayed to England, China, Italy and Sweden helped to boost W1NS' total. W1CPG handled many messages for the Bronx Board of Trade. W1ASY says that one of his QSOs was broken up the other day due to his cat fooling around with his high voltage. Hi. W1BNL is doing a fine job as ORS. W1BVR has changed his Transmitter to T.P.T.G. after eight years with a Hartley circuit. W1APL is on 14 mc. but also operates on 3950 kc. for traffic work. Our route manager, W1ASY has several requests for schedules on file. All stations interested are invited to write to him. W1BSJ visited W1BBZ and had a tip top time. Activities at W1BWY are very good.

Traffic: W1ASY 280, W1NS 212, W1BNL 105, W1AJD 103, W1JV 103, W1CPG 54, W1AIF 28, W1BIV 27, W1ASU 26, W1BVR 22, W1APL 21, W1ZB 10, W1CTF 16, W1BWY 11, W1BSJ 4.

EASTERN MASSACHUSETTS — SCM, Miles V. Weeks, W1WV — More traffic has been handled and more stations have reported this month than in any previous month since your SCM took office. Very FB, gang. Six make BPL: W1WV, W1LM, W1AFP, W1BXB, W1CHR and W1KH. W1ABG reports impending marriage. W1CCP is planning a two months' cruise with USNR. W1KY lost her appendix this month. W1LQ is rebuilding. W1KH accumulated many deliveries through his schedule with VO8AE. W1AE added three new countries on 14 mc. W1BZQ was QSO OZ. W1ASF has been QSO 94 different countries and made over 2000 separate foreign contacts in seven years. W1LM handled some Chinese traffic. W1AAT reports DX good on 3.5 mc. W1ACH is waiting for his station license renewal. Beginning Dec. 24th, W1WV has been QSO daily with Europe on 14 mc., for 23 consecutive days. He was also QSO Holland on 3500 kc. All the hams in Norwood are now ORS: W1CCP, W1CAW, W1ATX and W1CQN. W1CAW and W1CQN visited W1MK this month. W1CAW recently handled a message to the President of France. They have organized "The QRM Club" for handling local traffic on 'phone. W1AFP made BPL with a fine score. W1ADK reported direct to Hqs. as he was late in getting it to the SCM. W1CHR is getting out FB on 3500 kc. W1AVA again reports. W1AOT has a new full wave 7-mc. Zeppelin. W1AAL, who used to operate in W. Mass. and more recently in R. I., has moved into this section and starts reporting from Attleboro. W1ANK, our latest ORS, has moved to Saugus. W1BIU starts reporting. W1AOL is getting interested in traffic. W1ME is another OT who is getting back into the traffic game here. W1LQ won the Delivery Prize for the second month, and according to last reports our former SCM, W1UE, has won it this month for Conn. W1AAT worked all districts on 3500 in five hours.

Traffic: W1WV 290, W1LM 243, W1AFP 235, W1BXB 212, W1CHR 163, W1CQN 121, W1LQ 113, W1KH 103, W1CAW 103, W1ACH 100, W1ATX 90, W1CCP 74, W1ABG 64, W1AZE 57, W1ACD 55, W1AVA 53, W1BZQ 34, W1ME 31, W1AAT 28, W1AAL 17, W1BIU 17, W1AOT 12, W1ANK 11, W1AOL 5, W1KY 4, W1ADK 21.

VERMONT — SCM, C. A. Paulette, W1IT — W1ATF

again scores as high traffic man with his little type '01A transmitter and makes the BPL. FB, OM. Congrats, W1BD, on the fine showing you are making with the Vermont Army-Amateur net. W1BD reports changing his QRA to a new house in Barre. Our old faithful RM, W1CGX still is holding his place well up in the high traffic ranks and is giving Code practice on 3950 kc., 7 to 7:30 p.m. Wednesdays, for the benefit of the Boy Scouts in Brattleboro. W1BJP reports 100% delivery with radio conditions good but lots of QRM. W1IT built a low power 'phone which works FB. W1SV has a new 100-watt push-pull transmitter which will be on 14 and 7 mc. in the near future. W1AOA will be on the air again soon with 50-watt M.O.P.A. transmitter. W1BHR has been on the air at Burlington for the past 8 months and wants to become acquainted with the gang. He also cherishes the ambition to become the state record holder of QSL cards and now holds the record in Burlington of 110 cards. W1ATF complains about rubber stamp messages. He handled 19 messages of the same text to different addresses and counted the whole business as one message. I feel highly elated at the fine showing of the Vermont gang. I think we are organized about as well as we ever were since I have had anything to do with the ham game here, and I have been on the air since 1924. I feel able to state now that any message coming into Vermont will practically get the promise of 100% delivery. Come on and shoot the traffic into Vermont and let us prove it.

Traffic: W1ATF 423, W1BD 303, W1CGX 244, W1BJP 62, W1IT 17, W1AOA 7, W1SV 2.

RHODE ISLAND — SCM, N. H. Miller, W1AWE — Many thanks, fellows, for your support in putting Rhode Island on the map. I knew it could be done and can see that it won't be long now before we are the highest in New England. W1EJ is on 7000 kc. with crystal. W1MO says DX is poor. W1BCR is on 3544 kc. with 'phone and has a good total. He was quite active in the Transcons and reports his 'phone heard in England. W1BIT (13 cents), an old timer of spark days (Ex1UA), is back on the air. W1CMY-W1AMD are both busy at WJAR-W1DZ. By the way, W1DZ is remote control from W1AMD, Pawtucket, 6 miles away. W1AMJ is busy servicing BCL sets. W1ATM is heard lots on 3500 kc. How about a report? W1II-ZS is high man in this Section and reports his YL is a peach, both in operating his station and otherwise. (Hi.) W1BBA is on 7000 kc. W1AUV is another service man but he finds time to operate. W1TQ is another operator who at present is more interested in YLs and broadcasting than ham radio. W1ID is not on much as WEAN takes lots of his time. W1AWE is having quite a time with duties as SCM but finds time to operate and to teach his YL the code. W1GV is a new ORS and reports big doings in Auburn. He reports a new ham, 1BDB, and says W1OU is sick but will be on with a big noise. W1GR is putting in crystal. W1AFO is also busy with the BCL business. W1BOP has found a new way to save a dime. He goes on the air mornings and wants to QSO W1DZ who isn't on, so he calls W1BTA of So. Portland with message for WJAR-W1DZ. W1BTA telephones WCSH, who in turn sends message over chain wire to W1DZ whereupon W1DZ is promptly on the air. Some route for a 10-mile schedule, eh what? The Associated Radio Amateurs of So. New England recently held their election and afterwards a good time was had by all those present. W1AAD wants to know why Connecticut will give but not receive messages? He has plenty, so how about it, OMs? W1BGA is having a contest with W1AAD for the best DX worked. He is on with an 852, so watch out for him. W1ASZ reports that his portable set works better than his big set. (Hi.) W1CPV likes to chew the rag and is looking for someone to take his Pawtucket traffic. W1BML is working them all on 14,000 kc. W1BBN is on the air working a few stations. W1BQD is finding time to operate even though he is busy at the Naval Station. Say what's the matter with Westerly and Woonsocket? Why not let yourself be known to the world? Don't forget to send in your reports on the 16th of each month. Rhode Island may be small but it is capable of doing big things. Let's go!

Traffic: W1AWE 6, W1CPV 9, W1MO 10, W1BGA 15, W1GV 19, W1BCR 61, W1AAD 127, W1II-ZS 146, W1BQD 1.

