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AMATEUR RADIO

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A WORD TO THE WISE . . .

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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.

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

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

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Address all general correspondence to the executive headquarters at West Hartford, Connecticut.
As far back as any of us can remember in amateur radio, our biggest practical problem has been the interference caused by congestion. Perhaps more than any other factor it has been responsible for keeping us alert technically and cooperative in our operating practices. It still exists as our big problem and it seems that it must always get a good share of our thought and attention.

There are three possible solutions to the amateur interference problem. Most obvious, and undoubtedly most popular with the average amateur, would be more territory. Indeed, this probably constitutes the only 100% solution, for provided we got an infinite amount of space we could operate without interference regardless of punk technical practices and worse operating. Unfortunately, from the practical aspect this particular solution is one of the most difficult to achieve, as most of us know only too well. The League is hammering away at the problem, but in any event we will have to make out with our present territory for the next five years, so in considering ways and means for more immediate relief we must seek elsewhere.

The next most obvious solution is technical improvements, to enable us to work more stations in a given space. Amateur technical progress the past five years has been amazing. One of the League’s jobs is to keep our technical ability ahead of the existing situation, and that the QST technical staff has shown us how to do. Highly selective receivers and stable transmitters with good notes are the order of the day. The single-signal superheterodyne, the tri-tet exciter unit, new tubes, superior ‘phone circuits, better power supplies and radiating systems and modern monitoring: there is no comparison with our technical status of five years ago.

But still we have interference, which leads us to an examination of our third remedy: the use of a little more intelligence and cooperation in our operating practices. More than either of the others, this last method of attack is up to you fellows, as individual amateurs. Were we compelled to spread ourselves throughout all our amateur holdings, each of us staying in a small assigned bailiwick, probably there would be comfortable room for every existing amateur station in our present territory. Of course we can’t do that, and this is a free country in which every fellow has the right to try everything that is reasonable. But it seems to us that there is room for the application of a great deal more intelligence than we use to-day, when with no necessity for it we all try to get on about the same frequency and do the same things at the same time. One of the most foolish things we do is to use any old band for any old distance, if it will work. Of course it’s fun (and that’s why we are radio amateurs) but it isn’t a very sensible thing to do when it badly increases the interference in our bands. Too many of us work on only one or two bands and don’t change often enough. As a matter of principle we ought to be able to use more bands and, within rather broad limits, for each distance that we work we ought to select the band that will lay down the best signal with the least power. By all that is sensible, there ought to be in every amateur station a device for reducing the power, after contact is established, to that which just gives comfortable communication—and instead, like senseless galoots, we’re all striving to be QSA5 R9 at every point on the globe simultaneously! Again allowing every opportunity for free choice, amateur radio offers so many facets that the diversification of individual activities, with resultant diversification of operating hours, ought to be practiced for its own merits as well as being a positive relief to the interference situation. There are many other things that might be mentioned, things that QST has preached for many years but which still apply: Clean the whiskers off of your signals; the rest of us now demand it. Although friendly intercourse is the very breath of ham radio, remember to be considerate of others. Cut out the long calls; if the fellow tunes to you, he’ll hear a short call; if he doesn’t tune to you, he’ll never hear you in a million years. Use break-in; it’s about the best-known interference minimizer but its chief merit is that it’s swell sport. One of the dumbest things we hams do is pile on top of each other, six deep, at the low-frequency end of our harmonic family, simply for the sake of being able to double into the successively narrower high-frequency bands—leaving large green pastures of relatively open space in the middle portion of the band. One simple escape from the fantastic snarl of QRM which decorates our low-frequency edges is to blow yourself to an additional crystal for one of those frequencies in the less-congested central part of the band that does not double into a higher band. It is still a good com-
Municating frequency and if it is more difficult to raise a QSO from such a frequency it only proves that we haven’t yet organized our operations as intelligently as we might.

Amateur radio is often spoken of as a many-mooded mistress, all things to all men. We should know her better than we do. In the infinite variety of her charms there is increasing joy. And from the practical ham standpoint, by diversification of activity and the application of a little common sense, there is relief from much needless interference.

---

**Strays**

From W2DTE comes a clipping from one of the New York papers in which the radio “expert” advises an anxious reader that blue glow in an 83 is a sign of gas and indicates a defective tube that should be replaced!

To prevent ruining a 59 should the crystal in a Tri-tet oscillator refuse to “go,” Clyde B. Trevey of Beaumont, Texas, suggests connecting a flashlight cell in series with the grid lead to provide a little fixed bias. Without this protection the screen is likely to get hot and cause abnormal plate current to flow, especially if the screen voltage is much over the recommended 100 volts.

Keeping up with the “midget” spirit of the times, W9LWB has a miniature QSL card. Measuring a little less than 2 by 3½ inches, it’s just about the size of the ordinary calling card.

It seems that silvering is not the only way to lower the frequency of a crystal. W6QF, wanting to shift to a slightly lower frequency in the 75-meter 'phone band, rubbed his 160-meter crystal gently with aluminum powder, cleaned off the edges, and found that the second harmonic had shifted six kilocycles, which was plenty to clear a heterodyne.

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**Magnetic Materials at Radio Frequencies**

Recent revival of interest in the use of radio-frequency transformers having magnetic rather than the more usual non-magnetic (air) cores has directed particular attention to late developments in high-permeability materials for use in r.f. transformers. An impartial survey of the present knowledge of magnetic materials and compositions has been made by a sub-committee of the Radio Research Board of the Department of Scientific and Industrial Research, of Great Britain. The results of this survey are given in thorough and comprehensive fashion in Radio Research Special Report No. 14, “Magnetic Materials at Radio Frequencies,” by F. M. Colebrook. Copies of this report are obtainable from the British Library of Information, 270 Madison Ave., New York, at 17 cents each.

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W9LQE spent a few sleepless nights wondering why a supposedly good r.f. choke wouldn’t do its stuff in his final amplifier, only to discover later that the choke was OK when the milliammeter behind it was shorted out. Things returned to normal when one of the choke pies was short-circuited to compensate for the added inductance of the meter. A by-pass from the “cold” end of the choke to ground or across the meter terminals should also cure troubles of this sort.

An automobile headlight bulb makes a cheap substitute for an antenna ammeter, having such low inductance that the tuning of the antenna circuit is not disturbed. The 15-candle-power size is about right for a 10 with 50 watts input. An old stunt—but it may be overlooked now and then.

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**LI’L’ BRASS KEY**

(You know the tune)

My rig and I live all alone
Right upstairs, where we hold our own.
I pound brass from morn till night,
And the way I work is sure & fright.
Hiyi, Hiyi, you and me,
LI’L’ brass key, don’t I love thee!

The signals roam to who knows where,
Maybe here and maybe there.
If an Aussie hears it, goodness me,
I’ll be happy as can be.
Hiyi, Hiyi, you and me,
LI’L’ brass key, don’t I love thee!

I call ZL’s and Aussies too,
But no matter what or who,
I can ne’er an answer get,
ALL I do is sit and fret.
Hiyi, Hiyi, you and me,
LI’L’ brass key, don’t I love thee!

I called an “X” the other day,
He came back as if to say,
What a note, boy, what a note!
Sounds like a frog wid a clogged up throat!
Hiyi, Hiyi, you and me,
LI’L’ brass key, don’t I love thee!

Once a guy was calling me,
I was so happy as could be,
But when the poor soul gave his call
As W9-, ‘twas nothin’ a’ tall.
Hiyi, Hiyi, you and me,
LI’L’ brass key, don’t I love thee!

I called an “X” the other day.
He came back as if to say,
What a note, boy, what a note!
Sounds like a frog wid a clogged up throat!
Hi yi Hiyi, you and me,
LI’L’ brass key, don’t I love thee!

I’ve also called some PY2’s,
But of course I went and blew a fuse,
I threw the pliers at Ye Olde Two Ten,
Called it a day and left the den.
Hiyi, Hiyi, you and me,
Dern old rig, you frustrate me!

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8 QST for
Increased Radiating Efficiency for Short Antennas
A Tuned-Top System for Amateur Frequencies
By R. B. Dome*

Antennas necessarily foreshortened because of the space limitations that afflict many amateur installations are a real handicap to station performance. Although the problem has received occasional attention, no particular design of predictable performance that could be applied generally has heretofore been available to amateurs. The novel system of tuned loading developed by a fellow amateur, W2ETH, and described by Mr. Dome in this article, therefore is welcomed as a promising solution of one of our most vexing problems. The development should be of interest to every amateur.—EDITOR

OPERATING at 80 and 160 meters where space is limited, usually results in the necessity of increasing the transmitter power to make up for the low efficiency of the antenna installed in the restricted area. Such practice is wasteful of power and equipment besides being much more expensive initially. It is the purpose of this paper to describe a new method of tuning relatively short antennas to render them as effective radiators as possible for their height.

The inefficiency of short radiators results from two causes: First, the relatively high ground connection losses caused by the passage of relatively large current into the earth whose resistance is usually high in amateur installations where good grounds are hard to obtain; and second, the vertical field pattern is such that the ground-wave to sky-wave ratio is relatively low, resulting in the transmission of power in directions not generally useful.

The first cause of inefficiency is much more important. Let us consider the case of a simple vertical wire antenna λ/8 in height. Its radiation resistance is 6.8 ohms and the ground resistance, let us say, is 10 ohms. Let other losses be considered negligible. For every 100 watts of power fed into the antenna, then

\[
\frac{10}{10 + 6.8} \times 100 = 59.5 \text{ watts are wasted in the ground, while only 40.5 watts are radiated. Now if we should by some means increase the radiation resistance referred to the base of the antenna to 200 ohms, we would find the power wasted would be but } \frac{10}{200 + 10} \times 100 = 4.75 \text{ watts and the power radiated 95.25 watts. The radiated power has more than doubled and the field strength increased to 164\% of its first value. It is seen that it is very much worthwhile, then, to increase the base radiation resistance; or, in other words, to lower the current in the ground lead.}
\]

The first expedient, and one which has been practiced commonly, is to erect a flat top on the antenna. The current is no longer zero at the top of the vertical section as it formerly was. The current at the base has been decreased somewhat, indicating that the base radiation resistance has increased. The ground losses will be less and the  

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useful radiated power thereby increased. It is seen that if we could go all the way, and reduce the ground current to zero, all of the power put into the system would be radiated. It is the purpose of the system of antenna construction described here to achieve this condition practically.

**TUNED TOP DESIGN AND ADJUSTMENT**

A study of transmission line theory shows us that we must provide at the top of the vertical wire a suitable reactance to space so that the current distribution may be such as to obtain a current node at the earth. This reactance consists of a series inductance and capacity of the proper values to satisfy the equation

\[ Z_2 = jZ_e \cot \theta = j(\omega L - \frac{1}{\omega C}) \]  

where

- \( Z_2 \) = top reactance
- \( Z_e \) = antenna surge impedance
- \( \theta \) = electrical length of the vertical section (in degrees)
- \( L \) = inductance at top
- \( C \) = capacity at top

\( \omega = 2\pi f \) (\( f \) in cycles per sec.)

This equation is presented in graphical form in Fig. 1 for \( Z_e = 400 \) ohms, which corresponds to a wire 0.1 inch in diameter. This curve will serve closely enough for the average installation where the wire size is anywhere from No. 6 to No. 14. The curve shows the reactance required from the top of the antenna to space for antennas of heights up to a half-wave length.

The capacity part of the reactance is conveniently made up of a sphere, a disc, or a cylinder of metal. The capacities of these bodies may be easily calculated from these formulas:

1. Sphere \( C = 0.56 d \ \text{micro-farads} \)
2. Disc \( C = 0.354 d \ \text{micro-farads} \)
3. Cylinder \( C = 0.802 d \ \text{micro-farads} \)

where \( d = \) diameter in centimeters. The cylinder is also \( d \) in height. One inch being equal to 2.54 centimeters, the capacity of a 20-inch sphere would be

\[ C = 0.556 \times 20 \times 2.54 = 28.2 \ \text{micro-farads} \]

<table>
<thead>
<tr>
<th>Ground Resistance (Ohms)</th>
<th>Wire Size</th>
<th>No. of Turns</th>
<th>Length of Winding (Inches)</th>
<th>Inductance (Micro-henrys)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>2.5</td>
<td>20</td>
<td>6</td>
<td>178</td>
</tr>
<tr>
<td>15</td>
<td>3.5</td>
<td>14</td>
<td>8.5</td>
<td>122</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>0.25&quot; tubing</td>
<td>20</td>
<td>70</td>
</tr>
</tbody>
</table>

**TABLE II (1875 kc.)**

<table>
<thead>
<tr>
<th>Ground Resistance (Ohms)</th>
<th>Wire Size</th>
<th>No. of Turns</th>
<th>Length of Winding (Inches)</th>
<th>Inductance (Micro-henrys)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>5</td>
<td>14</td>
<td>12</td>
<td>356</td>
</tr>
<tr>
<td>15</td>
<td>7</td>
<td>8</td>
<td>17</td>
<td>244</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>0.25&quot; tubing</td>
<td>40</td>
<td>140</td>
</tr>
</tbody>
</table>

**TABLE III (7150 kc.)**

<table>
<thead>
<tr>
<th>Ground Resistance (Ohms)</th>
<th>Wire Size</th>
<th>No. of Turns</th>
<th>Length of Winding (Inches)</th>
<th>Inductance (Micro-henrys)</th>
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</thead>
<tbody>
<tr>
<td>25</td>
<td>1.31</td>
<td>25</td>
<td>3.15</td>
<td>93.5</td>
</tr>
<tr>
<td>15</td>
<td>1.85</td>
<td>19</td>
<td>4.5</td>
<td>64</td>
</tr>
<tr>
<td>5</td>
<td>4.75</td>
<td>3/16&quot; tubing</td>
<td>10.5</td>
<td>36.8</td>
</tr>
</tbody>
</table>

The turns are spaced a wire diameter except those wound with tubing. A clip is provided for changing the inductance by shorting out turns from the end connected to the sphere.
Fig. 2 shows these capacities graphically for various diameters.

Where a sphere of inconvenient dimensions would be called for, a disc may be substituted conveniently. The wind resistance of a disc is almost negligible in comparison with the wind resistance of the equivalent sphere or cylinder. The spheres, discs, or cylinders need not be solid bodies, however, but may be made up of screening, well-soldered, or of a network of wires.

In order that losses in the inductance be kept within reasonable limits, the minimum size of the sphere required is quite definite. With inductances of 0.005 power factor (a reasonably good coil), the size of the capacitor should be at least as large as the one shown in Fig. 3. Of course the body may be made larger with improved results if desired. This curve is based on obtaining 75% of the ideal signal strength improvement possible for grounds of various resistances. It is very nearly exact for all heights of antennas. The curves are for 3750 kc., and twice these capacities must be used for 1875 kc.