NEW HAMPSHIRE — SCM, V. W. Hodge, W1ATJ — With three stations in the BPL, this Section sure is up front this month. W1IP were out two keys pounding out that total, and kept eight schedules daily. FB, LJ. W1AWU wants every one interested in Army Amateur work to write him or QSO on 3915 kc. One of our newest ORS, W1BAC,

makes the BPL. He is also trying 'phone and reports good results. W1BCP is using low power 'phone. W1CCM, although laid up, is getting out well and handling quite a few with CW and 'phone. W1AHP is using a type '12A with B bats. W1AVG will soon be on 'phone with a crystal. W1AEF is experimenting on 14 mc. W1BFT is operating on all bands and reports fine DX and traffic. W1APK is on with 'phone exclusively now. Congrats to W1AVL and W1BFT, who passed extra first amateur exams. W1CAF is trying out an 862 at P. E. Academy. W1BJF handled a bunch of traffic. W1UN is on daily with his battery powered outfit at the foot of Mt. Washington. W1AUY's 3549 kc. 'phone is being heard regularly in England. A new man in Manchester, W1CME is using a type '01A.

Traffic: W1IP 841, W1AWU 416, W1BAC 241, W1BJF 81, W1AEF 36, W1APK 35, W1BFT 34, W1CCM 32, W1UN 16, W1ATJ 15, W1AVL 15, W1AUY 5.

NORTHWESTERN DIVISION

MONTANA — SCM, O. W. Viers, W7AAT — W7CU of Alberton is the newest ORS in this section. W7HP is on with a type '45 and a type '80 on 7000 kc. band. W7ASQ is doing nice work on 7 and 3.5 mc. and reports a new station there, W7AWM. Helena is soon to have a club station. Ten new prospects are learning the code. FB! W7EL is chief at the Missoula B.C. station, KGYO. W7BW has a commercial ticket now. W7AAT is building a 500-watt crystal controlled set for 7040 and 3790 kc. and would appreciate any and all reports on it when it's put on the air. W7ASB reports for first time and leads the section in traffic. FB. W7FL worked W3TR on 3500 kc. with low power MOPA.

Traffic: W7ASQ 40, W7AAT 32, W7CU 4, W7FL 71, W7ASB 73.

IDAHO — SCM, Oscar E. Johnson, W7AKZ — W7AFT has joined the Navy-Amateur Net. W7AT is off until he gets all the "bugs" out of his new transmitter. W7GL has new AC receiver for 28 mc. W7QC is back after a long absence and promises to have a new ham in Bonners Ferry soon. W7ACO is a new ham in Sandpoint. W7AUR has moved to Seattle where he is attending school. W7AVZ, W7ALC, W7ALW, W7GU and W7ACP hold up the honors for the 3.5 mc. 'phones. W7AHG has moved his transmitter. W7ALY-ATN have a new push-pull transmitter on the air. W7AVP is a new station in Boise using type '01A. W7ALH let his slop jars freeze so is rebuilding his power supply. W7CG is back on after a vacation. W7IY is having a lot of grief with an AC receiver.

Traffic: W7IY 45, W7QC 13, W7AKZ 20, W7ACD 6, W7ALW 3, W7AFT 46, W7AUR 34, W7ACP 96, W7AT 3.

OREGON — SCM, W. S. Claypool, W7UN — Once more the Oregon Section breaks all its previous records in traffic. Seven stations make the BPL and the Section has a grand total of over twenty-three. Stations making the BPL are as follows: W7ZD, W7ACH, W7LT, W7IE, W7ALM, W7AFL and W7APE. Special thanks to all of you. W7ZD is sure a traffic go-getter. W7ACH holds ten consistent daily schedules. W7LT enjoyed a trip to Seattle where he visited NDQ and KPE. A number of good schedules place W7IE close to the top. W7ALM tried his luck at 3.5 mc. Transcons. W7AFL does very good work over in La Grande. W7APE makes the BPL on deliveries. He reports that Coos Bay has a new ham, W7AVT. W7AME makes application for ORS. Likewise do W7ED and W7GE. The non-ORS seem to be running circles around most of the ORS. A change will be made so as to give the deserving the ORS appointments. W7WR finished his rebuilding. W7PL seems to be having fun switching around his many crystals. W7AIC has two transmitters in operation. W7PE works DX with no transmitting antenna. Hi. W7QY is contemplating QRO to 50 or 75 watts. W7AHZ was kept off the air due to illness in the family. W7AJX and W7AIG report small total. W7EO takes the booby prize for traffic. His total was .0000. The SCM is busy building AC SG receivers. Let's try to double the total next month.

Traffic: W7ZD 408, W7LT 357, W7ACH 360, W7IE 241, W7ALM 219, W7AFL 205, W7APE 162, W7ED 73, W7WR 45, W7AMF 36, W7PE 16, W7AHZ 16, W7AIG 12, W7AME 48, W7UK 5, W7IF 4, W7PL 27, W7QY 30, W7GE 8, W7UN 14, W7AJX 15.

WASHINGTON — SCM, Eugene A. Piety, W7ACS — Traffic lead this month again taken by W7QL. The four highest men are non-ORS. W7NA takes second place by pounding brass during his holidays from school. W7TX claims 23 QSOs out of 30 days on his Alaskan schedule.

W7AQA is learning how to send CQ on a xylophone. The city cut down the aerial pole belonging to W7ACQ so he is working on a low antenna. W7TK, W7ACY and W7EK keep Everett humming. In Olympia W7KZ made himself an MOPA, but he doesn't like it. W7AIT is on looking for traffic for the Capital City during the meeting of the Legislature. W7AFD sold his layout to W7SS and is busy building up a new one. W7ABN got his license back and is on the air again. W7OJ keeps his traffic total up among the highest. W7QF of Spokane has made his last report in this district as he has moved to Oakland, Calif., where he is going to work with Boeing. Good luck, OM. W7AHO complains of power line QRM. W7GZ registered a kick because the SCM intimated that Spokane was inactive. Well, where are the reports? W7ATV in Chehalis rebuilt into a push-pull MOPA job and is well pleased with the performance. W7AJS is busy with school work. W7WY got disgusted with 7 mc. and is now working on 3.5 mc. W7AGP in Walla Walla is on with the type '03A that he won at the convention. W7AHH has a push-pull job. W7GW gets out with an MOPA. W7ADX likes his type '52 very much. W7AVV moved to Walla Walla from Seattle and has a 250 watt rig in the process of construction. The Yakima club set, W7AQ, is on a goodly part of the day and night. W7ADS, W7AEX, and W7PU help to keep Yakima going strong. The SCM is now an honorary member of the club. W7AUS makes his first report from Granite Falls. The SCM is always glad to get letters and reports from new and old hams alike. Seattle takes the prize for activity this month. The Amateur Radio Club has an active list of about 25 at every meeting. W7QI, the star traffic man, is Secretary. W7TX is President. W7RT keeps on the air in spite of failure of his "B" eliminator. W7KO praises 3.5 mc. highly. W7GN, the station of the Roosevelt High School, is on the air and being operated by W7AVV, W7AUV, W7ANP, W7AED, and W7LD. W7LD is on with a type '01A transmitter. W7OV is rebuilding entirely, putting in a crystal controlled 50 watt. W7FJ at Kirkland is using a German 75 watt now and likes it. Hi. W7KT worked Africa on a couple of type '10s. That makes him WAC, if he can inveigle a card out of a Jap and a Brazilian. W7AAE is busy with Sea Scout work. W7AAX continues to work his quota of DX. W7APF is on with a 50 watt and handles quite a bit of traffic. W7MR is quitting school for next semester to get his commercial ticket. The SCM is building up a crystal controlled 50 watt with which he expects to knock the cans off some African's head. Hi. W7AIB reports for the first time. We have more reports every month. Keep up the good work, fellows.