The inductance value required is computed from (1), and Fig. 3 shows the inductance required when using the minimum capacity as shown in the same figure. This curve is for 3750 kc., twice this inductance being required for 1875 kc. The inductance coil must be made as low-loss as possible, and may be conveniently placed within the sphere for protection against the weather, as shown in Fig. 4. The coil may be designed from well-known formulas or from charts which have appeared from time to time in various periodicals, textbooks and handbooks. The secrets to low-loss construction are: (1) Use of a good-sized wire or tubing; (2) winding on a form of the skeleton type to reduce dielectric losses; (3) making the physical size of the coil as large as convenient. A convenient diameter form is one about one-fourth the sphere diameter.

Tables I, II and III give the design data for coils which will go within the spheres specified in Fig. 3 and correspond to the inductance values of that figure.

The diagram of connection at the top is shown in Fig. 5. An overall view of a completed antenna is shown in Fig. 6, this being the installation of C. A. Nickle, W2ETH, Schenectady, N. Y., the inventor of the antenna.

The antenna should be tuned in the following way: First, make up field intensity measuring equipment consisting of a battery-operated diode-rectifier, or a crystal rectifier, and couple this to a receiving antenna located about 300 to 1000 feet away from the transmitting antenna. A milliammeter should be provided for obtaining readings. In case no low reading milliammeter is available, a medium range d.c. voltmeter will sometimes give a good indication. As a last resort, a radio receiving set may be used as a measuring device, although care should be taken to see that no adjustments are made throughout the test which might affect the sensitivity.

Starting with zero turns in the coil, increase the turns one by one, recording the field strength obtained from each adjustment. A point will be reached where a sudden drop in field strength is observed. The maximum field strength is found to occur just before this drop. It is well to leave the antenna coil adjusted a turn or so fewer than the maximum point. During this test care should be taken to see that the output of the transmitter is kept constant by always loading to the same plate current. The frequency likewise must not be allowed to vary. The latter may be checked against a standard oscillator by the heterodyne method. It will be found that a good coupling and tuning circuit at the base of the antenna, for the adjustment at the top for maximum signal strength, is a simple parallel tuned circuit, one side connected to the antenna and the other to ground. If an ammeter is used to indicate current, it should be placed in the antenna lead-in.

LINEAR TUNING

An alternative method of obtaining the inductance required is to make use of the properties of a transmission line. With an antenna system constructed as shown in Fig. 7a, it has been found that a position for the jumper J can be found which will give a maximum field strength. Note that no coil is used, the inductance looking into
the line A-B being the inductance required. However, this holds only for antennas approximately a quarter-wave long. For antennas less than a quarter-wave but greater than an eighth, the jumper J must be replaced by a good inductance which is adjustable. This is shown in Fig. 7b. For antennas less than an eighth-wave, the inductance is best split into two parts as shown in Fig. 7c. Note that all of these methods permit easy adjustment from the ground. Fig. 7d shows the jumper J replaced by a variable capacitor; this arrangement is used for antennas between a quarter and three-eighths wave in length. For antennas from three-eighths to a half-wave, nothing other than the capacitor at the top is needed.

Fig. 8 shows the results of a test made on 7150 kc. Curve 1 is for a simple wire showing field strength vs. height of antenna for constant transmitter power. Curve 2 is for the same wire but with a 12-inch diameter sphere at its top with no inductance. Curve 3 is for the same sphere carefully tuned, with a series inductance, for maximum field strength. Note that the inductances and capacities required for 7150 kc. are 52.5% of those shown for 3750 kc. in Fig. 3.

The principles outlined here may be expanded in several directions. For instance, the inductance-capacitor combination may be used at the ends of horizontal doublets to increase their electrical lengths where physical lengths are restricted due to space limitation. Also, a sphere may be used at the lower end of a vertical antenna that must be operated where it is impossible to use a ground, as in mobile equipment.

While the writer has confined his description to the case where the current is reduced to a minimum at the base, W2ETH has found that an adjustment which gives equal current at the top and bottom of the antenna is desirable for some conditions. This adjustment is made using the same equipment as described, except that not quite so much inductance is used as for the case where the current node is at the base. The angle of radiation is slightly higher for this adjustment. On the other hand, by increasing the inductance beyond the point required for minimum current at the base, the radiation can be made largely sky wave with but little ground wave. Such an adjustment will lessen local interference and will cause the reflected wave from the Heaviside layer to come to earth at a point closer to the transmitter and thereby improve transmission at an intermediate distance. The attenuation over longer distances, however, will be greater and this type of transmission therefore is restricted in its usefulness.

With reference to the "wired wireless" suggestion on page 62 of July QST, W2BRB writes that the following circuit constants have been found satisfactory for work over a distance of several hundred feet:

- **Coil**—400 turns No. 30 on 2-inch diameter form.
- **Load tap** (to line) 70 turns from ground.
- **Cathode tap** 90 turns from ground.
- **Load condenser**—0.05-µfd. paper condenser.

The 33, 38, 47, 2A5, and 59 tubes have been found to be satisfactory. R.F. pentode types do not work as well as the audio tubes. The energy radiated into space is very small—no more than that radiated by an oscillating detector. At the low frequency used no interference will be caused by the fundamental but occasionally a harmonic may land on a local broadcast channel. In such a case a slight shift in frequency will move it to a less objectionable spot.
Firing Up on the Newly-Opened Ultra-High Frequencies

Some Successful Experimental Gear for 2½ and 1¼ Meters

By Ross A. Hull*

FOR many years past, we amateurs have had only two ultra-high frequency bands in which to work. The five-meter band, of course, has been the scene of much splendidly successful experiment and communication. The three-quarter-meter band, however, has been virtually unavailable to the ham because of the lack of special tubes operable there.

All that is changed. The ham may now roam with fixed, portable or mobile equipment on any frequencies above 110 megacycles, and many of these frequencies are attainable with ordinary tubes in ordinary circuits. It seems certain that these new ultra-high frequencies will soon be swarming with amateur signals.

Our first bit of experiment in the new frequencies has revealed very forcibly the enormity of the territory available. It would certainly seem that we are to experience many difficulties in finding each other’s signals unless we decide on some particular slices of frequencies for the first work. One plan which looks perfectly practical is to set aside two bands harmonically related to the present 56-mc. band and concentrate our activity in them for the time being. The first one would be 112 to 120 mc. (“two and a half-meter band”)—the second one, 224 to 240 mc. (“one and a quarter-meter band”). Ordinary tubes can be made to work in both these bands and both of them offer tremendous possibilities for short-haul rag-chewing and experiment.

NEW GEAR OR OLD?

Our first thought in preparing to cook up some experimental gear for these bands was that maybe we could modify some of the existing 56-mc. apparatus for the new job. As a result, we wound new coils for a standard transceiver and, after much struggling, obtained fairly satisfactory operation on 112 mc. It soon became obvious, though, that an entire re-arrangement of the oscillator portion would be necessary for really successful work even on that band—let alone the 224-mc. band. The high minimum capacity of the shunt tuning condenser used in most 56-mc. sets and the long leads used in the r.f. circuits made it almost impossible to get any appreciable concentrated inductance in the tank circuit. We do not suggest for a moment that it will be impossible to rig transceivers and the like so that operation can be had in both the 56- and 112-mc. bands. We only know that the problem needs more attention than we have given it.

OSCILLATORS FOR 112 MC.

The next step was to see just what a really effective 112-mc. oscillator would look like. To do this, about a dozen different oscillators were built. The first was a tuned-grid tuned-plate arrangement using a 53 and linear tanks tuned with a sliding bridge on both grid and plate tanks. Fig. 1 shows the circuit. The plate tank consisted of two copper rods seven inches long soldered directly to the two plate lugs on the 53 socket. The bridge was a piece of spring brass bent over the rods to give good contact. Experiment with the grid tank showed that a piece of wire bent into a “U” shape with 1-inch sides was about right. The arrangement worked well, but very careful adjustment of the r.f. choke was found necessary. With the choke turned spaced more or

* Associate Editor.
less than a certain degree the entire arrangement, power leads and all, constituted a powerful 20-meter oscillator. The circuit was, of course, unsuited for receiving because of tuning difficulties. Even the smallest tuning condenser across the two plates pulled down the permissible inductance seriously.

The next attempt was with the unity-coupled rig of Fig. 2. The plate coil was of ¼-inch tubing 2 inches outside diameter and this, hitched directly to the two plate lugs of the tube socket provided oscillation on about 112 mc. Again we bumped into the tuning problem. One partial solution was to make the coil slightly smaller, then connecting a small tuning condenser not from plate to plate but across about an inch of the coil on either side of the center-tap. These two circuits were then rearranged for the use of two separate tubes—a variety of types being used. The chief result was to establish that any of the common tubes and any of the usual push-pull circuits can be made to operate on 112 mc. though some would seem to be more practical than others.

At this stage we gave the conventional single-tube circuits a fling. The old favorite of Fig. 3 was highly successful. With the constants given, it gave excellent output on about 112 mc. and, for reasons yet to be discovered, proved much more stable and "sure-fire" than the arrangements used previously. But again came the problem of tuning. An attempt was made to tune by using a variable condenser for C1. This gave a limited tuning range except toward the minimum settings of the condenser and at these settings oscillation became somewhat unreliable. The same effect was noticed in the 56-mc. receivers of a few years ago.

In an attempt to retain the popular shunt-tuned circuit of Fig. 4 a special type of tuning condenser was evolved—a condenser which would provide a very low minimum capacity and a short path from one terminal to the other. The idea behind the condenser is shown in Fig. 5. Two rotor plates of the shape shown and two stator plates were cut from aluminum and mounted on the frame of a National Type STHS midget condenser. The diameter of the circle on which the stator plates were cut is 1½ inches. With the usual plate spacing provided by the original washers on the rotor shaft, this condenser gave a tuning range from about 110 to 135 mc. Its minimum capacity proved to be very low—the frequency of the oscillator being lowered to only the slightest perceptible degree when the condenser was hitched in place. Such a condenser is, of course, not essential for 112-mc. work, but it would seem likely that some sort of low minimum

FIG. 1—ONE OF THE EARLY 112-MC. OSCILLATORS

L1 and L2 are described in the text. The r.f. choke consists of fifteen turns of No. 20 wire wound on a lead pencil—the pencil being removed. The grid resistor and condenser are 10,000 ohms and 100 µµfd. respectively.

FIG. 2—A UNITY-COUPL ED 112-MC. TRANSMITTER

Offering possibilities for experimental work, particularly in regard to a tuning system, this arrangement might well be given further attention. R1 is 10,000 ohms or more. Other details are given in the text.

FIG. 3—THE CIRCUIT USED IN PRELIMINARY COMMUNICATION TESTS ON 112 MC.

L1, L2—A single ¼-inch turn each of 14-gauge antenna wire.
C1—100-µµfd. fixed condenser.
C2—0.004-µfd. fixed condenser.
R1—10,000 ohms for transmission, 50,000 or 100,000 for reception.
RFC—Two feet of 28-gauge wire wound on a 1-meg. grid-leak form.
A 100-µµfd. condenser across R1 may be found desirable.

FIG. 4—THE COMPLETE RECEIVER CIRCUIT SHOWING THE SPLIT-STATOR TUNING CONDENSER IN PLACE

The constants throughout the circuit are the same as in Fig. 3 even though C3 and C4 were transposed by the draughtsman. C5 is the special condenser described in the text and illustrated in Fig. 5. A 100-µµfd. condenser across R1 may be found desirable.

FIG. 5—THE SPECIAL CONDENSER PLATES FOR THE CIRCUIT OF FIG. 4
THE 224-MC. TRANSMITTER OR RECEIVER SHOWN IN FIG. 7

This type of equipment, especially if provided with condenser stator plates of special design, would seem likely to provide one solution to the problem of providing a tunable oscillator for the frequencies between 224 and 240 megacycles. The 100-µfd. condenser across the grid resistor is not shown in the circuit and is not always an essential.

capacity and short path condenser will become popular.

The arrangement of Fig. 4, then, is the most effective of all the arrangements tried for either transmission or reception on 112 me. As a receiver, the tube super-regenerates splendidly with a grid resistor of 50,000 or 100,000 ohms. Antenna coupling may be provided either with a very small condenser connected to the grid of the tube or, preferably, with a single-turn antenna coil mounted between $L_1$ and $L_2$. The most desirable tube so far operated in this rig is the 37 for transmission and the 76 for reception. Even with 400 volts at 40 ma. the 37 still seems willing to accept the consequences—and has for a dozen hours or so.

Fig. 6 shows another slightly different type of oscillator which shows great promise—particularly for the still higher frequencies. In this case, the inductance consists of two copper strips $S_1$ and $S_2$ mounted on stand-off insulators and connected to grid and plate of a 37 tube. For 112 me., the strips were 1-inch wide and 15 inches long, spaced about $\frac{1}{4}$-inch. Tuning is accomplished by sliding a copper plate $P$ over the ends of the strips and about $\frac{1}{4}$-inch above them. Some decent mechanical arrangement for mounting and sliding this plate is yet to be provided. The affair works well, however, and offers definite promise. The tuning effect is obtained, as will be guessed, by shorting the strips as far as r.f. is concerned by the capacity between the strips and the plate.

A 224-MC. OSCILLATOR

This scheme for a transmitter is really the outcome of the experimental 224-mc. rig shown in Fig. 7. The idea was to use two stator plates of a split stator condenser for the tank inductance of the transmitter or receiver. This particular condenser was built by dismantling a National SEU 20 condenser (it is the one with four very heavy gauge plates) and mounting each stator plate on a separate pair of machine screws. One end of these plates was connected to grid and plate of a 37 tube, the other ends being by-passed with a midget 100-µfd. condenser. The actual circuit is, of course, the same as that of Fig. 4 or 6. Dizzy contraption that it is, the thing oscillated well on about 230 mc. and could be tuned to higher frequencies by meshing the rotor plates with the stator plates—the reverse of what one would expect at first thought. Incidentally, to reduce the lowest wave-length at which circuit will oscillate it is only necessary to reduce the spacing between the stator plates—though possibly this would hold good over only a limited range of plate spacings. Here, though, is a thoroughly practical and smoothly tunable 224-mc. band transmitter or receiver!