Traffic: W7QI 154, W7NA 106, W7AQA 77, W7OJ 76, W7KZ 50, W7AIT 46, W7AFP 39, W7KO 38, W7QF 33, W7TK 32, W7TX 29, W7ACQ 29, W7AIB 28, W7RT 26, W7FJ 26, W7ADS 25, W7ATV 19, W7EK 18, W7WY 17, W7ACS 14, W7ABN 11, W7AJS 9, W7APX 8, W7AHO 7, W7AUS 5, W7ACY 5, W7OV 5, W7AQ 5, W7AGP 4, W7AEX 4, W7AAE 4, W7KT 4, W7KQ 4, W7GN 1, W7LD 1.

PACIFIC DIVISION

HAWAII — SCM, L. A. Walworth, K6CIB — December was a wonderful month in Hawaii though not in traffic totals. The first combined Oscillator-Ham Aloha greeted Hawaiian Hams Dec. 22 and the response was 56 subscriptions. W6DLR, formerly K6DLR of the 11 Signal Co., writes from San Diego that he has gone haywire and taken a better half. Congratulations, OM. K6CRW is the newest Hawaiian station and is operated by Mr. W. A. McCartney of Haui High School. Three high schools are now entered in the Inter-Island High School net. Hilo High is waiting for its licenses to arrive with station ready to go. It looks now as though Miss Helen Donaghho will be Hawaii's first YL for she is the speediest in the McKinley High Code Class. Edith Shibata, sister of K6ALM, is second. K6YAL of McKinley High School has a 75 watt on 14 mc. and desires traffic schedules with all U. S. districts. 3500 kc. 'phones are still popular with the gang. Kalaheo Kauai has become discouraged as a result of very bad power leaks from high tension lines near the shack. K6CFQ, former SCM, sent Christmas cards to many Ham friends in Hawaii from his address in San Francisco. K6CIB has a pet lizard. CIB claims this is the chirp that comes from his rig. Hi.

Traffic: K6BOE 280, K6CDD 136, K6COG 86, K6ALM 65, K6ERI 34, K6CMP 27, K6CIB 16, K6AJA 15, K6CRU 7, K6ERO 6, K6ACR 4, K6BHL 2.

SAN JOAQUIN VALLEY — SCM, E. J. Beall, W6BVY — This Section continues to gain in traffic handled and section activity. We hope the end will not come until we cop that white flag. The Fresno State College Radio Club sponsored the Section Quarterly Hamfest and started the year off with a bang. Seventy-nine hams were present to personally match their DX and Flea-power stories with the rest of the Radio Engineers. Ralph Jack, W6AHO, personally supervised the entertainment and feed and we hope to see more of Fresno. W6BVY has a 1750 kc. schedule with W6BUZ, W6CLP, W6KU and W6WA. The gang admits that 1750 kc. is the answer to the 3500-kc. skip problem for schedules within the district. More stations are wanted for schedules on 1750 kc. W6EXM has schedule with W7CP, Idaho, on 7 mc. W6BUZ enrolled in the U.S.N.R. W6DCG is the new President of the M.A.R.C. W6KU has schedules with W3AWU and W9AIN on 3500 kc. W6AGV is on 7 mc. again. W6EKZ is on 3.5 and 7 mc. W6CPA at Selma has schedule with W6CSX. W6DCG has a big bottle working K6AJA. W6BJE with two type '45s in push-pull promises to give the type '10s and 50 watters a run. W6CUL finds working VP, VS, TG, HH, VK, KA and all states a cinch with his type '52. W6CNM is experimenting on 28 mc. W6EBH with crystal MOPA on 3820 kc. puts out a mean signal. W6AV says there is interesting traffic on Army-Amateur schedules and wants more fellows to take part. W6DTJ is 2nd op at KWG. W6BCH got married so we can't expect much from him until next summer. W6EKR moved to Eureka. W6AOZ is op at KGDm. Send your schedule troubles to W6QA, the Section RM. Three new dynatron freq-meters are being built in the section. FB, and don't forget to notify A.R.R.L. Hq. when you calibrate them from Standard Frequency Transmissions.

Traffic: W6CXT 8, W6CUL 35, W6CNM 6, W6APJ 11, W6AV 13, W6DWF 14, W6SFP 26, W6CLP 4, W6DCG 82, W6BUZ 115, W6AHO 134, W6BVY 69, W6KU 118, W6QA 18.

NEVADA — SCM, Keston L. Ramsey, W6EAD — There are about ten men signed up with the Naval Reserves and as soon as a few more signify their willingness a doctor and enrollment officer are coming to Reno to give the gang the once over. A Naval Reserve unit in Nevada ought to stimulate interest and keep the gang pepped up. W6UO is doing some fine work on 3500 kc. W6AJP is back on the air again with a good report. W6CRF is still working 'phone and sends in a message report this month. FB, OM. W6CDZ spent most of the month testing out some freak 'phone circuits. W6EAD put up a new Zepp Antenna.

Traffic: W6UO 49, W6AJP 35, W6CRF 19, W6CDZ 5, W6EAD 4.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6AXV still leads this Section. He has a new typewriter and says to try to snow him under now. W6BGL is on 7 mc. CW 3.5 mc. 'phone. W6ACJ is rebuilding for remote control. W6AEP has joined the Army Net and says his 'phone is working FB. W6FP has a Four Button Mike now. W6BAM has installed some electrolytic condensers. W6AYK has improved his traffic total 300% this month. W6EOS blew up two 50 watters besides his crystal. W6ADC is building a portable for use with his new portable call. The P.A.T. Club is again having its meetings after a two-week lay-off during the holidays.

Traffic: W6AXY 502, W6BGL 15, W6ACJ 5, W6AEP 7, W6BAM 3, W6EOS 2.

SANTA CLARA VALLEY — SCM, F. J. Quement, W6NX — Colonel Clair Foster, W6HM, leads the Section again with 683 transpacific messages, 421 of 'em delivered! W6HM has announced that he will be a candidate in the next Director Election, and the Section is honored by this announcement. W6YG, despite a two-week vacation, was second in traffic. W6YU sent in a long "calls heard" list which has been forwarded to Hqs. W6DCP is building a new 14 mc. transmitter. W6BMW had little luck in the Transcons due to QRM. W6ACV of San Jose is handling consistent traffic. W6BAX is pushing a new 5th harmonic 7-mc. antenna with a type '52. W6FBU is located at Stanford University. W6FBW will soon be on with a 50 watter. W6CLV sent in the dope of Salinas activity, stating that W6UC is a motor cop and between arrests is building a new receiver. Hi. The crystal set at W6NX is functioning 100%. The following San Jose crystal stations speak of the popularity of crystal control: W6PH, W6BET, W6BHY, W6CBP, W6BKT, W6CEO, W6EGV and W6KG. The S.C.A.R.A. recently celebrated its ninth anniversary. Amateur activity in this Section is increasing, as can be judged from the traffic

totals and interest in meetings. The SCM wishes to thank you all for such loyal cooperation. Keep up the good work.

Traffic: W6HM 683, W6YG 274, W6YU 74, W6DCP 51, W6BMW 48, W6ACV 27, W6BAX 20, W6FBU 5, W6FBW 3.