Limited time has made it impossible for us to do much actual communication with these rigs with the idea of discovering how these new (to us) frequencies work, but it seems that we can at least expect a performance closely similar to that of 56 me. One great advantage that the new bands offer is that highly directive antennas can be built without getting a very clumsy structure. And directive antennas for both transmission (Continued on page 88)
WEBSTER'S definition of a club is "an association of persons to promote a common object, or for good-fellowship." How well this applies to our A.R.R.L! American Radio Relay League members are in reality members of a huge amateur radio club; the unfortunate thing is, however, that the members of this club are too widely scattered ever to hope to get together for unified meetings. How, then, are these club members to get together? You all know the answer: Aside from contacts "over the air," A.R.R.L. conventions and hamfests make possible a certain amount of personal contact between members, but these are only occasional affairs and do not occur with any fixed regularity in every section of the country. The real mediums for personal contact between A.R.R.L. members are the A.R.R.L. affiliated clubs. These local groups (for affiliated clubs are for the most part groups of amateurs from their own local areas) meet regularly weekly, bi-monthly, monthly, etc., and are composed essentially of A.R.R.L. members; a meeting of any affiliated club is, we might say, a local meeting of A.R.R.L. members. This is true to-day more than ever before, for at its 1934 annual meeting the Board of Directors, A.R.R.L., set forth a new policy concerning club affiliations. This policy was explained in the report of the Board Meeting (June QST), but we are repeating it here for the edification of club members who may have missed it heretofore. Every member of an affiliated club should be familiar with this new ruling.

RE: CLUB AFFILIATION WITH A.R.R.L.

At the 1934 meeting of the A.R.R.L. Board it was voted: (a) that it is the policy of the League not to grant affiliation to any amateur society unless the articles of the applicant society lodge the control of its affairs in licensed amateurs; nor unless 60% of the licensed amateurs belonging to the applicant society are also members of the League; (b) that the communications manager is directed to make a suitable survey of the affiliated clubs at the end of each year; and (c) that it is the policy of the League to terminate the affiliation of any society found by such survey not to comply with these conditions. This simply means that the articles of any given club must be so written that control of its affairs is vested in licensed radio amateurs, and that at least 60% of these licensed radio amateurs must be A.R.R.L. members. Officers of clubs now affiliated should take immediate steps to assure that their club constitution and by-laws are in accord with these requirements. Officers of clubs wishing affiliation should, with their applications, give the language of the articles, the calls of licensed amateurs and the names of League members.

The wording in the constitutions of three active clubs relative to the "licensed amateur control" clause may be of assistance to other clubs in lining up the necessary changes in their constitutions: The Sheridan Amateur Radio League (Wyoming) does it this way:

"Only licensed amateurs may vote on any question or for any officer in S.A.R.L."

The San Diego Radio Amateur Association words it thus:

"Members shall be of two kinds, Regular and Associate. Regular members shall be in possession of a valid amateur radio operator License. Associate members shall be those not in possession of such a license who have a genuine interest in Amateur radio. Upon application, candidates may become members by a majority affirmative vote of the members present at the time of application. Only Regular members shall be entitled to vote upon any matter which concerns the business or opinion of the organization. Only regular members shall be eligible for office."

The Indianapolis Radio Operators Club has amended its constitution as follows:

"Members. There shall be three classes of members, Resident, Non-Resident, and Junior. The non-resident members shall be those residing outside of Marion County. The membership shall include only persons who hold an amateur operator's license. They shall be of good moral character, and if their station is inactive for a period to exceed six months they shall be dropped from the club automatically. Junior members shall have no voting rights."

These are but three examples of wording to comply with the Board's "licensed amateur control" ruling. A possible change to the third example might be to define junior members as those not holding amateur operator licences and with no voting rights. The exact wording is, of course, up to the decision of each individual club, and may best be determined by discussion at the club meetings. The ruling concerning 60% A.R.R.L. membership of the licensed amateurs controlling club affairs speaks for itself.

CLUB ACTIVITIES

The great outdoors is claiming most club activities at this time of year! Hamfests, field days, picnics, 56-mc. work, portable tests—with all these outdoor doings we find clubs keeping the ball rolling throughout the summer. Then, as usual, we find the club workshops showing signs of the rebuilding fever, which the QRN-days always bring to light. We are reminded of an incident recounted to us by W3AAJ, Richmond Short Wave Club. It seems that a bunch of club members were recently enroute by automobile to a hamfest some miles away. In true ham fashion they had rigged up 56-mc. gear on each car. As
the leading car would reach the top of a grade or round a particularly "dangerous" curve, the chap operating the 56-mc. gear would signal the rear cars, "Road clear ahead. Open her up." Whereupon the other carloads of hams would forge ahead past any other cars on the road, much to the wonderment and consternation of the regular tourists! There's an idea for some 56-mc. fun, especially when there are several cars in the party, but we don't recommend it. Safe enough with amateur radio, it violates most traffic laws and the cops won't appreciate the stunt. Hi!

Some years ago Mr. I. Creaser, W1BSJ, prepared a paper, "Why Does the Radio Amateur Need an Association?" The contents of this paper apply just as well to-day as they did when W1BSJ wrote it. He said, "One of the essential purposes of a radio organization is to serve the amateur by supplying him with those things which he needs in the way of advice, that he may derive the greatest pleasure and benefits along with his own efforts." He went on to point out eight essential principles for proper organization: unity of purpose; common aim; cooperation; specialization; instruction; learning; leadership; and action. How does your club shape up?

A low-power contest is being arranged for the month of September by the Providence Radio Association, Inc. The rules for this contest may offer suggestions to other clubs for a similar activity: Total points for each contact will be derived the greatest pleasure and benefits along with his own efforts. The rules for this contest may offer suggestions to other clubs for a similar activity: Total points for each contact will be derived from one point for 10 watts to ten points for one watt. Similarly, scoring for miles covered will vary from one point for zero to 100 miles up to ten points for more than 3000 miles. Scoring for the band used will be as follows: Eight points for 1.75 mc.; four for 3.5 mc.; two for 7 mc.; one for 14 mc., and two for 28 mc. There will be first and second prizes.

ATTENTION, CLUB SECRETARIES!

It is hoped that this "With the Affiliated Clubs" section of QST can be a regular feature. To a great extent its continuance depends upon your cooperation by sending us news. We desire to make this a chronicle of particularly interesting affiliated-club activities. We won't have room to report ordinary meetings, but information on unusual activities, especially of the type which might benefit other clubs, is earnestly requested.

VISIT THE CLUBS

A good many hundred amateur radio clubs throughout the United States and Canada are affiliated with A.R.R.L. At headquarters we have recorded the addresses of these clubs, their places and times of meeting. Clubs are splendid places to get acquainted with other amateurs and to participate in interesting discussions on amateur radio. Do you want to be put in touch with a club in your vicinity? Would you like to attend a club meeting in another city you are visiting? Address the Communications Manager (enclosing 3¢ stamp, please) for data on Affiliated Clubs in your vicinity.

E. L. B.


1. The Contest is open to all licensed radio amateurs.

2. The Contest will commence at 0001 GT October 1, 1934 and will conclude at 2400 GT September 30, 1935.

3. Licensed power must not be exceeded.

4. Contacts may be established at any hour and on any day during the contest period.

5. One point will be scored for each completed 100 miles of contact, with a specific station (e.g. a contact with a station 99 miles away scores no points, contact with a station 658 miles away scores 6 points). All distances will be measured by a Great Circle line between stations.

6. In computing his final score a competitor may claim points for each different station worked once during each calendar month.

7. Proof of contact in writing may be required by the contest committee.

8. Re R.S.G.B. Award: (a) A minimum signal strength of QSA 3 must be recorded before a contact counts for points. (b) The decision of the President of the R.S.G.B. will be final in all cases of dispute. (c) Entries must reach the Secretary, R.S.G.B., 53 Victoria Street, London, S.W. 1, not later than November 15, 1935.

9. An A.R.R.L. Award Committee shall consider the file of reports and data submitted by competitors to the A.R.R.L. Its decision will be based on: (1) The number of weekly reports to A.R.R.L. on 28-Mc. work, 25%. (2) Equipment description and development work on same, 25%. (3) Number of points in accordance with Rule 5, 50%. Examination of all reports with ratings weighted on these factors will determine the 28-MC. ACHIEVEMENT AWARD. Entries from W/VE must all be received at A.R.R.L. on or before Oct. 15, 1935, to be considered for the A.R.R.L. Award.

A bronze charm will be presented by the A.R.R.L. engraved "FOR 28 MC ACHIEVEMENT OCT. 1, '34-SEPT. 30, '35", and with the call of the winner. One point will be scored for each completed 100 miles of contact. Decision between W/VE competitors will be based on weighted credits. (1) The number of weekly reports to A.R.R.L. on 28-Mc. work, 25%. (2) Description of equipment, and development work reported on same, 25%. (3) The number of points

(Continued on page 49)
Another Simple Solution of Break-in
Its Practical Application in the Crystal-Controlled Transmitter

By Ludlum Smith, W6BJM*

In this enlightened era of horseless carriages and low-cost crystals, where all one hears is "break-in," the lowly ham who would benefit by all three is up against a rough proposition. As long as a self-excited oscillator was the height of something-or-other, break-in could be affected after a fashion by pushing the phones as far forward on the head as possible and letting nature take its course. This little stunt may or may not have been hard on the phones, depending on the power of the transmitter, but it certainly wasn't any too satisfactory. At any rate, the increasing prevalence of crystal control has changed things considerably. The customary amateur receiver is still either a detector and one-lung or a tuned r.f.—greatly re-vamped, to be sure, but the same old story, nevertheless. On the other hand, it is usually impossible to use the receiver at all with the crystal oscillator running in the same band, without resort to an extensive shielding campaign.

So it is that, to the amateur not having the facilities of R.C.A., break-in is a compromise at best. As long as the transmitter and receiver are both located at the same place, the transmitter must stop during reception and the receiver must be off during transmission. There's no getting around that. Even with a "sniggle-sniggle," when working close to the transmitter's frequency, such must be the case. In high-speed work, with a bug screwed up to the last notch, complications are bound to set in.

The object of this article is to describe such complications and to explain the method by which each was overcome as it presented itself. The solutions to these problems are not difficult, nor do they require a great amount of originality. In fact, very few of the ideas to be presented found their origin in the writer's mind. Rather, they are an accumulation gained by observing other amateurs' methods and moulding them into a satisfactory unit. Incidentally, most of these ideas have been previously described in QST from time to time and may or may not have been taken advantage of already by the reader. As to outlay of cash, nearly all required parts should be lying around the shack somewhere, or should be easily available by the customary recourse to "swap." Let it be said that those were the only two methods used here.

By keeping one eye on the accompanying diagram as you read what follows, the "modus operandi" is easily comprehended. Let us take the first step toward good break-in operation. When the key is pressed, the receiver must cease to function—at least as far as the ears are concerned. This disabling may be accomplished to a greater or less extent by one of three methods; the antenna may be grounded, the plate supply disconnected, or the phones disconnected. In actual practice only the last is easy on the hearing, and then only when breaking the phone circuit does not open the plate supply. In other words, the phones must be connected to the last audio stage either through a condenser and impedance arrangement, or with an output transformer. This works in very conveniently with what is to follow since one side of the phones may be connected to ground. Probably the easiest parts to obtain are an audio transformer (with the primary and secondary in series for use as an impedance) and a coupling condenser of whatever capacity is available—somewhere between 0.1- and 1-µfd. Experience has shown that regardless of what values the parts in diagrams have tacked on them, the value actually used is the one at hand—and it usually works, which is more to the point. When this much is finished, it will be found that the phone circuit may be closed and opened as rapidly as necessary without the slightest aural discomfort. In fact, were it not for the background and signals, it would hardly be noticed.

The output lead from the receiver is brought to a double-contact relay, and connected to that contact which normally closes the circuit when the relay is open—that is, when the field is unexcited. The phone jack is connected between the relay armature and ground. Thus the phones are normally in a position to receive signal impulses from the receiver. The relay field is excited when this much is finished, it will be found that the phone circuit may be closed and opened as rapidly as necessary without the slightest aural discomfort. In fact, it would hardly be noticed.

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Now, after the key has been jiggled up and down awhile, the utter blankness that is encountered when the key is down may be found to interfere with the ability of the operator to send clearly. Most of us like to hear something when we send, for obvious reasons. It is therefore necessary to hook up some kind of sounding device to the

* 20 Hillside Ave., San Anselmo, Calif.
other relay contact so that the 'phones will be connected to it during the interval of sending. At first glance this might look like an excellent opportunity to drag in the freqmeter-monitor and arrange matters accordingly. But not so! We still want to work on the frequency of the transmitter occasionally. While it might be a good idea to go a step beyond the ones described here, and use a change-over switch so that the monitor can be connected in place of the audio oscillator when desired, for practical purposes the audio oscillator alone is the best bet. No description of that particular breed of animal is needed, save that it would be worth while to replace the off-on filament switch with a rheostat in order to vary the tone. If a fixed note is desired, a carbon resistor of suitable value may be inserted in the grid. Note that the plate return must be made through a common ground. In other words, the positive lead of the battery is grounded. This will be a terrific shock to the lads who have grounded the negative from time immemorial.

Perhaps a word on the intricacies of the relays would be helpful. If the only ones available have but one set of contacts, try putting on an extra insulated one, arranged so as to make contact with the armature when the field is open. Usually an old "B" supply or "eliminator" will have a relay with two contacts already on it. If the resistance of the field is too low it's a simple matter to rewind it with what it

THE AUTHOR'S STATION, W6B JM, WHERE HIS SIMPLE SOLUTION OF BREAK-IN IS APPLIED TO THE TRANSMITTER AT THE LEFT

The stage line-up is 47 crystal oscillator, 46 buffer-doubler and 211 final, the latter customarily doing business on the 3.5- and 7-mc. bands with 175-watts plate input. The operating position, with receiver and whatever, is at the left. Not to be overlooked, under the table, is the mimeograph from which pours "that masterful rag, QSA5!"

wise to state that such a stunt should not be tried with the crystal running "free"; that is, without the rest of the transmitter coupled to it. When this is done it usually sounds like a very poor self-excited rig with crystal control—if such a thing can be imagined. The only way to try the experiment is to be sure the transmitter is properly tuned and neutralized, arrange some sort of fixed grid bias for all amplifier stages, and connect the keying relay to the center tap of the oscillator. One trial will convince the wildest skeptic.

For those who are horrified at the mere mention of interrupting the oscillations of the crystal stage, suppose we compare it with the conditions existing in its normal operation.

The crystal is or is not temperature-controlled. In either case it is customary to start and stop it whenever desired without serious effects on the frequency stability. Of course, it must start without such coaxing as running over and rapping the holder with a pencil, axe, or whatever the operator happens to have in his hand at the moment. The oscillator must not be loaded so heavily that one wonders how it works at all. Whether starting and stopping it at normal keying speeds will affect the crystal's frequency stability more than, or as much as, running it continuously is something for the engineers to figure out. It certainly does not change it enough to be noticeable in a monitor. It might be a good idea to bear in mind that the oscillator is not the

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final amplifier, and to curb the urge to put a couple of thousand volts on it. After all, when one breaks down and confesses, very few amateur transmitters, temperature-controlled and all, have a great deal in common with WWV; and it's a pretty fair bet that the old rig will stay just as close to its supposed frequency when the oscillator is keyed as when it is the final that makes the transmission more or less intelligible. Last and least, it's sure death on key-clicks.

Crystal keying is really more prevalent than some might think. It was only after working five or six of the best signals imaginable and having the operators say something to the effect, "... keying crystal hr . . . .," that it was considered.

RF.AMP

The last straw was an exceptionally fine rag chew with W9AAB, who said, "Too bad ur not key ing xtal. We cud use bk-in. Why don't u try it?"

Well, that's enough of that. Let's take a peek at the conditions which must be fulfilled to do the trick satisfactorily.

(1) The crystal must be a fairly stable oscillator. If it isn't it's no good anyway. Either a good X- or Y-cut rock, in a proper mounting, seems to operate as well as ordinarily, and three or four hundred volts on the plate ought to be enough to drive the next stage decently without running the risk of damaging the crystal.

(2) All succeeding stages must be sufficiently neutralized to preclude the possibility of any one of them breaking into oscillation.

(3) All succeeding stages must have cut-off close, and it must be a heavy enough resistance to dissipate safely the power lost in it. At the above figures a 75-watt 6000-ohm wire-wound resistor is used, with taps that can be scooted up and down freely and easily, allowing for very close adjustment of grid voltage. Incidentally, although this is another time when the positive is grounded, nothing has blown up as yet.

By another quick glance at the diagram it is seen that upon closing the filament switch the bias unit is also started up, but that closing the plate switch has absolutely no effect until said unit is operating satisfactorily. By the same token, should anything occur to disrupt the operation of the unit, the bias-circuit relay, which has suddenly assumed the impressive name of (Continued on page 80)
AMONG the irritants that return to plague us at least once in every so often is the problem of figuring the resistor values for the voltage divider of a plate power supply. We were reminded of this little matter on a sultry day, recently, while sitting with H. T. Hayden, W2FO, in conversation on life's little problems in general and those of hams in particular. It wasn't at all illogical that the question should arise, either, because W2FO, in his work with Ward Leonard, has been called upon to work out almost every conceivable combination in voltage dividers; hundreds of them, in fact.

"It's surprising," said he, "how many amateurs—and engineers, too, for that matter—seem to be completely stumped when it comes to figuring out even the simplest kind of plate-supply voltage divider, although it's really one of the easiest jobs in the world—provided you know Ohm's Law and start in the right place."

"Then, it's high time we had it," said we. And here it is.

First of all, let's make sure that everybody has Ohm's Law straight. You say everybody knows it? Well, we'd like to believe that every amateur is completely familiar with this simple relationship between voltage, current and resistance—the cornerstone of all electrical and radio calculations—as it is given in Chapter Three of the Handbook, for instance. But we have our suspicions. Only recently we were told that an inquiry to a representative group of radio servicemen, many of whom are amateurs, revealed that the majority did not know Ohm's law and could not apply it to a practical problem! Perhaps an all-amateur group would make a better showing; but just to be on the safe side—

Current = \( \frac{\text{Voltage}}{\text{Resistance}} \); \( I \) (Amps.) = \( \frac{E \text{ (Volts)}}{R \text{ (Ohms)}} \)

And the other practical forms in which we shall have occasion to use this relationship in connection with voltage divider design:

\[ R = \frac{E}{I} \text{; and } E = IR \]

Since the current value, \( I \), must be in amperes, the usual milliampere values must be converted to decimal fractions of an ampere in making the calculations. (100 ma. = 0.1 amp., 10 ma. = 0.01 amp., etc.)

Now for the second important point—starting at the right place. The wrong place to start is at the positive end of the divider. The negative end is the right place to start. Then, knowing the value of the resistor bleeder current, the voltage delivered by the power pack, and the current and voltage values at each tap, the rest is easy. Let us take a typical problem to illustrate the method.

As diagrammed in Fig. 1, our divider is to deliver 750 volts at 40 ma., 500 volts at 50 ma., and 300 volts at 20 ma. from a 1000-volt rectifier-filter system. Now for the purpose of designing the divider the current delivered from the 1000-volt terminal is of no importance except in so far as it may affect the power supply voltage regulation. But it is essential that the current drawn from each of the taps on the divider be known, at least to a close approximation. The bleeder current is chosen as 15 ma. in this case, which is a fair value.

The resistance values for the individual sections are calculated in the alphabetical order shown, beginning with section A at the negative end. The voltage across this resistor will be equal to the voltage indicated for the first tap, 300 volts. Since the only current that flows through section A is the bleeder current of 15 ma. (0.015 amp.), the resistance value will be

\[ R_A = \frac{300}{0.015} = 20,000 \text{ ohms.} \]

The current through section B will be the bleeder current plus the 20 ma. taken off at the 300-volt tap or 35 ma. (0.035 amp.) The voltage across B is, of course, the difference between the voltages at its ends; that is, 500 volts minus 300 volts, or 200 volts.

\[ R_B = \frac{200}{0.035} = 5714 \text{ ohms (5700 O.K.)} \]

The resistance of section C is similarly calculated, the current through it being the bleeder current plus the current to each of the taps below it, or 85 ma. (0.085 amp.)

\[ R_C = \frac{250}{0.085} = 2941 \text{ ohms (3000 O.K.)} \]

Finally, the resistance of section D is calculated, the current through it being the bleeder current plus the current to all the lower-voltage taps or 125 ma. (0.125 amp.)

\[ R_D = \frac{250}{0.125} = 2000 \text{ ohms.} \]

**Dissipation and Voltage Ratings**

Now it isn't enough to know just the resistance values in order to pick the resistor units for the divider. You must know also the power dissipa-
tion rating required of each unit. We must remember that, while we may think of the resistor in terms of its voltage drop, it is actually a power-consuming device; and that all the power consumed is converted to heat which must be dissipated by the resistor. This power is equal to the voltage across the resistor multiplied by the current through it. That is,

\[ P = VI \]

Alternatively, the power is equal to the resistance multiplied by the square of the current,

\[ P = IR^2 \]

FIG. 1—PROBLEM: DESIGN A VOLTAGE DIVIDER

It's one of the easiest jobs in the world—provided you know Ohm's law and start in the right place.

Dissipated power (watts) = \( P = E \times I \) (volts) \times (amps.)

The answer will be the same. Taking the voltage and current values, the very minimum dissipation ratings required of the resistors of our example will be as follows:

\[ P_A = 300 \times 0.015 = 4.5 \text{ watts} \]
\[ P_B = 200 \times 0.035 = 7.0 \text{ watts} \]
\[ P_C = 250 \times 0.085 = 21.25 \text{ watts} \]
\[ P_D = 250 \times 0.125 = 31.25 \text{ watts} \]

At this point it is advisable to say something about the dissipation ratings given to resistors by their manufacturers. Since the power is dissipated in heat, it is logical that the dissipation rating should have temperature rise as its basis. As standardized by the Radio Manufacturers Association, the National Electrical Manufacturers Association, and the National Board of Fire Underwriters, the full rate of a wire-wound vitreous enamelled type (the type generally used in voltage dividers) is the load in watts which will produce a temperature rise of 250°C (482°F) at the hottest spot of a two-terminal resistor when it is suspended in air at least one foot away from the nearest object and when the temperature of the surrounding air does not exceed 40°C (104°F).

It is obvious, of course, that the normal rating assigned to a resistor on this basis will be lowered when the resistor is crowded with other apparatus, or other resistors, or where the temperature of the surrounding air runs higher than 104°F. It is, therefore, a safe rule to choose a resistor having a full dissipation rating of twice the calculated power dissipation, at least for the applications usual in amateur equipment. Although resistors may be overloaded within reasonable limits for short periods of time, it is wise economy to avoid doing so by picking a resistor of adequate dissipation rating.

Another factor entering into the safe life of resistors is the voltage across each unit. Insulation between turns of the wire-wound resistors is likely to break down if the voltage should be excessive. One leading manufacturer recommends that there should not be more than 500 volts between the end terminals of a radio-type resistor unit, although admitting that this voltage can be exceeded with impunity in many cases. We know, of course, that 1000 volts have been used across resistors with impunity, if not with complete safety, in many instances, particularly with a resistor of the long skinny type that has more turns per volt.

CHOOSING RESISTOR UNITS FOR THE JOB

Now that we know the resistance, dissipation and voltage-drop values for our divider, the final step in the design process is to pick out the resistors themselves from a list or catalogue of commercially-available types. It becomes immediately apparent that standard units exactly meeting the specifications are not available in every instance. This calls for the exercise of a little personal judgment. After all, as we have learned, successful engineering is about 10% mathematical design and about 90% smart estimating.

In our present problem the A and D sections happen to have round-number resistance values that can be picked right from the catalogue. For A there is a 20,000-ohm 10-watt type listed, while for D we can choose a standard 80-watt 2000-ohm type. But sections B and C are not readily satisfied by any standard types we find listed. A 3000-ohm unit would be satisfactory for C; but both B and C together could be taken care of by a single unit having adjustable tapping bands. A safe choice would be one of 160-watt size having a total resistance of 10,000 ohms. Two tapping bands would be used, one set 5700 ohms from the negative end and the other 1300 ohms from the positive end. In adjusting a band, incidentally, be careful to loosen the clamping screw so that the contact point does not drag on the bared resistance wire when the band is moved. Otherwise the wire may be broken and the resistor spoiled.

THE FINAL SET-UP

In assembling the divider, take reasonable care to allow as much clear space around the resistors as may be available so that there will be free circulation of air to provide cooling. In no case should a resistor be jammed up against a

(Continued on page 78)
Sixth International Relay Competition Results

A N A.R.R.L. DX tournament is always an “Open Sesame” for the radio amateur, bringing new thrills in distance work, new friendships in all corners of the world, and operating enjoyment unexcelled. The Sixth International Relay Competition, March 10-18, 1934, was no exception, breaking all previous DX contest records, both from the standpoint of participation and from accomplishments.

Pages could be written on the magnitude of the “Sixth International,” orators could talk at length on the wonders of present-day radio distance work, but actions speak louder than words—take a look at the list of scores rolled up in this contest!! Forty-eight operators made over 10,000 points! W3ZJ set a new high record for DX competitions with a score of 32,879 (QSO’s with 237 stations); his is an enviable achievement!! NYIAB (operator Vandekamp) came out of the encounter with the highest score outside of the United States and Canada—25,648! This represents QSO’s with 612 stations—it takes operating ability to do that!! And competition was high with 1302 operators represented in the scores; 923 in the U.S. and Canada, 379 in sixty foreign localities. It is estimated that amateurs were active in more than eighty countries.

To the victors go the spoils. In the case of this contest the winner in each A.R.R.L. Section and each foreign locality receives a certificate attesting to his accomplishments. Every winner may feel justifiable pride upon a victory hard earned!

Deserving of special mention are the scores of several “highest scorers” : X1AA 22,722; HC1LC 19,152; EA5BE 15,960; ZL4II 13,650; ZL2CI 13,273; GBY 12,051; EA4AH 11,544; ZLAO 11,480; D4BAR and X1AM 11,349 (tied); K7SA 11,124; CM2JM 10,403; CT1GU 10,296; F3MTA 10,140; ON4AU 10,127. Each of the following, in order of scores, made over 10,000 points: EA1BC, K61DK, VK3MR, K6HQQ, K6BAZ, ZL2GQ, K6BFI, J2GX, VK3WL, ZS2A, F8EX, HP1A, F8EB, VK3XX, G2MA, ZL2GN.

Within the United States and Canada we find the following scores in addition to W3ZJ’s record breaker: W18Z 28,305; W4AJX 22,748; W12I 22,672; W2BHZ 20,081; W5CBY (operator “BZ”) 19,920; W6QD 19,193; W2DC 19,194; W1FII 18,648; W8CRA 18,336; W9UM 16,090; W6CWX 15,072; W9ADN 14,490; W2UK 14,400; W2BYP 14,268; W9IJ 13,896. Highest Canadian scorer was VE2AX with 9036 points. Each of the following, in order of scores, made over 10,000: W1DHE, W9ARN, W2CQX, W9GDIH, W6BYB, W6FZY, W1CMX, W1GSH, W8ZY, W8DVX, W4FT, W1BUX, W6EXQ, W1DJX, W6GRL, W8DLD.

Only six foreign participants worked all fourteen W/VE districts: NY1AB, X1AA, CM2JM, ZL4AI, ZL4AO and HC1LC. The following each worked thirteen districts: G5BY, D4BAR, ON4AU, F8EX, F8EB, X1AM, X1BC, X1CM, ZL2CI, ZL2GQ, ZL2GN, ZL4BT, K6COG, VK3MR.

Credit for working the greatest number of foreign localities goes to W1ZI who worked 52 countries! W1SZ would have equalled this record had it not been for K7 which was really in Alaska and not operating portable on the Pacific Coast!! W1SZ did, however, work 51 countries! W3ZJ was QSO 49 countries, W4CBY (two ops) 49, W8CRA 48, W2UK 45, W4AJX 44, W2BHZ 43, W1FII, W2DC 42, W2BYP 41, W2BSR, W9UM (two ops) 40, W1GSH W1BUX W2CQX 39, W1CMX W2BUX 37, W1DJX VE2AX W8DLD W9IJ W9AEH 36. This represents QSO’s with 612 stations—it takes operating ability to do that!! And competition was high with 1302 operators represented in the scores; 923 in the U.S. and Canada, 379 in sixty foreign localities. It is estimated that amateurs were active in more than eighty countries.

In view of this fact it is a real accomplishment for W6CWX to have worked 32 countries, W7VY 30, W6QD 29, W7BB (two ops) 29, W6EXQ 28 and W6ADP 27!

It has been the practice in A.R.R.L. contests in recent years to make separate awards to the highest scoring amateur in each A.R.R.L. Section and each foreign locality. In this way operators are competing only with other amateurs within their own territories and conditions in different areas do not enter into the contest so much. However, it is always interesting to compare scores to see who made the highest score of all participants. In comparing highest United States scores this year an equalizing factor has been applied such as was suggested in February QST (page 23). The high ten scores in each of the four time zones were averaged to determine the correction factor for each zone. The averages were: Eastern 21,718, Central 11,606, Mountain 1,630, Pacific 11,264. The Eastern Zone having the highest average was used as a basis, with the following multiplication factors being found for the other zones: Central 1.83, Mountain 1, Pacific 2. The Mountain Zone factor is very high, due to the fact that the ten highest scores in that zone ran considerably lower than in the other areas. Applying these factors to compare the highest scorer in each time zone we have: W6CNX (Mountain) 75,100; W6QD (Pacific) 38,400; W3ZJ (Eastern) 32,879; W9UM (Central) 29,400.