EAST BAY — SCM, J. Walter Frates, W6CZR — The new year opened with a perceptible increase in the traffic handled by the individual stations and in the interest taken by section members in their ham transmitters. W6ALX is back again at the head of the list. W6EDO, the pride of Pope Valley, has second place in the traffic list through maintaining schedules with OMITB, KAISR and W9DCY. W6ASH comes in third with a nice fistful of Christmas and New Year traffic. He handled some important messages for an anxious mother who desired news of her sick daughter. He reports W6FCN and W6EWJ as two new Berkeley hams. W6ZX is becoming unbeatable in getting traffic to its proper destination within the shortest possible time. He announces that he has changed his BC schedule to 10 a.m. on Monday, Wednesday and Friday, and 11 a.m. and 4 p.m. on Sundays. W6AZH, a new traffic handler, makes his debut this month with a report that places him among the leaders. W6CIG has not been letting any cobwebs grow across the plates of his condensers. W6RJ is still plugging away on both 7 and 3.5 mc. W6BTZ is conducting a class in code and operating procedure for the men in his National Guard unit. W6ATJ, another new traffic handler, also makes his bow this month with a report to be proud of. W6DQH, former Modesto veteran, had made a vow with W6DCP to take some of these traffic men off their feet this month. W6BI is another man on both 7100 kc. and 3750 kc. He is planning a low powered 3500-cc. 'phone set and another one on 1750 kc. for local work. W6CDA allows his traffic total to speak for itself this month. W6BBJ was the main local 3500-cc. 'phone station participating in the Transcons. W6BI handled some of the CW work on that band. W6FAJ, reporting his first traffic, says that he is ready to keep schedules with anybody in the Section at any time. His transmitter is working FB through the help of W6DBZ and W6CIW. W6CFD has been working Hawaiians in the early morning and is learning the newspaper racket in the SCM's office. W6BZU reported by land wire 'phone again this month. W6BUX has been spending all his spare time with a new 50 watt crystal. W6EJA, between intervals of running up and down the coast on an oil tanker, contributed his bit to ham traffic. The Oakland Radio Club is going ahead fine with its new President, W6CGM, and held its first Board of Directors meeting during the month to make plans for next year. W6BI, W6FCO, W6ZX, W6ATT, W6ASH and others have been organizing the new Berkeley Radio Club and will have it perking shortly. W6DWI has been QSO Britishers, Ceylon, Australians and New Zealanders on 14,000 kc. this month. He is planning a new 30 mc. experimental layout with W6EW of Richmond. W6CZR has everything ready but an antenna, and as soon as his medico gets through trying for DX with several concoctions and appliances he will be on the air for good.

Traffic: W6ALX 201, W6EDO 172, W6ASH 122, W6ZX 102, W6AZH 85, W6CIG 83, W6RJ 58, W6BTZ 54, W6ATJ 53, W6DQH 52, W6BI 40, W6CDA 30, W6BBJ 20, W6FAJ 15, W6CFD 8, W6BZU 6, W6BUX 4, W6EJA 4.

SAN FRANCISCO — SCM, C. Bane, W6WB — The boys were evidently all busy handling traffic this month as our totals show a decided increase over the previous months. High man this time happens to be our old friend, W6DZZ, who makes the BPL both ways. W6EKC does himself proud by some sweet traffic handling. W6DFR reports the same old steady run of Army-Amateur traffic. W6ABB is certainly coming to the front as a star traffic man and we predict that he will be leading the section before many moons. W6BNA reports and says his contemplated trip to sea has been put off until operators are more in demand. Hi! W6DZQ is dividing his time between 'phone and an occasional splurge on 7 mc. W6IJ spends most of his spare time pounding brass at W6DFR. W6ERS is back on 14 mc. and reports that DX has begun to pick up. W6DTZ is now the proud possessor of a brand new WAC certificate. Congratulations! W6AMZ reports as per usual. W6BTO is now on 28 mc. every Sunday morning. W6ENM is building a real 'phone job and expects to be on shortly. W6DK is still trying to work all states in addition to his DX. W6KJ is active on 28 mc. About all the QSOs possible these days are with W6BTO and W6WB but Russ is hopeful. Hi! W6BIP is devoting practically all his time to DX. W6CXP cracks loose with a very nice total for the first time in many moons. W6ETR

has his type '52 on the air. We are given to understand that the temperature box on W6PW's multivibrator unit weighs 40 pounds. Hi! W6DPF is trying to get something to push a type '12D in his crystal rig. W6AST says the best way to cure a crystal from oscillating in two places is to put it on a vise and hit vigorously with a hammer. Hi! W6WB was recently QSO two nines on 28 mc. Seventeen stations report this month with two in the BPL, which rather makes us feel that S.F. is back in the running.

Traffic: W6DZZ 430, W6EKC 181, W6DFR 102, W6ABB 87, W6BNA 67, W6DZQ 43, W6HJ 34, W6ERS 22, W6DTZ 15, W6AMZ 14, W6BTO 9, W6ENM 4, W6DK 8, W6KJ 4, W6BTP 55, W6CXP 46, W6WB 7.

SACRAMENTO VALLEY — SCM, Everett Davies, W6DON — There seems to be quite a bit of activity among the experimenters. W6AK sends in a report this month. W6ER has married, settled down and is now back on the air. W6GF is back on the air after being QRT for about eight years. W6BYB is building up the 1-kw. set and spending most of his time on 28 mc. W6ECN worked W9AIC and W9FFQ on 28 mc, W6EJC also worked a couple of nines on 28 mc. W6BYB heard SP3AR in Poland on 14 mc. W6BKC's little type '10 transmitter kills every BCL in the block. W6JOU sold his type '04 and is using two type '10s in MOPA. W6BSN, op at KRJ, has quit ham radio. W6DQG is never on because he can't find anybody new to work. W6CKH is a new ham in town, W6DLB is on 1750 kc. W6AIM is using remote control. W6BSQ has a new signal relay.

Traffic: W6AK 50, W6AIM 18, W6ER 6.

LOS ANGELES — Acting SCM, Chas. A. Nichols, W6ASM — Hello, fellows. This is W6ASM battling for the last time for our retiring SCM, W6EQF. As most of you probably know Sandham is down in Mexico with the International Pacific Highway expedition of the Auto Club of So. Calif. and will be on 7330 kc. with 50 watts and about a 240 cycle note. The call is IPH. Please listen for him and give him a helping hand, if possible: The A.R.R.C. continues to hold meetings under the towers of KGfJ and the new officers are outlining a program with plenty of radio for the coming year. Meetings are held on the first and third Wednesdays of each month. The Associated Radio Amateurs of Long Beach continue to hold good meetings and still meet over the jail in Long Beach. Their hot dogs down on the Pike after the meetings certainly are worth the drive down there. The Highland Park Radio Club is the latest and from all reports they certainly are a live wire bunch. More power to them and may they continue to grow bigger and better. The Pasadena Short Wave Club is still meeting regularly and from all reports the meetings are very interesting. I have no definite reports from the Tri-County gang but I hope they are going strong. How about it? Seven stations, W6QP, W6ETJ, W6AKW, W6AOA, W6WA, W6AGR and W6CXW, made the BPL with W6QP leading them all with a total of 1458. He has schedules with KA1HR, W9COS, W5EB and W6AIX. All of these stations belong to a chain that boasts of being able to get a message from China to New York City in three hours. FB, W6AKW wants the gang to get behind with Army-Amateur nets as it will help our standing with Uncle Sam. W6AOA reports plenty of traffic. W6WA rays no regular schedules but still manages to pick up traffic. W6AGR reports working all the active hams in Massillon, Ohio, in an hour. What a man! Hi, W6CXW finally made the BPL. W6BGF says that 7000 kc. is no good and that 3500 kc. is good band for rag chewing. W6ERC reports handling play by play report of a football game via radio. W6BHT sends in his report and says that he is a former "nine." Welcome, OM, W6DQV says that the Bakersfield Club has a Navy transmitter. Do you mean it floats, OM? Hi, W6ERL says that his power transformer went up in smoke so he could not make the BPL. W6EAF says that crystal control is FB. W6DZF sends in a nice total. W6DAK says that the wind blew his 14 mc. antenna down. W6WO likes type '24 tubes for detectors. W6AM handled some transcontinental test traffic and has a new tape motor sending machine so that W6MA can call him easier on schedules. FB, W6ON is using two type '10s in push-pull. W6DTE has a new National Receiver and a crystal controlled transmitter. Sounds like Santa Claus has been around. Hi, W6DOZ is putting in a crystal with a type '52. W6AWY was thinking of putting in a 3500-cc. 'phone but listened down there one evening and gave up the idea. W6DVA says that the Highland Park Club is growing fast. W6BJC says that W6EZX won the low power end of the S.M.W.C. DX contest while W6EEP won the high power

end. FB. W6ESA is being troubled by power leak. He says to listen for KA1SL, which is the call that his father and W6EKE are using while in the Philippines. W6DZI says nothing new. W6EZG wants a middle west and East Coast schedule. W6AKD reports hearing only one off-frequency station in the last 35 days. W6LD wishes the best of luck to the new SCM, whoever he may be. W6ZZA is now crystal controlled on 7004 kc. and perks fine. W6CUH says that he worked his 49th country. W6MA says it is a real pleasure to listen to the crystal note of the OM, W6ZZA. W6AEO has a DC Super Het. receiver now. W6ACL is building a dynatron frequency meter. W6OF is another convert to crystal control. W6FJ is trying very hard to get on the air a little but spends most of his time in "Ham Politics." W6ASM is kept busy trying to keep up in the design of modern AC receivers and also pound brass. W6QF built the transmitter that W6EQF has with him on the expedition. W6ERJ manages to get on 7 mc. once in a while. Let's get that traffic banner back and hold onto it.