OUTSTANDING SIGNALS

Signals from the following foreign stations were reported as outstanding and consistent: In the First U.S. District—EA5BE (most outstanding),
<table>
<thead>
<tr>
<th>Operator</th>
<th>Call Sign</th>
<th>Name</th>
<th>Country/Region</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>QSL 815</td>
<td>WS2J</td>
<td>John Doe</td>
<td>United States</td>
<td>100</td>
</tr>
<tr>
<td>W123456</td>
<td>WA5J</td>
<td>Jane Smith</td>
<td>Canada</td>
<td>90</td>
</tr>
<tr>
<td>KJ23456</td>
<td>N1NOV</td>
<td>Mike Johnson</td>
<td>United Kingdom</td>
<td>85</td>
</tr>
</tbody>
</table>

**Scores**

- Operator of station first-listed in each Section and Country. No. 1 indicates others as indicated.
- Number countries-prefixes (in case of W/VE participants) and number W/VE Stations worked (in case of country-prefixes) shown in parentheses in nearest call.
- Asterisks denote stations not entered in contest, reporting that to set stations they worked get credit.

**Scores**

- Operator of station first-listed in each Section and Country. No. 1 indicates others as indicated.
- Number countries-prefixes (in case of W/VE participants) and number W/VE Stations worked (in case of country-prefixes) shown in parentheses in nearest call.
- Asterisks denote stations not entered in contest, reporting that to set stations they worked get credit.
Awards are being made to the highest scorer in 21 clubs. The winners and their clubs are as follows: W1QV, Amateur Radio Research Club, New London, Conn.; W1DUK, Great Bay Radio Association, East Rochester, N. H.; W1ZW, Fellows Radio Club, Medford, Mass.; W3CGU,
<table>
<thead>
<tr>
<th>Call</th>
<th>Name</th>
<th>Frequency</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>W9AA</td>
<td>John Doe</td>
<td>1500 MHz</td>
<td>Ohio</td>
</tr>
<tr>
<td>W9BB</td>
<td>George Smith</td>
<td>1200 MHz</td>
<td>California</td>
</tr>
<tr>
<td>W9CC</td>
<td>Jane Doe</td>
<td>2000 MHz</td>
<td>Texas</td>
</tr>
</tbody>
</table>

... (Continued on page 44)
The Convention Season Progresses

Large Attendances and High Enthusiasm Characterize This Year's Gatherings

The Atlantic Division Convention

THE Hotel Schenley at Pittsburgh, June 22d and 23d, was a regular beehive of hams representing every section of the division. From the time that “Bill” Martin, W8CNZ, chairman of the convention, called the delegates to order until the award of the last prize, there was not an idle moment. The preparation of this affair, under the auspices of the Amateur Transmitters’ Association, South Hills Brasspounders, Beaver Valley Amateur Radio Club and the Amateur Communications Club, gave evidence, as the program progressed, of careful planning by the committee presided over by A. P. Sunnergren, W8FTY.

Director Woodruff, W8CMP, started the program with a lecture on “Radio Building Blocks” clearly demonstrating how to avoid spending a fortune on the building of a transmitter or other units. Following this, H. L. Buechner of Westinghouse, covered the subject of miniature radio instruments fully and H. V. Noble of the Gulf Research Labs delivered a splendid talk on “Short-Wave Superhet Designs.” Other fine lectures were given by R. S. Kruse and John L. Reinartz. Clark C. Rodimons, W1ISZ, and A. A. Hebert, treasurer, represented A.R.R.L. The convention was honored by having present Chas. H. Stewart, Vice-President A.R.R.L., who spoke on legislative matters in Washington. During the convention two meetings of the ‘phone and traffic groups were held, with Dr. Simpson, W8CPC, and SCM C. H. Grossarth, W8CUG, respectively, in charge. In the traffic meeting W3BYS represented Eastern Pennsylvania and W5GPS, Western New York. W8HD, Hoffman, SCM for West Virginia, assisted as a visitor. Outstanding events of the convention were demonstrations by Dr. Phillips Thomas of Westinghouse and Dr. J. O. Perrine of Bell Laboratories. Motion pictures of the Board of Directors were shown for the first time and Mr. Fabian, W8GJM (through whose courtesy the motion picture projector was obtained) was later responsible for some fine entertainment at the banquet. The efforts of WSBIT, in charge of the prizes, enabled practically every delegate to receive a remembrance.

More than 400 people attended the banquet. Under the guiding hand of Toastmaster Dr. Simpson, the guests, speakers and professional entertainers enjoyed a high degree of conviviality. The climax of the evening was the choice of the next convention city, which, after a spirited contest, went to the Syracuse delegation.

--A. A. H.

The Indiana State A.R.R.L. Convention—South Bend, Ind.

At the Oliver Hotel, South Bend, the registration desk opened to a waiting line at 9 a.m. Friday, June 8th.

The convention itself opened with a bang at 2 p.m. with a trip through the “Silver Edge” Brewery, with plenty of free refreshment for all. This was followed with trips through the local A. T. & T. repeater station; The Indiana & Michigan Electric Company’s power house at Twin Branch, and WP9N, the South Bend Police radio station. The evening was given over to the visiting of local ham shacks. Cars and guides were furnished by local members of the club.

On Saturday morning the Sectional Meetings were held. Cummings, W9FQ, of Valparaiso gave a traffic talk; Crawford, W9CBN, of South Bend, a talk on the N.C.R.; and Bartlett, W9HY, of Indianapolis conducted a talk and general discussion on the subject of ‘phone. After the crowd had assembled in the auditorium after lunch, F. H. Schnell gave a talk on r.f. amplifier efficiency, and a demonstration concerning automatic transmission, code speed, and the proper adjustment of a bug key. Boyd Phelps next gave plenty of good dope on antennas. Following this Professor Johnson (we think that was an alias) set up an elaborate apparatus and gave a demonstration and lecture on improving the output of tubes by coating their envelopes with some chemical, the formula for which was two feet long. Unfortunately an accident resulted in an explosion, ruining his demonstration. After the smoke cleared away, the tube was found to be well coated. Most of those present were not inclined to take this seriously, and some bolder ones even laughed out loud! A short discussion of League policies and happenings at the recent Board meeting was lead by Director Windom of Columbus, Ohio and Rex Munger, W9LIP, of Minneapolis-St. Paul.

The gang assembled during the early evening for the banquet, at which excellent entertainment was furnished in the form of music and songs. After the banquet J. L. Reinartz, W1QP, presented the tales of his trip North.

Sunday morning started off with a talk by F. H. Schnell on antenna measurement and efficiency. This was followed by another talk by Reinartz on antenna mastering; the use of the oscilloscope, demonstrating modulation from zero to over 100% and a new one-tube 5-meter circuit.

September, 1934
The convention ended at noon with the awarding of a large number of fine prizes. Those who remained for the afternoon attended an air circus at the municipal airport. Amateurs from Illinois, Minnesota, Ohio, Michigan, as well as Indiana, were present at the convention, but the real DX record goes to Mr. and Mrs. Frank Libbe, W5BBR, of McAllen, Texas, who registered Friday noon after several days of driving.

Credit for the success of the convention goes to the St. Joseph Valley Amateur Radio Club, which sponsored the convention, the South Bend Chamber of Commerce, the Oliver Hotel, and the various manufacturers who cooperated.

--C. R. Putnam, W9AKJ, Secy. S.J.V.A.R.C.

South Dakota's Convention

The convention this year at Huron, South Dakota, run under the auspices of the Huron Radio Club, proved a characteristic success. Talks were given by Max Staley of KSOO, Sioux Falls; Elmer Bayles, W9BAE; Eddie Smith and Rex Munger. Side trips to various points of interest proved a great attraction but the highlight of the whole affair was undoubtedly a 56-mc. demonstration of communication between plane and ground. In spite of very unfavorable flying weather (a bad dust storm in the morning) W9CFU, piloting the plane, maintained completely satisfactory two-way contact with a pair of ground stations. All three sides of the conversation were fed into a public address system.

Fargo and Valley City, North Dakota and North Platte and two other Nebraska towns were represented as well as a dozen South Dakota points. Everybody had a swell time.

Massachusetts State Convention, Provincetown

Provincetown, on Cape Cod, must be a rather cramped and over-full little town even in the dead of winter. One simple way to turn the village upside down and inside out is to give it some typically beautiful summer weather, bring in about 30 ships of the U. S. Scouting Fleet and then stage a swell ham convention. All those things happened simultaneously on July 28th and 29th.

Sponsored by the Provincetown Radio Club, the convention provided a high time for the several hundred that attended. The technical session, under the wing of New England Division Director George Bailey, brought forth a wealth of dope. Mr. Fletcher of the New England Telephone and Telegraph Company described in detail the new directive 63-mc. telephone link between the Cape and Boston (and did everybody prick up their ears!); John Reinartz covered all sides of the blackboard with circuits and ideas and Mr. MacDonald of the Lighthouse Service gave the inside story of radio beacons. K. B. Warner and Ross A. Hull of Headquarters also talked.

Warner chaired the evening session at which Lt. Myers, U.S.N., lead off with an illuminating description of the part radio plays in Naval maneuvers. Mr. Meeder of the Naval Communications Reserve then discussed the activities of the Reserve and opened the way for Dick Purinton of Raytheon and Arthur Lynhe to continue the technical program. Reinartz followed with a fine showing of his oscilloscope. One highlight of the evening was a demonstration and talk by Theodore McElroy, for many years the world's fastest radio operator. Distribution of a couple of truck loads of prizes carried activities late into the night.

An important feature of the gathering was the presence of many mobile 56-mc. stations. Rag-chewing between the cars around town and en route provided a brand new thrill and left all the gang wildly enthusiastic about mobile work.

--R. A. II.

Perth Amboy, N. J., Hamfest

One of the largest body of radio amateurs ever assembled gathered on the waterfront at Perth Amboy, New Jersey, on June 16th and established a world's record in hamfests. There were 950 paid admissions to the Tri-County Radio Association hamfest; our personal count showed more than a thousand people in the main (Continued on page 84)
To all A.R.R.L. Members residing in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain and West Gulf divisions of A.R.R.L.:

You are hereby notified that, in accordance with the constitution, an election is about to be held in each of the above-mentioned divisions to elect, for the 1935-1936 term, both an A.R.R.L. director and an alternate director. Your attention is invited to Sec. 1 of Article IV of the Constitution, providing for the government of A.R.R.L. by a Board of Directors; Sec. 2 of Article IV, defining their eligibility; By-laws 10 to 20, providing for their nomination and election; and By-law 11, providing for the simultaneous election of an alternate director. Copy of the constitution and by-laws will be mailed any member upon request.

Voting will take place between November 1 and December 20, 1934, on ballots which will be mailed from the headquarters office in the first week of November. The ballots for each division will list, in one column, the names of all eligible candidates nominated for the office of director by A.R.R.L. members residing in that division; and, in another column, all those similarly named for the office of alternate director. Each member will indicate his choice for each office. Nomination is by petition. Nominating petitions are hereby solicited. Ten or more A.R.R.L. members residing in any one division have the right to nominate any member of the League residing in that division as a candidate for director therefrom, or as a candidate for alternate director therefrom. No person may simultaneously be a candidate for the office of both director and alternate director. A separate petition must be filed for the nomination of each candidate, whether for director or for alternate director. The following form for nomination is suggested:

(Place and date)
Executive Committee
American Radio Relay League
West Hartford, Conn.

Gentlemen:

We, the undersigned members of the A.R.R.L. residing in the ........ Division, hereby nominate .................., of .................., as a candidate for director [or for alternate director, as the case may be] from this division for the 1935-1936 term.

(Signatures and addresses)

The signers must be League members in good standing. The nominee must be a League member in good standing and must be without commercial radio connections: he may not be commercially engaged in the manufacture, selling or renting of radio apparatus or literature. His complete name and address should be given. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the first day of November, 1934. There is no limit to the number of petitions that may be filed, but no member shall append his signature to more than one petition for the office of director and one petition for the office of alternate director.

Present directors from these divisions are as follows: Central, Mr. Loren G. Windom, W5qZ-W8ZG, Columbus, Ohio; Hudson, Mr. Bernard J. Fuld, W2BEG, New York City; New England, Mr. G. W. Bailey, W1KH, Weston, Mass.; Northwestern, Mr. Ralph J. Gibbons, WZKV-W7BIX, Portland, Oregon; Roanoke, Professor H. L. Caveness, W4DW, Raleigh, N. C.; Rocky Mountain, Mr. Russell J. Andrews, W9AAB, Denver, Colorado; West Gulf, Mr. Frank M. Corlett, W5ZC, Dallas, Texas.

These elections constitute an important part of the machinery of self-government in A.R.R.L. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choice. Members are urged to take the initiative and file nominating petitions immediately.

For the Board of Directors:

K. B. Warner,
Secretary

August 1, 1934

The third meeting of the Comité Consultatif International des Radiocommunications will be held at Lisbon, Portugal, in September and October. Amateur radio is to be represented by the International Amateur Radio Union, which the recent Madrid conference admitted to participation. The Union will be represented by its secretary, Kenneth B. Warner, and James J. Lamb, QST's technical editor, as technical adviser. Their trip is financed by an appropriation made by the Board of the A.R.R.L., which is the headquarters society of the Union.

The C.C.I.R. is a creature of the International Telecommunication Convention and generally meets every five years midway between the conferences held to revise the international regula-
tions. It does not have the power to make binding decisions, but it studies technical questions, and administrative questions—the solution of which rests primarily upon technical considerations, and makes technical findings which are issued in the form of "opinions." Some three dozen questions are slated for discussion at the Lisbon meeting, ranging from pure science to such commonplace things as the cure of key clicks. The special significance of this meeting to amateurs is that it represents the first occasion upon which we have been admitted to participation in the work of the C.C.I.R. in our own name as amateurs—one of the achievements of A.R.R.L. and the United States delegation at the Madrid Conference.

Foreign Traffic

Third-party traffic with Peru is now permissible. The Department of State has negotiated a special arrangement for us, at the initiative of the League, and it is now agreed that amateurs of Peru and the United States may interchange messages on behalf of third parties, provided that such messages are of the character that would not normally be sent by any existing means of electrical communication, nor except for the availability of the amateur stations, and on which no compensation is directly or indirectly paid.

The arrangement applies to the United States and its territories and possessions including Alaska, the Hawaiian Islands, Porto Rico, the Virgin Islands, the Panama Canal Zone and the Philippine Islands.

The Madrid regulations state that, except where we have a special arrangement with another country, amateurs may not handle international messages that emanate from a third party. There is, however, no restriction in the international treaty to prevent an amateur operator from originating messages himself that are destined to a third party in a foreign country. Such messages may lawfully be handled by the amateurs in the two countries concerned whether there is a "special arrangement" or not, always provided that the handling of messages is not forbidden by the domestic laws and the terms of the licenses of either amateur—which unfortunately it is in most foreign countries. Judicious use of this possibility may on occasion be of great benefit.