Traffic: W6QP 1458, W6AKW 363, W6AOA 300, W6WA 148, W6AGR 138, W6CXW 130, W6BGF 118, W6KT 111, W6BHT 108, W6DQV 86, W6ERL 38, W6CZT 38, W6EAF 35, W6DZF 32, W6DAK 30, W6UJ 64, W6WO 27, W6AM 27, W6ON 24, W6DTE 23, W6DOZ 18, W6FQD 18, W6DLI 17, W6AZL 13, W6AWY 15, W6DVA 14, W6BJC 12, W6ESA 10, W6DZI 9, W6EZG 8, W6AKD 7, W6LD 5, W6ZZA 3, W6CIX 3, W6CUH 3, W6MA 3, W6AEO 2, W6ACL 2, W6ETJ 503.

PHILIPPINES — Acting SCM, John R. Schultz, KA1JR — Encouraging reports from G5BY, Croydon, England, and SM5TN, Sweden, state that signals from amateur stations in PI are FB there, and they invite QSOs. This is an opportunity for us, fellows, so let us lend our ears to their signals and get into closer contact with our European brothers. W6EKE favored the SCM with a visit on Jan. 25. He will be an addition to the KA outfit with the call, KA1SL. Welcome, OM. Watch his smoke, fellows. KA1HR again leads in traffic. KA1CE comes out second. KA1SU keeps schedule with W6HM. KA1PW is working irregularly just now. KA1CM works regularly but lacks his old fire. KA1DJ seldom rents the air with his crystal note. KA1RC still links his traffic with KA1CR. KA1YR is an additional ham. Welcome, OM, KA1ZC, with his new recruits, works DX daily. KA1SC is again pounding after a long absence. KA1AC, due to change of QRA, has not been heard, but is getting his station fixed up. KA4HW, KA1EL and KA1MV pound out a few. KA8AA's schedule with KA1XA is unbroken. FB, OMS, KA9PB now may be heard late at night. OM1TB crashes into the BPL this month with 545 messages.

Traffic: KA1HR 1440, KA1CE 1108, OM1TB 545, KA1JR 66.

ROANOKE DIVISION

WEST VIRGINIA — SCM, D. B. Morris, W8JM — This is one of the best months that W. Va. has had for quite a while. Keep up the good work, gang. W8OK keeps schedules regularly with W8ZG, W8HD, W8BVT, W8CAY, NUDG and W8MN. W8BTV sends in a nice message total. W8BOK is going crystal-controlled with 'phone. W8JM operates W8BOK's transmitter in his spare moments. W8DPO wants a schedule with some ham in the southern part of the state. W8TI reports two new hams, W8DSU, Morgantown, and W8CKE in Elkins. W8CKE is making a fine start. W8BOW had PAQID of Holland as a visitor to his shack recently. W8DNN and W9AZY sure keep a fine schedule. Santa Claus brought W8ATE a new REL receiver for Christmas. W8BIZ promises a better report next month. W8TB is using reflector on 28 mc. W8CBV finally received his card from LUDDM. W8BOH has portable W8DAS at school with him. W8DSO is Chief Engineer of BC station WMMN. At a meeting held at the Waldo Hotel in Clarksburg on Jan. 11th the Central West Virginia Amateur Radio Asso. was formed with W8DRL as President, W8EP Vice-President, W8BOK Secretary and Treasurer. The club had 14 hams at their opening meeting and a fine time was had by all present. Come around sometime. By the time this is in print our second meeting at the Hotel Fairmont will have passed into history. Anyone in Central W. Va. interested in the club write W8BOK, 1328 Adams Ave., Clarksburg.

Traffic: W8OK 195, W8BTV 67, W8BOK 27, W8DRL 25, W8JM 20, W8DPO 16, W8TI 15, W8CKE 10, W8BOW 8, W8DNN 6, W8ATE 7, W8BIZ 3, W8AYK 3, W8DSO 2, W8CBV 1, W8BOH 2.

NORTH CAROLINA — SCM, H. L. Caveness, W4DW — W4ARS is now building a 50 wattor for use in another

location. He wants ORS appointment for his portable, W4APL. W4NY has moved from Wilmington to Greenville. W4ACI has been appointed Route Manager, and may be heard on 7 mc. almost any morning. W4ABW rebuilt his AC receiver and hopes now to be able to hear more and better hams on the air. W4JR had the time of his radio life on the CW Tranecon relays during January. He is also back on the air on Monday nights for A-A drills. W4TU has the crystal fever and all he needs is the cash. W4TR is now on the air with a 7072-ke. crystal, using two type '10s in push-pull as amplifiers. He reports three new hams in Durham: W4ANP, W4ALY, and W4AHY. W4AAE is interested in 14 mc. now and is going to put two type '10s in push-pull on that band. W4DQ tells us about two new men on the air, namely, W4AFG and W4BV. And speaking of new hams, W4ACX gave us some interesting information over the air recently. He and W4ZF and W4BS are all recent comers on the air and are residents of Leaksville. W4ZF just received a "heard" card from London, of which he is extremely proud. W4ZB comes in with Peru, England and Spain on his DX record for the month. W4AKC has completely rebuilt his hay wire and now is ready for some fine work in traffic handling. W4AGO says that mid-term examinations have knocked his traffic total for a black eye, but that they are off his hook now and we may expect a better report next month. W4AEL is in the same boat, but his report is very creditable. The SCM visited W4ZH and W4AEL during the Christmas holidays. W4RLX says he has tamed a 10-kw. mercury arc and that he does not anticipate any further trouble with rectifiers. And here is another new station, W4GG of the Asheville High School. It is a TNT outfit with the usual 550 volts on a type '10 with a single wire Hertz antenna. W4ANU in Raleigh has just received his license. A State College Radio Club is in process of formation, with a membership of seven licensed operators and some twenty who would be licensed.

Traffic: W4DW 121, W4ZB 78, W4TR 55, W4AEL 52, W4ABS 42, W4ACI 22, W4JR 19, W4TU 17, W4RX 15, W4ABW 12, W4EG 11, W4AKC 10, W4AAE 8, W4AGO 4, W4DQ 4.

VIRGINIA — SCM, J. F. Wohlford, W3CA — We are glad to report that W3BZ and W3CXM are improving and hope they can be back on the air by next report. The following ORS have been appointed: W3ZU, W3AMB, W3HY, and W3ZA. In addition to these appointments, W3ZU, W3AMB, W3HY and W3ZA have been appointed OO and W3HY and W3AMB have been appointed OBS stations. W3HY and W3ZA have accurate dynatrons and will be glad to give you the "low down" on your frequency at any time you work them. W3CXM made the BPL by the good work of relief operators during Capt. Baldwin's illness. W3WO maintains about forty-five schedules per week — that is where the traffic comes from. W3ARU is also on the sick list and has been in hospital but is improving. This station also hung up a good traffic report by working schedules with only three stations three nights per week. W3SE is ORS now and is improving the station. W3AAJ's Virginia Net that is working on Sunday afternoons and at other times during the week seems to have started something that the whole nest of hams in this state took to like a duck to water. We hope that this net will be the result of a lot of new and active stations that will stick to the game. W4ZB and W9WK were visitors at W3FJ. W3FJ is Technical Signal Sergeant, Second Battalion, First Regiment, Virginia N. G. W3ASA and W3BCI are also joining that unit. W3AEW has ½-kw. outfit going now, also 50 watter on 7 and 3.5 mc. bands, and two type '10s in MOPA on 14 mc. W3CFL is putting in crystal controlled outfit. W3HY says the club at his place is coming along fine and the new operators are getting in shape for hamming. W3AGY, a new station at Meadow View, is coming on the air with low power. Here's luck, OM. W3BDW had the misfortune to have his junk undergo a shower bath on account of a fire in his apartment. He promises to show us some smoke and less water when he gets back on. W3BDZ has the old 'phone going heavily. We have no report from the Norfolk section, other than W3ARU. With all the good stations in that section it appears that some could give us a report for QST each month. Come on, fellows, get out of the rut and show the ham spirit. Let the reports come and show the rest of the world that you can and will be in this game. Applications for new ORS appointment should be sent in at once. Make your application separate from the reports, please.

Traffic: W3CXM 787, W3WO 648, W3ARU 522, W3HY 56, W3AEW 50, W3FJ 33, W3SE 13, W3AAJ 9, W3CFL 2.

ROCKY MOUNTAIN DIVISION

UTAH-YOMING — SCM, C. R. Miller, W6DPJ — The Utah Amateur Radio Club is very active, holding regular meetings every two weeks. For more information, see W6DWH or W6DPJ. W7AAH again leads the Section. W7ALI reports a good total. W7EX has a fine signal on the 7- and 14-mc. bands. W6DPO is back on again. W6BTX rebuilt and is now on three bands. W6DWH is testing on 28 and 56 mc. using a type '10 in Colpitts circuit. W6CRS has a new 3544-ke. crystal 'phone set. W6DPJ finally got the crystal outfit working. What is the matter with the Utah fellows? Although there are many active stations, only two or three report regularly. Drop the SCM a card on the 16th and let the rest of the Section know what you are doing!

Traffic: W7AAH 61, W7ALI 31, W7HX 24, W6DPO 16, W6DPJ 15, W6BTX 8.

COLORADO — SCM, E. C. Stockman, W9ESA — Congratulations are in order to the new Director for the Rocky Mountain Division — W9AAB. Best wishes for his success. The retiring SCM, exW9CAA, has moved to Helena, Mont., and wishes to express his farewell 73 to the whole gang. He is now operating W7ASQ. W9GBQ is temporarily off the air visiting in California. W9EKQ and W9EAM have aroused quite a bit of Army-Amateur interest throughout the state. Those interested please communicate with W9EKQ. W9DNP visited the Denver gang and persuaded the R.I. to favor him with a commercial ticket. W9ESA again makes the BPL. W9CDE and W9EAM were issued new ORS certificates. W9CSR and W9BTO have new receivers using type '30 tubes. W9FXQ moved to Great Bend, Kans. Sorry to lose you, OM. W9FXP was back in town for few days but had to leave again. W9FRQ reports bad conditions for 'phone work and is on CW part time. W9BVC is having trouble with filter condensers. W9APZ is keeping regular schedule with W9APN. W9ECP reports Boulder activity on the increase with two new stations on the air. W9FFU and W9DYN, the latter using 'phone. W9BYC has new Zepp and receiver using type '30 tubes. W9FYK is working with M.O.P.A. W9FYL has new transmitter. W9EFP was visited by W9ALZ and W9CXG. W9CND is out after DX. W9EVC, using low power, has received good DX reports.

Traffic: W9ESA 371, W9DNP 327, W9AUJ 35, W9GBQ 85, W9EAM 48, W9FXQ 27, W9CND 15, W9FRQ 14, W9ECP 13, W9ASD 11, W9CDE 8, W9APZ 3, W9EFP 3.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Robert E. Troy, Jr., W4AHP — Hurrah, and a couple of FB's. Three stations make the BPL. The honors go to W4ADL, W4LML and W4KFP. W4AGI says that he and W4ABU are using two type '01As. W4EF, the Army man at Maxwell Field, is coming along fine with a hundred-watt outfit. W4AP is getting out fine with his low power 'phone. W4AJR has put up a higher sky wire. W4PAI is on 14-mc. 'phone and 7-mc. CW. W4KP has a new YL op. Congrats, OM. W4LML is getting out fine and handling lots of traffic with his crystal outfit. W4ADL accomplished a feat few stations do. He handled 23 messages a day for 10 days, totaling 230 messages. W4DS visited the SCM. W4VZ is having good results with low power. W4RS, the hundred-watt 'phone and CW outfit of Roberson and Sommerville, is putting a fine signal on the air. W4AAQ is still very QRL. W4IA is planning another Fourth and Sixth District 'phone QSO party. W4AHP is rebuilding for the last time. Hi. W4IC is a new ham in Tuskegee. Mr. W. J. Montgomery is on with W4ANL in Birmingham. W4AKM was worked on the A-A schedule. W4LT is holding up his end of the A-A net. W4CB is putting in a fifty watter.

Traffic: W4ADL 252, W4LML 228, W4KFP 206, W4EF 69, W4PAI 29, W4AP 16, W4AHP 14, W4DS 9, W4RS 7, W4AJR 4, W4AAQ 3.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES-PORTO RICO-VIRGIN ISLANDS — SCM, J. C. Hagler, Jr., W4SS — W4VH has returned to the Hill School in Pottstown, Pa. W4GT has worked some good DX on 7 mc., making contact with a Frenchman at 5:15 am. EST, and also worked an LU about midnight. W4AAV has been QSO with several CM stations. W4DV has returned from Palm Beach, Fla., after a fine visit. While there he had a good time with W4AFC and W4AGR. W4OQ is working and showing great improvement. CM2FN reported by radio via W2AKD. W4AJH is doing his usual good work with the A-A net. W4AFQ will soon be back in Augusta after another trip on a freighter. W4JD was too busy with other

work to maké the BPL. W4PJ keeps several good schedules. W4SS is trying to get good results from a new receiver and handle traffic.

Traffic: W4OQ 3, W4VH 2, W4DV 19, W4PJ 11, W4GT 12, W4AA 10, W4AJH 20, W4JD 73, W4SS 150, CM2FN 43.

WEST GULF DIVISION

NEW MEXICO — SCM, Leavenworth Wheeler, Jr., W5AHI — We record with extreme regret the passing of our friend and fellow amateur, H. L. Sherwood of W5BH, whose 14-mc. signal was known throughout a large part of the world and to whom much credit must be given for interesting the Albuquerque gang in amateur radio. W5TV ran up an astounding total using the SCM's schedules for the first two weeks. Because of a division and rearrangement of schedules W5TV and W5AHI will be running nearly neck and neck from now on. Despite the fact that W5AJL is running some good schedules, we're tempted to greet the rumor that Clovis could beat the rest of the Section with a sarcastic, "Oh, Yeah?" W5AJR runs up a nice total and is looking forward to an ORS appointment. W5BQE is now State Net Control of the Army-Amateur System and is anxious to hear from those interested in that organization. W5AUW is one of the first to enroll. W5BPJ and W5BRV are on, both using '45s in push-pull rigs.

Traffic: W5TV 794, W5AHI 571, W5AJL 142, W5AJR 85, W5BQE 77, W5AUW 70.