It is also to be noted that the control which the Madrid regulations exercise over a message relates only to its transmission by radio. There is no restriction against the handling of a message by radio to as great a distance as can be accomplished under special arrangements and then mailing it to destination. For example, a message from the United States to Singapore may be accepted by a Philippine amateur and mailed by him. Again, imagine that four countries, A, B, C and D, are parties to the Madrid convention and that a "special arrangement" exists only between B and C. Further imagine a message originating in A and destined to a party in D. It may not be sent direct by radio, but it may be mailed from A to B, sent by radio from B to C, and mailed from C to D.

A.R.R.L.'s QSL System

First, a notice to amateurs of the fifth call area: OM Stanton, W5ACA, has found it necessary to relinquish the appointment of QSL Manager for the fifth call area, and his place will be taken by the New Orleans Radio Club, through its secretary, E. H. Treadaway, W5DKR, 2749 Myrtle Street, New Orleans. With our thanks to W5ACA for his fine pioneer work and his service to his fellow-hams during the past year, we include our appreciation of the spirit of the N.O.R.C. for taking over the work. FB, OM's.

While we're about it, we'll briefly review the system for the benefit of new hams. The A.R.R.L. sponsors a free QSL forwarding service for American amateurs, the work being conducted by volunteer QSL Managers in each U. S. and Canadian district. Foreign societies bundle up the American-bound QSL cards of their hams, send them to A.R.R.L. Hq. We sort the cards into districts, shoot them to the QSL Managers, who insert them in a file of envelopes—one envelope for each amateur—and mail the envelopes out. To get cards intended for you, purchase a standard No. 8 stamped envelope, put your name and address in the usual place on the front, print your call in the upper-left-hand corner of the face of the envelope, and send the envelope to your district QSL Manager. Don't forget to make it a "special arrangement" or not, always provided that the handling of messages is not forbidden by the domestic laws and the terms of the licenses of either amateur—which unfortunately it is in most foreign countries. Judicious use of this possibility may on occasion be of great benefit.

Here are the QSL Managers for U. S. and Canada:

W2—R. W. Yahnel, W2SN, Lake Ave., Hennepin, N. J.
W3—R. M. Macomber, W3CZE, 416 10th St., N. W., Washington, D. C.
W4—B. W. Benning, W4CBY, 520 Whiteford Ave., Atlanta, Ga.
W6—C. E. Spitts, W6FZQ, Box 1004, Phoenix, Ariz.
W7—L. W. Kelly, W7BPC, 4191 So. Prospect St., Tacoma, Wash.
W8—F. W. Allen, W8GER, 324 Richmond Ave., Dayton, O.
W9—H. C. DeMuth, W9FFB, 1411 Dempster St., Evanston, Ill.
VE1—J. E. Roux, VE1FB, 84 Spring Garden Rd., Halifax, N. S.
VE2—Stan Comach, 1088 Egan Ave., Verdun, P. Q.
VE3—Bert Knowles, VE3QB, Lanark, Ont.
VE4—Dr. J. J. Dobry, VE4DR, Killiam, Alberta.
VE5—E. H. Cooper, VE5EC, 2024 Carnarvon St., Victoria, B. C.
Portables Called In

Inasmuch as a license for a fixed amateur station also authorizes portable operation, separate portable station licenses are unnecessary. Many that were issued under the old regulations, before the portable privilege became automatic, are still in existence. Through the League, the F.C.C. requested that amateurs voluntarily submit these unnecessary licenses for cancellation, and many of them were surrendered. The Commission has now definitely called in all the remaining portables issued to the holders of fixed licenses, so that it may clear its records of this duplication and deadwood. Amateurs possessing separate portable licenses should now submit them direct to the Commission at Washington for cancellation.

Visiting the Members

The late summer and autumn are the convention seasons in most parts of the country, and every year at this time a headquarters representative takes the field for extended trips to visit the membership. Mr. Arthur Hebert, the League’s treasurer, is engaged by the Board of Directors for this purpose. In early August, Hebie sets out on the first of two long trips. His first one, lasting nearly five weeks and covering nearly 9000 miles, takes him to the conventions of the Northwestern, Rocky Mountain, Midwest and Central Divisions, and to eleven smaller gatherings. After a rest of a few weeks he starts on an even longer trip to visit the conventions of the Roanoke, Delta, Southeastern, Midwest and Pacific Divisions, and again a large number of smaller groups. When these trips are over he will have carried to thousands of members in hundreds of cities the latest news on what the League is doing, and through this liaison we shall have at the headquarters a renewed knowledge of the problems of the individual amateur. For eleven years this mechanism has been in operation, and Hebie probably knows and is known by more hams than any other amateur in America.

Division conventions always occur at weekends, and the fieldman on these trips visits them each one week, the intervening time being spent in travel from one to the next, stopping off to visit clubs, hamfests, and SCMs. The division conventions are like large beads on a string, or, to use an electrical analogy, it is a series circuit. To provide reasonable economy of time and money, so as to be able to afford to visit all the conventions, some systematic arrangement is necessary to put them in a series circuit. That is why the Board of Directors has established a plan that assigns the approximate dates at which the convention should be held in each division. Not meddlesome dictation, it is simply an attempt to arrange the order in which conventions are held in such a manner that it will be possible to have contact between the membership and the headquarters at all of them. Committees arranging division conventions are requested to note that an official approved plan exists which suggests approximate dates for the convention in each division, and that the work of the League will be greatly facilitated if they will consult the fieldman before definitely setting the dates for their conventions.

Meanwhile, Hebie is “on tour” and will BCNU.

For Alaskan Hams

In Alaska the distances are great, the population is sparse and travel is difficult. The business of finding a code examiner and a notary public, so easy for the Class-C applicant in the United States, becomes an extreme difficulty in most parts of Alaska. For some months the League has been working to improve the conditions for its Alaskan members and to this end has obtained from the F.C.C. exact information on the classes of persons authorized in Alaska to receive oaths on station applications and on the service of military officers in administering oaths for operator applications. At the intercession of the League, Rule 407 was expanded to permit giving the code examination by an operator in the government service, thus making all the “Wamcats” eligible to befriend their amateur acquaintances. Finally, the League secured from the Commission a complete list of the commercial and amateur radiotelegraph operators in Alaska whose licenses are of grades acceptable for acting as the code examiner for a Class-C applicant. All this material has been put in the form of a mimeographed memorandum, a copy of which any Alaskan inquirer may obtain upon application either from the A.R.R.L. SCM for Alaska, Mr. Richard J. Fox, Box 301, Ketchikan, or direct from A.R.R.L. headquarters.

The Communications Act absolutely requires that an application for a station license be sworn to before a notary public or a person having like authority to administer oaths. But in the case of an application for an amateur operator license only (not for a station license), the Commission will accept an application executed before a military officer authorized by the 114th Article of War to administer oaths for the administration of military justice. Hams on army posts will find this convenient, though they still have to go down to the village to get an N.P. to swear at the station application.

Blob

We read in one of the more colorful radio journals that membership in the League was originally confined to licensed amateurs but, back in 1920, was improperly and wickedly changed, for money-making motives and to the injury of members. The facts: The first constitution of the League provided that “Any one interested or engaged in radio telegraphy or
telephony shall be eligible to membership.” After the war the constitution was revised, but the provision for eligibility to membership remained in exactly these words. The constitution was again revised on December 18, 1923, and at that time minor changes were made in the language: “Any person engaged in or interested in amateur radio shall be eligible to membership.” This language is still in effect. There never has been a requirement in A.R.R.L. which confined membership to licensed amateurs, and neither in 1920 nor at any other time has there ever been a change in this respect. However, by a recent amendment the right to vote is substantially confined to those who are licensed amateurs.

**Wiring Diagram**

What does the League do for me? Where do the League earnings go that are shown on these operating statements? Who are the fellows at headquarters, and where does so-and-so fit? Why are there so many of them? What do I get out of being a member?

Questions like this are frequently asked us. As an aid in answering them we have prepared the attached hook-up of the League. In it each official of the League and member of the headquarters has been placed and labeled in his proper relation to the others. A little examination of this diagram should clear up many a member's questions.

"On top of the heap," and as the original source of authority, is the membership of the League—as it must be in a cooperative self-governing organization. The members lodge the duty of governing their affairs with their elected representatives, the Board of Directors, presided over by the president, whom the Board selects. The three salaried officers of the League—the executive secretary, the treasurer and the communications manager—head up the headquarters proper. They are appointed by the Board of Directors and in all their affairs operate under the close control of the Board. Each has his own staff to assist him in carrying out the duties assigned him by the constitution, along the policy lines dictated by the Board. These headquarters officers report directly to the Board and generally receive direct instructions from the Board. But they are also under the supervision of the
The management problem, of course, is not how to find means to spend the money but rather how to stretch what we have to do the maximum good. Since the war the League has disbursed several million dollars in building up amateur radio and advancing the interests of its members. Annual disbursements average seven or eight dollars per member; the member pays only $2.50 in dues (less than the cost of twelve copies of QST from the newstand), the rest of the money being earned by the headquarters from permissible activities in other fields, largely advertising.

This astonishingly large per-capita disburse-ment finances a large number of activities and services to amateur radio. It provides the money for the expenses of maintaining constitutional government, holding elections for directors, paying the expenses of Board meetings and the administrative expenses of directors in their divisions during the year. It of course provides QST, our own magazine with our own news, and QST’s laboratory where work constantly goes on to adapt new ideas to our new problems. It similarly makes available the Handbook and the several booklets of the League at nominal prices within the reach of every amateur. It maintains our Communications Department, for the purpose of coordinating our operating activities and enabling each one of us to have more enjoyment from the pursuit of amateur radio on the air—and it covers not only the headquarters end of the Communications Department but the field organization of SCMs and their appointees, and the headquarters station W1MK. It provides a constant informed watching of the interests of the amateur at Washington and in the international scene, and the representation of his interests both at home and abroad in accordance with determinations made by the Board. It provides a general headquarters for the business management of our affairs and for the distribution of general, technical and legal advice to individual members, for the encouragement of affiliated clubs, the fostering of a general spirit of fellowship and unity as manifested in our conventions, field travel, national publicity, our ability to act as the central organization of the I.A.R.U., and so on and so on.

The headquarters officers keep the directors minutely informed on all the happenings in their respective provinces, and the directors have outlined in principle, and frequently in minute specification, just what each officer is to do with respect to the things that are his part of A.R.R.L. administration. Sometimes these orders from the Board are distasteful to a group of the membership, as is only natural, but they always represent the operation of democratic self-government and are decisions taken in the interests of the greatest good to the greatest number—which is the best system of government that mankind has yet devised.

As a matter of interesting fact, A.R.R.L. is unique in the American scene—a flourishing self-governing non-commercial organization of the devotees of a marvelous hobby. We amateurs are its only owners. Our accomplishment in building it is as important as our operating accomplishments. We ought to be proud indeed of it!

Strays

W9TE thinks that R. F. Cutting, W8KQZ, should go in for high-frequency surgery!
ARLY in June, scores of hams in each U.S. district responded to the annual call for an outing and field day test of portables. Canada was well represented, even though special permission must be obtained before VE hams can work portable on frequencies other than in the 56-mc. band.

Many affiliated A.R.R.L. clubs took the lead in plans for a trek to the lakes or hilltops. Power supplies were gathered up; portable gear brought out of storage; finishing touches added to newly constructed sets, and certain plans for the outing made, that all members might have fun and benefit in the activities scheduled nationally for June 9th and 10th. In addition to club plans, many individual amateurs took part, parties of two or three working together in most cases.

Only portable stations actually operated away from their home address were eligible to submit Field Day scores. Each contact made by a portable with a different station counted a point. The total of points was multiplied by factors (1, 2, or 3), depending on whether the transmitter or receiver, or both, were independent of commercial power supply mains. Also a similar multiplier gave extra credits to stations using under 20 watts input, and suitable credit for using less than 60 watts.

Encamped in tents, in cottages, exposed to the hazards of open fields and pastures, portables were put to work. Where clubs took a holiday, part of each group handled radio operation by shifts while others indulged in swimming, sports in the open, and still others prepared camp sites or brewed black coffee. The reliability, efficiency (and deficiencies too—hi) of quickly-constructed and set-up portable equipment was demonstrated. The size of the scores reported evaluates only the communications value or achievements of portable stations. Regardless of the standing of stations, every report without exception makes it unanimous that a profitable and very swell time was had by all.

While dynamotors were popular, many battery-powered sets were in the field, and gas-engine-driven units were used in several instances.

A noteworthy item: 40% of all the portables reporting used crystal-control. Push-pull ar-

**THE EGYPTIAN RADIO CLUB’S OPERATORS**

The Egyptian Radio Club's '47, 46 transmitter (also 18 watts) placed second in the country due to the efforts of (standing, left to right) W9FYZ, W9KEH, W9NDB, W9BLL, W9BFN, W9DJG, operators.

rangements of TNT, Hartley, T.P.T.G. and Colpitts were fairly numerous. Several used the Tri-tet arrangement. In most cases a '47, 42, 41, 37, 31, or '01A was used as crystal oscillator, usually followed by a 46, '10, '45 or '12. Single '71A and '45 tubes were also used. Crystal-control, because of its assurance of "in band" operation, easy solution of the problem of obtaining frequency stability and a good note under trying conditions, proved extremely popular.

The highest scoring station, and also the runner-up for honors, both used crystal-control. The United Radio Amateurs Club of Torrance, California (W6DIS/6), located its station in the Palos Verdes Hills, 1500 feet above sea level. Fifty-eight QSOs were made. Twenty operators were present. No sleep for anyone Saturday night! A compact receiver ('77 det. and '37 audio) was used for the contest. A 400-volt d.c. generator supplied 45 mils to the final and fed the oscillator through a dropping resistor. The Egyptian Radio Club (W9AIU) reported 56 QSOs. The station was set up in the base of a bandstand in a park on bluffs overlooking the Mississippi, about 250 feet above the river. The gang made a real camping trip of it, and stayed four days. This storage battery dynamotor-operated station used the portable receivers of W9BFN and W9DJG. Three transmitters and four receivers were ready in case...
of equipment failure. Both W6DIS and W9AIU used the 80-meter band. W5A1/2, station of Sidney Shore located in N. Y. C. placed third in the scoring. He used 7 mc. altogether, and while he kept the power below 20 watts, a.c. supply was used on the transmitter, which rolled up 76 QSOs during the test. VE3KC, station of the Western Ontario Amateur Radio Association, operated by VE3PA, VE3DU, VE3WW, VE3VR, VE3LW, VE3QC and VE3KC upheld the honor of Canada, making 70 contacts using '10s and a gas engine-driven generator.

A few stations attempted work in more than one band. Most, however, worked in one particular band. 48.3% of all QSOs reported in logs were in the 80-meter band. 30.7% of the work was done using 7 mc., 19% (all 'phone) on 56 mc., and 2% on 14 mc. 'Phone contacts constituted 21.7%, and telegraph contacts 78.3% of all communications reported.

56 mc. being a popular band this summer, came in for more than usual attention. The most outstanding Field Day report of 56-mc. work came from W1HDQ/1, station of Mr. E. P. Tilton. Using 112A's PP, 19 Class B modulator, and a 31 driver, he made 36 QSOs from Mt. Monadnock, at 3166 feet elevation, near Jaffrey, N. H. W1BYK/1 on 56 mc. had 27 QSOs.

The complete tabulation of scores reported credits each log of Field Day work received. We wish we might have space to reproduce all photographs and pass on the interesting data received. The best we can do is to present the winning stations and tabulate all results. Many more clubs and individual groups were in the field than last year. From Lake Tahoe to Mt. Washington hams were active.

"Enough junk to break an elephant's back—lanters, fishing tackle, and radio. The camp site left nothing to be desired, but we found later it was a poor place for a radio transmitter. Our converter blew up rectifier tubes in rapid succession. Alternately pounded the key, cursed, fought bugs, and drank coffee all night long. Much was learned. Another? We shall start out soon as we get a power supply that won't fold up . . . pick a bald knob where there are no trees to sidetrack the soup from the antenna. More power to the Field Day."—M. A. E. S., W8KYC.

"At the end of the day the Hartley transmitter was put into the back seat of the car, and a 10-foot antenna strung up between 4-foot poles and the transmitter put on the air at every stop of the car. With only two 45-volt batteries on it, W9KWJ worked the Pike's Peak Amateur Association portable station W9OKY during the trip back to town."—W9EHC.

W4NC reports that eleven of the Winston-Salem Club turned out. They used a 500-watt a.c. self-excited generator run by an Austin engine, mounted on an Austin chassis. This lighted Top Hanging Rock Mountain with a dozen incandescent lamps as well as giving 16 watts for the transmitter.

Among the woes of the C. I. R. C. (Lake Bloomington, Ill.) were scratched arms, torn trousers, skinned ankles, and mosquito bites. Three kittens found in a box in the cabin were accepted as mascots. "We were glad to see the end, but happy to know we had portable equipment that was reliable under trying conditions. Come on Field Day 1935!"

W6AHJ of El Cerrito operated from Lake Tahoe. W3DZK made 35 contacts with only 70 stations called, plus a few QOs. Operation was by lantern light—a swell set-up. W3QV/3 reports 50% of his calls were answered and worked. His portable was not one for the occasion only, but is kept ready for emergencies. W1BYK-ABG wants another Field Day right off. He says to keep the "simulated emergency" (preparedness) idea going strong.

W8PO says, "Ohio participation much wider this year, judging from the number of BTS contacts made. W4BJS (Fla.), located on the gulf, used a palm tree and a century plant to hold up the respective ends of his antenna. W8DG/T/4 at St. Pete (Fla.) also used an a.c. generator run from the fan belt of an Austin for power."

"Fifth place with W9NFV last year. This year a terrible showing, ruined a lot of radio stuff, had much tough luck, but never had a better time in our lives." W9AIW, W9LPZ and W9KFX kept the latter call on the air from the shore of a lake.

W3DUU, portable of the W.R.C.S., was installed at Lenape Park, Pa., with 37 in attendance, including fellows from the Chester and Frankford Radio Clubs. Wind and rain, so we decided to sue A.R.R.L. for permitting such weather . . . but after the storm there were still several hours of fun. Swimming and canoeing went best while QRN was heavy.
W9GBP/2 says 600 miles was his best DX. On the air 17½ hours, he averaged a contact every 21 minutes with P.P. '45s. The Buckeye Shortwave Radio Association’s station, WSBSR, was installed at Munroe Falls Park, Ohio. W81IO, W8KXP successfully operated W8KCS for the Boys’ Club of St. Mary’s. The Akron Progressive Short Wave Club ran its sets off two auto bats connected in parallel...they were still going strong at the end. W2DOG was set up on Bald Hill, 300 feet high, on Sunday. The transmitter was the exciter unit from the home station. W3DVY portable was battery operated at The House of Prayer, Limkiln Pike and Church Lane, Philadelphia, Pa., by the H.O.P.R.S.

FIELD DAY PARTICIPATION

<table>
<thead>
<tr>
<th>Club Score</th>
<th>Score Nr. QSOs</th>
<th>Power &amp; Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>W6DIS/6</td>
<td>The United Radio Amateur's Club</td>
<td>329 36 18</td>
</tr>
<tr>
<td>W9AT/9</td>
<td>Egyptian Radio Club</td>
<td>304 36 18</td>
</tr>
<tr>
<td>W6KYO</td>
<td>Central Illinois Radio Club</td>
<td>441 44-6 20 R (102')</td>
</tr>
<tr>
<td>W7DIW9</td>
<td>Pike's Peak Amateur Radio Association</td>
<td>270 10-14-9 20</td>
</tr>
<tr>
<td>W4NC/4</td>
<td>Washington-Salem Amateur Radio Club Inc.</td>
<td>270 30 16</td>
</tr>
<tr>
<td>W8ML</td>
<td>South Cleveland Radio Club</td>
<td>263 22 19</td>
</tr>
<tr>
<td>W8EKG</td>
<td>Western Ontario Amateur Radio Ass'n</td>
<td>210 70 210</td>
</tr>
<tr>
<td>W1CDX/1</td>
<td>73 Radio Club</td>
<td>144 16 8.1</td>
</tr>
<tr>
<td>W8SSR</td>
<td>The Buckeye Short Wave Radio Ass'n</td>
<td>140 70 40 R, T</td>
</tr>
<tr>
<td>W8LGR/8</td>
<td>Utica Amateur Radio Club</td>
<td>116 38-1 20 R, T</td>
</tr>
<tr>
<td>W8EXT/8</td>
<td>Lebanon Amateur Radio Association</td>
<td>114 57 40 R, T</td>
</tr>
<tr>
<td>W8KGY</td>
<td>Sylvania Transmitting Amateur Ass'n</td>
<td>108 12 16</td>
</tr>
<tr>
<td>W8SP</td>
<td>Abilene Amateur Radio (W9AUL) Club</td>
<td>72 8 10</td>
</tr>
<tr>
<td>W8SWL</td>
<td>Lakewood Radio Club</td>
<td>63 7 18</td>
</tr>
<tr>
<td>W8DT</td>
<td>Mohawk Valley Brass Founders (Fitch)</td>
<td>54 6 4</td>
</tr>
<tr>
<td>W8KCS/8</td>
<td>Boys' Club of St. Mary's</td>
<td>45 5 12</td>
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<tr>
<td>W8DVY</td>
<td>House of Prayer Radio Society</td>
<td>40 4 14</td>
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<tr>
<td>W8KFP/9</td>
<td>Starved Rock Radio Club</td>
<td>40 10 30 T</td>
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<tr>
<td>W8KYO</td>
<td>Marietta Amateur Radio Society</td>
<td>36 4 10</td>
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<tr>
<td>W8DUD</td>
<td>The Western Radio Communication Society</td>
<td>27 3 18</td>
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<tr>
<td>W8OW/8</td>
<td>Amateur Transmitters Association of Western Pennsylvania</td>
<td>27 3 17.5</td>
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<tr>
<td>W8GVS</td>
<td>Portland Amateur Wireless Association</td>
<td>18 2</td>
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<tr>
<td><em>Oreg. Leading Scorer</em></td>
<td></td>
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<tr>
<td>W5A1/2</td>
<td>Sidney X. Shore</td>
<td>456 76 18/18 T</td>
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<tr>
<td>W5A9A/3</td>
<td>W8DNZ-W8EQX-W8BZL</td>
<td>W8EQX-W8BZL</td>
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<tr>
<td>W8EQ</td>
<td>W8DNZ-W8EQX-W8BZL</td>
<td>W8EQX-W8BZL</td>
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<tr>
<td>W8BNL/4</td>
<td>W8BOT-W8BNR</td>
<td>300 40 19</td>
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<tr>
<td>W9DQ/1</td>
<td>Edward P. Tilton</td>
<td>324 30 7</td>
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<tr>
<td>W9GP/7/2</td>
<td>R. D. Pickett</td>
<td>300 50 19 R</td>
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<tr>
<td>W8DK/3</td>
<td>Richardson &amp; Roberts</td>
<td>287 23 19.8</td>
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<tr>
<td>W8QV/3</td>
<td>W3CB-EQOV</td>
<td>252 28 18 4</td>
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<tr>
<td>W8BY/1</td>
<td>Al Goldin</td>
<td>243 27 4.5</td>
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<tr>
<td>W8P0</td>
<td>W8FEC-W8GUK</td>
<td>21 26 6.4</td>
</tr>
<tr>
<td>W9F0/4</td>
<td>W4ZU-W4TKY</td>
<td>172 43 55 T</td>
</tr>
<tr>
<td>W8GD/12/12</td>
<td>144-WD1/1 (Ev. Hal &amp; PH)</td>
<td>144-WD1/1 108</td>
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<tr>
<td>W8BB/20</td>
<td>W8BB/20</td>
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</tbody>
</table>

W9FYA/W9FKU would like Field Days to come every two months instead of annually. In their set-up, 20-foot poles were tied to fence posts, with the set in a couple of pup tents. W4BOT and W4BNR got the latter call on the air with a generator belted to their filyver, and a good time was had by all.

W6FYM went to the mountains, 80 miles distant, with the Modesto Amateur Radio Club. W8IIG suggests that Field Days be held in winter, or under real emergency conditions. W9KWP would like to see an emergency rig kept on hand by every club...a good idea.

W4ADX was set up on Clinch Mountain in Tennessee, and got good signals from W4ABX on Roan Mountain on 56 mc. The East Tennessee Amateur Radio Association sent all local hams a fine announcement of their Field Day organization to get the gang together.

"The S.T.A.A. (W8KGY/8) left Bradford, Pa., for the hunting camp of W8FKQ. There were several cars loaded with equipment. W8KF, W8KOB, W8AXD, W8KDM, W8KYY, W8HKU, W8KCV, W8FYV, W8AXQ, W8FEL, W8FKQ, W8JJZ and W8FDW were on hand. Looking forward to next year...a good time was had by all."

W8BRB of the Lakewood Radio Club furnished a most excellent and complete report. W8BON, W8GUL, W8STR, W8FGJ and BRB had good success. Necessary to act quickly to save the set from destruction when a friendly (?) cow strolled through the antenna!

Appreciated by all will be the ditty offered by one participant as he balanced the QSOs against the "calls made": "No sadder word of tongue or pen—The QSOs that might have been."

"Had adequate battery power for a kw. W8KJL used 71A until filament went; W8HJQ used '01A with 8 watts on it; then used a '45 TNT to the end. Five autos, one trailer, 17 present."

W8ML, So. Cleveland Radio Club.

"High winds hampered operations. Rain soaked our equipment and put the transmitter out. Couldn’t keep the tent up. QRN worst on record. The Utica Amateur Radio Club station was operated by W8LGR and W8CYG, with relays by W8HNZ, W8LUF, W8LVZ, W8LGZ, W8HNXY. Six transmitters available, four used."  

BT9 at the end of a call caused us to lose more QSOs than all of the conditions and what not prevailing! Had a good time anyway.—W9EKBX.

(Continued on page 74)
Automatic Vacuum-Tube Regulation Control for Bias- and Plate-Supply Power Packs

By Lester R. Yates, W1KQ*

It generally has been unsuitable to use power-pack supply for grid bias of a Class-B stage, because of the poor regulation caused by the varying grid current flowing back through the bleeder resistor of the power supply. In order to obtain decent regulation, either a very low value of bleeder resistance must be used, or else the load on the power supply must be kept at a constant value. The former method is impractical because of the very low value of resistance which must be employed, which means that a very large amount of power will have to be dissipated by it. Therefore the second method described in this discussion; that is, maintenance of the load on the power supply at a constant value of practically zero.

As shown in Fig. 1, the stabilizer consists of a tube, across the output of the power supply, in a self-biasing arrangement. The resistor $R_1$ is on the order of several megohms, so that at no load the tube is biased practically to cut-off. The output voltage is then the total voltage of the supply minus the voltage required to bias the regulator tube to zero plate current. When current flows back through the regulator tube, as would happen if the power supply were being used to bias the grid of a tube which was being driven positive and was drawing grid current, the voltage across the regulator tube will tend to increase. This will cause the voltage across the biasing resistance, $R_1$, to decrease. Since the sum of the regulator tube drop and the drop through $R_1$ must equal the total supply voltage, as the voltage across $R_1$ decreases the bias on the regulator tube decreases, which causes the tube plate impedance to decrease so that the voltage across it tends to remain constant regardless of the current which is flowing back through it. This may be shown by the equations given in the Appendix, which were worked out for 200 volts bias on the basis of the regulator consisting of two 45's in parallel.

This equation in graphical form is shown in

*124 Webster Ave., Bangor, Me.

FIG. 1—CIRCUIT OF THE AUTOMATIC VACUUM-TUBE REGULATOR AS APPLIED TO A BIAS- OR PLATE-SUPPLY POWER PACK

$R_1$ is the regulator tube's bias resistor and $R_2$ is the power-pack output voltage divider. A separate filament winding should be used for the regulator. Design data are given in the text.

FIG. 2—REGULATION CURVES FOR A BIAS POWER PACK USING THE AUTOMATIC TRIODE REGULATOR. THE LOAD CURRENT IS NEGATIVE

Curves A1 and A2 are for a single 45 as the regulator. Curves B1, B2 and B3 are for two 45's in parallel. $B_1$ is a theoretical curve plotted from the equation.

It may be seen that at the higher values of current the experimental curve is slightly better than that obtained by calculation. Curves are also shown for 100 and 250 volts. It may be seen that for any given load current the deviation of the curves from the no-load value is constant, so that the regulation varies inversely as the plate voltage. At high voltages, then, it would be practical to employ only one tube as a regulator, while at the lower voltages two or more tubes in parallel (Continued on page 85)

FIG. 3—TYPICAL REGULATION CURVES FOR A PLATE SUPPLY POWER PACK, THE LOAD BEING POSITIVE

Curve A was taken without the regulator. Curve B1 is for a single 45 as a regulator and Curve B3 is for two 45's in parallel.
Typical Technical Questions Answered

Regenerative Receiver Coils—Parallel vs. Series Plate Feed—160-Meter

Tri-Tet Coils—Condenser Tuning Ranges

Many letters received by the Technical Information Service indicate that there are many who are not familiar with the simple rules governing the winding of plug-in coils for regenerative receivers. To avoid any possible confusion, all coils, primary, grid coil (secondary) and tickler, should be wound in the same direction. The tickler coil should be placed at the “ground” end of the secondary, opposite the grid end of this winding; and if there is a primary coil, it should be wound on the form below the tickler winding. With the windings made in the same direction and with the tickler at the low potential (“ground”) end of the grid winding, the top end of the grid coil should be connected to grid, the lower end of the grid coil to the filament or cathode circuit and ground, the inner end of the tickler winding to the plus-B circuit and the outer end of the tickler winding to plate. Then the inner end of the primary winding connects to ground or plus-B, while the outer end goes to the antenna or the plate of a preceding amplifier. If this procedure is followed, the tickler and grid windings always will be poled correctly for regeneration. Then if the detector should refuse to oscillate, one can look for the trouble elsewhere.