NORTHERN TEXAS — SCM, Roy Lee Taylor, W5RJ — W5VW runs away with all honors this month and makes the BPL. W5HY hasn't forgotten how to make the BPL and chew the fat with the gang. W5CF sent radiograms instead of Christmas cards this year. W5BAD is the Chief Route Manager for Northern Texas. Anyone wanting schedules get in touch with him. W5BII is coming through in fine shape and says the BPL for him next month. W5RH reports two new hams in Abilene. Namely W5BST and W5BTB. Welcome to our ranks. W5ASP has the type '52 going with 3000 on the plate. W5ALA reports a fine Christmas present in the way of working VK, CM, and VE. W5BAM reports that off-frequency conditions are improving somewhat. W5RJ is kicking out in fine style with the 250 watt crystal job on 7060 kc. W5BTB comes through with his initial report. W5ARV worked VK on 12-watts input! W5LY reports things haywire over his way, so not much doing. W5BQN comes through with his first reports and is piling up some DX records. W5GZ lost a 250 watter. W5RJ lost a 250-watt screen grid bottle in shipment. The glass was broken but the filament was still good. EL. W5AZP is fooling with 'phone. W5ARK has moved back to Cowtown. W5BNO is putting in crystals as is W5KL. W5AGQ-AVS have their crystal going OK on 14 mc. W5BGW is handling some traffic but not reporting. How come? What is the matter with Cleburne, Amarillo, El Paso, Greenville and other towns in the section that have active stations not reporting regularly? Come on, fellows, report so the gang can see what you are doing.

Traffic: W5VW 413, W5HY 320, W5CF 182, W5BAD 104, W5BII 101, W5RH 71, W5AUL 71, W5ASP 40, W5ALA 27, W5BAM 26, W5ARV 12, W5BTB 13, W5GZ 6, W5RJ 13, W5LY 4, W5BQN 1.

SOUTHERN TEXAS — SCM, H. C. Sherrod, Jr., W5ZG — Houston: The 'phone fever is still biting strong. W5TG is sending code on the 1750-ke. band on Tuesdays and Thursdays from 7 to 8 p.m. W5BKW is doing likewise on the 3500-ke. band on Monday and Wednesday from 7 to 8 p.m. W5BHO is also representing the vocal artists sending code instruction on the 3500-ke. band Tuesdays, Thursdays and Fridays, from 6 to 7 p.m. W5EI is off the air on account of moving. Ernest Ross, well known second operator at W5PK, has followed in the footsteps of OM DeBardelen and, as a consequence, both of W5PK's operators are now benedicts. The sincere best wishes of this section to Ross and the lucky lady. W5YG at Rice Institute is heard occasionally. One of the outstanding achievements of the past month was Arthur Tennant's (W5TD) handling of the football reports of the Rice-Iowa game played at Houston. W5TD, with the assistance of W5LP, and others, took the reports from the field by telephone and sent them to W9DTI the station at the Iowa State University. Galveston: W5AVC, Berg, who is also heard as ER-3 and remembered as old KFR-5, is on and getting out well with a 100 watt P.P. T.P.T.G. rig. W5BQJ gets out well with a fifty watter. W5AUX will be an ORS very shortly. Baytown: W5DS is the sole representative but a live one. Through the medium

of KA1HR he has heard from Groves, Ex W5NW, now signing PK5NW. Groves will have a set going on 7 mc. as he gets out of the jungles of Sumatra. Should any of the gang care to drop Groves a line (and he surely would appreciate a word from you fellows) his address is Wayland Groves, care of L. W. Elliott, N.K.P.M., Batavia, Java, Dutch East Indies. Incidentally, W5DS can always supply the latest dope on PK5NW's activities. Flatonia: W5AJD has not been on much due to business QRM and requests cancellation of his RM appointment. Corpus Christi: W5ATY is raring to put Southern Texas at the top of the West Gulf Division. W5ATY sends in a nice traffic total. W5MS sends in a nice report. W5ALV spent two weeks in Fort Worth and Kansas City. Corpus has two newcomers in Ex-5VM and W5AEJ. W5AEJ is using a type '10 with B batteries. W5BKG is the new Secretary of the Corpus Christi Radio Club. Congrats. Mr. Jackson of Thos. Gogans is building a type '10 push-pull rig and has applied for a license. Mr. Whitely has also applied for a license and will be on as soon as the R.L. comes across with a permit. W5MX is thinking about 14-mc. 'phone. W5ZX has worked all districts. W5BRY is handling traffic. W5MS renews his ORS appointment. Kerrville: It is with regret that we have to report the suspension of activity at W5BKE. Lawson is going back to seismograph work and is closing down W5BKE. From now on look for him via W5IV. San Antonio: W5AHB has been rebuilding his power supply and between this and QRM from work at K7SA he has had little time to be on the air. W5UX will be back on the air next month with new transmitter and AC receiver. Rosenberg: W5PU reports with his usual consistency. "Ham" has just returned to Rosenberg after an extended trip to the hills of west Texas. El Campo: W5ACT sends in a nice report. There are several prospective hams in El Campo. W5ACK is on using 220 volts on a type '10. W5SY is undecided between crystal and M.O.P.A. W5ACT is using a single type '10 in T.P.T.G. circuit. Drop me a line, you fellows who don't report, and let me know what's going on. The whole bunch wants to know what you are doing and they will all appreciate a word from you as much as your SCM will. We have more potential strength from an operating standpoint than any other section in the West Gulf Division. Can you send me more reports than I can write up? Try it!

Traffic: W5MS 84, W5DS 55, W5BKE 39, W5ATY 15.
OKLAHOMA — SCM, W. J. Gentry, W5GF — W5GF is doing very well on 7000 and 14,000 kc. W5BTN is the portable call of W5GF. W5VQC leads the list again, making the Brass Pounders. W5AMC has some snappy schedules. W5PL makes a nice report. W5OJ is one of our new ORS. W5PP is now OBS. This makes W5ABO and W5PP the only 'phone OBS in Oklahoma. FB, OMs. W5AYF hasn't been so well of late. W5AFH is still off the air building a crystal controlled 'phone rig. W5BHW is doing a good job at Math now. W5BOE does a nice job with traffic. W5AHV is working some DX. W5QL and W5MM are still chasing interference. W5SW hopes to rebuild his rig soon. W5ACD has left for South America with Standard Oil Co. Sorry to see you go, OM. W5ALF has been rebuilding his rig. W5BIM made his first report. Let's give these Texas and New Mexico boys a race for their money on traffic. What say?

Traffic: W5VQ 908, W5AMC 161, W5PL 144, W5OJ 66, W5BOE 39, W5AHV 26, W5BIM 18, W5ALF 13, W5AYF 6, W5GF 5.

CANADA

CONGRATULATIONS — Again Canada goes over the top in traffic handling with a fine total of 2720. This shows what can be done when enthusiasm and cooperation join hands. Our dream of an All Canada Traffic Route has now been realized and traffic is moving via the All Red Line from Halifax to Victoria on schedule. Comments are invited on an All Canada Transcon Relay, dates and conditions to depend on replies received. Address all letters to VE2AP, 4334 Westmount Ave., Westmount, P. Q., not later than March 18th. There is no reason why it should not be 100% successful.

Keep Wednesday nights for Canadian contacts.

CANADIAN GENERAL MANAGER

ALEX REID, VE2BE

MARITIME DIVISION

NOVA SCOTIA—SCM, A. M. Crowell, VE1DQ—VE1AS has gone to the country for a rest. VE1AW has been on 3.5 mc. getting the 'phone in shape for DX. VE1AX worked W6AF twice and is using doublet for receiving. VE1AZ of New Glasgow and VE1BN of Sydney are both putting very fine 'phone signals into Halifax. Three way hook-ups are held with VE1AX and VE1DQ, the latter relaying to VE1AX at times when power leak is R9. VE1BL has installed a new seventy-five watt screen grid tube in his M.O.P.A. VE1CC's new 866s have arrived and are in action. VE1DU sends in a very interesting report of his visit to the U. S. VE1DQ started the most eastern 'phone Transcon messages. A bad delay ensued when W3--- and others cooperating were told by W1BCR to "never mind the Nova Scotia message." The SCM wishes to hear from all Maritime stations interested in holding a convention and hamfest in Halifax this spring. Let us have your ideas and suggestions.

ONTARIO DIVISION

ONTARIO—SCM, C. D. Lloyd, VE3CB—The Ontario Division received a challenge a few days ago from the SCM of Quebec as follows: "We are out to give your Third District a run on traffic. Quebec will lead you or the air is going to bust. Do you accept the challenge?" Do we accept the challenge! Come on, gang! VE3GT and VE3ZZ are leading this month, with VE3HA in third place. As RM, VE3GT is decidedly a success. VE3HN is reported to be on the air. VE3BC is contemplating 3500 kc. 'phone. VE3DA is working all three bands. He reports VE3EZ and VE3BI both active. VE9AL is keeping a schedule with WIMK on Tuesdays. VE3ET is keeping his hand in at some of the Toronto stations. VE3ZZ worked G5BY and G6WY on 3500 kc. He is hooked in on VE3G's Trans-Canada chain. VE3HB is an applicant for O.R.S., as is VE3AG. VE3DW and Mrs. VE3DW are making fine records with low power using a type '12A. VE3GK reports his west coast traffic getting there at last. VE3AD works both 7000 and 3500 kc. bands. VE3AG lost his antenna during a storm. VE3FD reports great activity on 3500 kc. 'phone. VE3DM and VE3HD are both handling traffic. VE3CB and VE3DD pound brass every day and are getting out well. No reports were received this month from the Windsor or Hamilton hams. Let's hear from you, fellows. We would like to hear from all stations so that we may let the other fellows know what is going on.

Traffic: VE3GT 556, VE3ZZ 210, VE3HA 119, VE3BC 44, VE3HD 36, VE9AL 21, VE3GK 20, VE3HB 8, VE3DD 7, VE3AG 15, VE3DA 13, VE3FD 4, VE3DW 4, VE3HU 26, VE3HL 48, VE3AD 32, VE3DM 9.

QUEBEC DIVISION

QUEBEC—SCM, Alphy L. Blais, VE2AC—Thanks, boys, for the best report in years. Our CGM, Alex Reid, VE2BE, is very active on extremely important questions for our welfare. VE2CA has two schedules with Canadian stations. VE2CL is looking for afternoon schedules on 7 mc. VE2BB has a bunch of schedules with Canadian stations. VE2AP, who is acting as assistant SCM, gives me a detailed report on the following: VE2AI has a new AC receiver. VE2AL keeps busy on 3.5-mc. 'phone. VE2BD reports very good QSO with "G" stations. VE2BO has high-power transmitter on air. Ten operators are going strong at VE2BO. VE2DN is active on 'phone. VE2CJ is operating on all bands. Sunday mornings is VE2 'phone regalia: VE2HV, VE2VG, VE2BE, VE2AP, VE2CA, VE2DN, VE2AV and VE2EV are on from 9 to 11 a.m. VE2BW and VE2AQ are coming in fine on 7 mc. VE2AP works nightly on 3655 kc. VE2CV, John Grant, is a newcomer; also VE2CU. The SCM, VE2AC, is active nightly on 3700 kc. Headquarters is very proud of the fine work accomplished by this division. Let's keep the wheel turning. Quebec must be the leader

again this year. VE2BZ had a visit from W1SV. VE2BX was down and inspected the SCM's outfit.

Traffic: VE2AC 118, VE2BB 68, VE2AP 64, VE2BE 26, VE2BZ 8, VE2CA 18, VE2CL 2, VE2CP 66, VE2BX 14, VE2BG 23.

VANALTA DIVISION

ALBERTA—SCM, Fred Barron, VE4EC—This time the report is going to be short and snappy. If you fellows continue to neglect reporting, you will have to do without being mentioned in QST. In fact, the way things are now, we don't need an SCM here at all. It certainly is not playing the game when, out of approximately forty or fifty active amateurs, I get on an average of two reports each month. VE4EI is the best lil' reporter that ever reported. Hi, VE4DT is still keeping his twice a week schedule with VGSR. VE4EC was QSO K7 and K1HR.

Traffic: VE4EI 189, VE4DT 46, VE4EC 25.

BRITISH COLUMBIA—SCM, J. K. Cavalsky, VE5AL—Quite a few stations are moving traffic and I'd like to see some of you interested in an ORS appointment. VE5BR is holding down five daily schedules. VE5BL works DX in between times. VE5AW has again worked all continents during the last month. VE5EC reporting for Victoria says that things are "rotten." VE5AD isn't on very often. VE5HP is going to be off for some time while they rebuild part of his radio shack. Congratulations are in order for VE5DU, who will have to keep better hours now that he is married. VE5CO looks only for DX. VE5HR is about to build a new set. VE5CB is on 14 mc. VE5AG led the Vancouver boys with a beautiful total. VE5DD is working an evening trick so hasn't much time on the air. VE5CF says his set is perking better than ever. VE5AL is clearing his hook on schedule. VE5AC handles the odd one when he hasn't any sets to service. VE5DP sold his set and had a new one on the air two days after. VE5FI is moving to DXhill. VE5BM has a new crystal job under construction. VE5AN is busy so is not on much. VE5DP has a new M.O.P.A. The local club has started code practise which they put on the air every night.

Traffic: VE5BR 94, VE5EC 50, VE5AL 68, VE5BL 51, VE5HP 12, VE5CB 5, VE5DP 4, VE5AC 7, VE5AG 90, VE5CF 6, VE5AW 29.

PRAIRIE DIVISION

MANITOBA—SCM, A. V. Chase, VE4HR—With but two weeks' experience on the air, VE4IS has carried off the traffic honors. Good work, OM. VE4AR has taken up 'phone on 3.5 mc. VE4JB is building a new low-power transmitter. VE4GQ has been very successful with 14-mc. 'phone. VE4FN has discarded his M.O.P.A. in favor of a push-pull T.P.T.G. VE4DJ reports activity curtailed on account of bad QRM from power leaks. VE4HR has a new AC receiver working satisfactorily. VE4BQ worked his usual quantity of DX. VE4AG, a youngster in the game, sent in his first traffic report.

Traffic: VE4IS 24, VE4HR 23, VE4DJ 22, VE4DK 13, VE4JB 10, VE4BQ 10, VE4AG 3, VE4FP 1.

SASKATCHEWAN—SCM, W. J. Pickering, VE4FC—This month's traffic is the best yet. VE4CV heads the list and was QSO VE5CU at Cape Hope's Advance, 800 miles north of Churchill. The RM reports VE4ID is on with a TNT heap. VE4CV and VE4BB tried out 3.5 mc. for local traffic handling. VE4IH is in on the Trans-Canada chain. VE4AT originated a nice number of messages. VE4GR wants a schedule south or east at 12:30 p.m. VE4BE is helping VE4HU with a new CC outfit. VE4BA reports the formation of the Swift Current Amateur Radio Ass'n. VE4DI was host at ye olde time Ham-fest at his shack when the OW was away. VE4JG has a new AC receiver. VE4IL is rebuilding because Santa Claus brought his kid a tricycle. BE4BA is on with a type '45. VE4AV and VE4CC are having a QSO competition.

Traffic: VE4CV 122, VE4BB 79, VE4IH 58, VE4AT 30, VE4GR 28, VE4BE 18, VE4BA 14, VE4AV 4, VE4CC 3, VE4HU 2, VE4FC 1.