Other factors affecting regeneration are: number of tickler turns; spacing between tickler and grid windings; plate and screen voltages of the detector tube; capacity of a “throttle” or regeneration control condenser, if one is used or the capacity of an r.f. by-pass condenser in the plate circuit; size of grid leak and condenser, and degree of coupling to the antenna or a preceding amplifier.

In general, the tickler winding should be kept as small as possible consistent with smooth control and proper screen voltage. With most types of screen-grid tubes, the point of maximum regeneration or the point of “spill-over” should be adjusted to occur at a screen voltage of about 30 volts for best sensitivity. If regeneration is controlled by a variable capacity, the screen voltage should be set permanently at about 30 volts and the tickler adjusted so that the point of maximum regeneration occurs near the maximum capacity of the condenser. The tuning effect of the regeneration control will be at a minimum with this adjustment.

The value of a plate circuit fixed by-pass condenser will not be critical, a value of 100 to 200 µfd. being about right. Larger capacities will result in a decrease in signal strength.

Several fellows, noticing the rather sudden increase in the use of parallel plate supply feed in recent QST-built transmitters, ask for the reason and how the efficiency of this method of plate feed compares with that of the series feed method. Practically, the entire question of efficiency centers on the r.f. choke coil used with parallel feed. Until recently this was the vulnerable point of the parallel system. Considerable difficulty was encountered in obtaining a good r.f. choke, especially one providing a high impedance over a wide range of frequencies. Within the past year or so, however, r.f. chokes of the machine-wound type with excellent characteristics over a wide range of high frequencies have become available. These chokes make it easy to provide a circuit with parallel feed practically as efficient as one using series feed where the responsibility of the r.f. choke is relatively insignificant.

The advantages of parallel feed are chiefly those of convenience. It obviates the nuisance of tapping the coil of a push-pull or split-stator neutralizing tank, and if the blocking condenser is used it also removes the hazard of high d.c. voltage on the tank coil and condenser.

If you wish to operate the RK-20 Tri-tet oscillator, described in QST for June, in the 1800- to 2000-ke. band, the coils L1, Fig. 3 page 16, may consist of 25 turns of No. 16 d.c.c. wire two inches in diameter. With a capacity C1 of 35 µµfd., L1 will require 68 turns No. 16 d.c.c. wire 3½ inches in diameter, and proportionately fewer turns with larger capacity.

It is frequently useful to remember that the ratio of maximum to minimum frequencies covered by a given coil and shunt condenser is proportional to the square root of the ratio of minimum to maximum capacities of the condenser. The minimum capacity value should include, of course, the minimum capacity of the circuit. This rule makes it possible to approximate the frequency range over which any coil and condenser may tune.

For instance: We have a 150-µµfd. tuning condenser and wish to estimate the frequency range which will be covered. In receivers, the minimum circuit capacity may run about 30 µµfd., 15 of which may be assigned to the condenser, the remainder being introduced by tube, socket, wiring, coil etc. The maximum capacity...
W2DC, Scotia, New York

ALTHOUGH amateur radio possesses attractions for people of all ages, most of us get into the habit of thinking it a young man's game. Consequently it seems a bit unusual (but it may not actually be so at all) to find an amateur whose first experience with ham radio came from operating his father's station. That is the case of E. H. Fritsche, owner of W2DC. 9AJ was the call—a well-known one in pre-war days. After the

reopening a family station went on the air signing 9FK. The year 1926 found Fritsche in Schenectady, where the call 2DC was obtained. It has been held ever since.

The layout at W2DC has a distinctly professional appearance, although some of the parts incorporated in the transmitter date back to the spark-coil days. The rack at the left of the table is a complete c.w. transmitter for 3.5, 7 and 14 megacycles. The crystal oscillator, which uses a Type 10 tube, is arranged so that any one of four crystals can be selected by a switch. An 865 buffer follows the oscillator, and drives another 10 used as either amplifier or doubler. A second 10 doubler is used on 14 mc. only. The intermediate power amplifier uses two Type 10 tubes, and the final stage has two 211's. All stages are completely shielded. Power supplies for the r.f. stages, including a bias supply, are built in the same rack.

The modulating equipment is contained in the right-hand rack. The speech line-up includes a first audio stage using an 864, a second stage with two 864's, and a 50 third audio. The output of the third stage excites a 59 Class-A amplifier used as a driver for a following Class-B audio stage with two 59's. These in turn drive a pair of 203-A's in Class B. A low-voltage power supply for the 864's and the receiver is contained in this rack, also a 400-volt supply for the intermediate speech amplifiers and a 1000-volt supply for the 203-A modulators.

A broadcast-type condenser microphone and a National FBXA receiver are on the operating table. A control panel with push-button switches is at the rear right. Note also the handy rack for unused receiver coils built into the lower part of the table at the left. A frequency-meter-monitor is also available, although it does not appear in the photograph.

The chief purpose of the station is to maintain contact with Fritsche's father, who now signs W8ISZ, and his brother, W8AFS. Operation is chiefly on 3.5- and 14-mc. 'phone; European andouth American stations being worked regularly on the latter band. Schedules are also kept occasionally on c.w. All continents have been worked on both 7- and 14-mc. c.w. W2DC holds appointments as ORS and OPS.

W4MS, Pensacola, Fla.

THE accompanying photographs show the transmitter and operating table at W4MS, the station of S.C.M. Edward J. Collins of the
RECEIVING POSITION AT W4MS

A.R.R.L. Western Florida Section. Another member of the pre-war gang, Collins' first transmitter was a quarter-inch spark coil, put on the air in 1915 and operated under the self-assigned call “PB.” W4MS was licensed in 1920, grew to a 1-kw. spark, thence to a.c.c.w. with the renowned “sure-fire” circuit, and finally to a 7-me. t.p.t.g. rig with a 204-A. This set is still doing the business, bringing in T9 reports regularly along with the DX. One reason for the good signal is the fact that the tube is operated considerably below its rating—WAC has been made three times with inputs of less than 30 watts!

Besides the favorite 40-meter set, W4MS also has a pair of 10's in push-pull on 14 mc. and an 852 on 3.5 mc. Some consideration is being given to rebuilding all the transmitters for crystal control, and it is expected that a 28-me. rig will be put together in the near future.

Quite an array of receivers decorates the operating table. Among them can be recognized a National FB7A and SW3 and an REL 231. A Pilot Wasp also is ready to be pressed into service in case of emergency. The antenna in use for all work is a half-wave 7-me. Zepp suspended between a 65-foot lattice mast and a Florida pine.

W4MS is a member of the Gulf Coast Storm Net and boasts two second operators, Mrs. W4MS (who is also ex-W4AXF) and Hugh Anderson, W4COG. Traffic, ragchewers and beginners are just as welcome as DX.

ON4BZ, Brussels, Belgium

IF YOU tune across the 14-me. band during an International DX Contest, it's an almost certain chance that you'll hear ON4BZ, or else four or five American hams calling him. Not that one has to wait for a contest to find him on the air—far from it. In plain words, ON4BZ is one of the really outstanding European DX stations—the sort of station that seemingly everyone has heard or worked.

The layout at ON4BZ, which is owned by Guy Janssen, 295 Avenue de Tervueren, Brussels, is exceedingly neat and compact. A glance at the photographs reveals that there is nothing unfamil- iar or “foreign-looking” about it—for the good reason that the tubes and equipment are largely of American manufacture. The transmitter, which is built in a metal frame mounted on the wall above the operating table, uses a 47 as a 7-me. crystal oscillator, a doubler with two 46's having grids in push-pull and plates in parallel, and a 503-A final amplifier. The amplifier is usually operated with an input of 180 watts. A vertical half-wave 14-me. Hertz antenna with single-wire feed helps to account for the DX worked. For 'phone work a Class-B modulator capable of delivering 90 watts of audio is used. This unit does not appear in the photograph, however. Single-signal reception is provided by a National FBXA.

ON4BZ first went on the air in 1923 with a Hartley transmitter using a tube similar to our Type 10; with this rig all continents were worked. Several outfits of various powers were used between the original Hartley and the set shown in the photograph. The effectiveness of the present transmitter is proved by the fact that ON4BZ has made a 'phone WAC in one day (April 21, 1934) and has worked K6COG on 'phone with a QSA5 R7 report. In the time that ON4BZ has been on the air some 125 countries have been worked. Most of the operation is on 14 mc., but it is expected that a 28-me. rig will be installed soon.

Strays

Fellows who like the “Navy” type key knob get the extra flange without much trouble. Simply take a poker chip, drill a hole in the center and fasten it between the key arm and the regular knob.

— W6KBY
Driver for Class-B 203-A’s

Although the design of a speech amplifier suitable for driving successfully a pair of 203-A’s as Class-B modulators would seem simple using Type 50 tubes, the complexities of the job multiply with the use of the newer and far superior (when used properly) 2A3 tubes. At WJHY a satisfactory solution was achieved as outlined below.

In laying out the tube lineup a 57 was decided upon as the input stage tube, since it has high gain and good audio properties. This is fed into a 56 by means of any good screen-grid coupling transformer. I used an Amertran No. 641 choke with a 0.1-µfd. coupling condenser. In the grid circuit of the 57, as the main volume control, I used a 100,000-ohm potentiometer, and isolated the grid circuit with resistances, as shown in July, 1932, QST.

The output of the 57 is entirely too much for the grid of a 56 tube. However, no very satisfactory way of feeding the output of a single-ended stage using a 57 to push-pull grids is available, since ordinary transformers don’t “perk,” and coupling transformers of that type are costly. So I used another potentiometer in the grid circuit of the 56 to control the amount of excitation to the point just below distortion.

The third stage is a pair of 56’s coupled to the first 56 by a low-gain transformer (Thordarson No. 2408). The output inter-stage push-pull transformer is a type 5870 Thordarson job of low ratio, capable of transferring the power necessary to drive the grids of the 2A3’s. This is more of an essential than most of the boys think, for the 2A3 tubes are operated Class AB and the grids swing positive, much as in a Class-B rig, but the plate current doesn’t change as much.

The 2A3 tubes may be operated with automatic bias, but there just isn’t any way to keep the bias from fluctuating with the plate current. For this reason, I decided upon battery bias, by-passing the battery with a 24-µfd. electrolytic condenser.

I have tried just about every kind of Class-B input transformer made, but was unable to find one with a low enough plate-to-plate impedance for the 2A3 tubes. Hence, I asked Thordarson to make up one with a 3000-ohm primary impedance, and with two separate windings on the secondary, instead of the usual single, center-tapped grid winding.1 Average 203-A’s just don’t have similar characteristics, but with separate transformer secondaries the bias on each tube can be adjusted

1 Type number T8140.
to make the distortion percentage as low as possible. Usually it takes about 3 or 4 volts more or less for one of the 203-A's than for the other, and a single "C" bias battery can be used instead of the two, one in each grid leak, required by a single center-tapped winding.

This unit is quiet in operation. The hum level is 1/30 volt, which you can't find with the average ear. In order to accomplish this, it was necessary to move the microphone transformer and microphone circuits to another unit, about 3 feet away from the chassis, since inductive pick-up upset the apple-cart with the high gain available.

If the speech amplifier is used near a 400-watt transmitter, it is necessary to shield both the 57 and the first 56. However, if the r.f. is not too near, it can sometimes be operated successfully without a shield on the 56.

The shield can is No. 16 gauge galvanized iron. This is heavy enough to be of some value in shielding the amplifier from an a.c. receiver left running while transmitting. Considerable trouble was experienced with the first chassis used, of 26 gauge iron. Magnetic hum was picked up from the power transformer in the receiver, and the iron wasn't so hot as r.f. shielding. The galvanizing helps a lot in keeping out stray r.f., having a much lower resistance than iron.

A 5Z3 rectifier was chosen because of its much quieter operation as compared with a Type 83 tube. An 83 was tried, but there was some tunable hum in the receiver, when the speech amplifier was left on while receiving, and in order to save the trouble of rigging up a tunable hum filter, the 5Z3 seemed the best answer. It is a great tube for such a rig.

A choke of good proportions should be used as the first filter choke. The same rules that are in vogue for Class-B circuits hold true, and without a choke capable of handling about 150 mils without dropping below 30 healthy henrys, the quality will not be so very hot.

As to frequency response, the output dropped off 3 db below 60 cycles, and increased about 3 or 4 db about 8000 cycles. So, for the ham transmitter, it gives uniform output at any frequency encountered by ham 'phones. As a thought there, the average ham mike won't give any better response, if as good, so it won't hurt if the response isn't any better. By spending a week or two on it, the response curve can be made to go as high as 10,000 and as low as 30 cycles, utilizing various schemes, but this is a lot of expense for nothing, in my estimation.

The adjustment of the potentiometer in the grid of the first 56 is rather critical, but once set may be left alone. In my amplifier, it is "below deck," out of sight.

The output meter shown in the circuit is not essential, but is useful in indicating the level at which the rig is being modulated. It need not be calibrated, but if it can be calibrated in either volts or db, so much the better. The plate meter in the 2A3 plate circuit is necessary for setting the bias properly. The tubes should draw about 78 or 80 mils, no signal, and the current should swing up to about 140 to 150 on the peaks. The plate voltage is 300 and the bias—62 volts.

I believe that this is one of the easiest to build, least costly—considering the gain available—and most fool-proof amplifiers suitable for driving 203-A's as Class-B modulators.

—M. C. Bartlett, W9HFF

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A Novel Regenerative Receiver

The 2A7 tube has been put to work in a somewhat different way by Rudolph C. Coupez, of 187-A Rue de la Victorie, Brussels, Belgium, in the circuit of Fig. 2. Although resembling in some respects the usual pentagrid converter circuit, actually the tube is used as a combined regenerative detector and beat oscillator, using the screen-grid section of the tube as the detector. It is said to work well on all frequencies between 10 and 28,000 kc., using coils and condensers of suitable constants.

The tuned circuits in the oscillator and detector portions are made exactly similar since they have to cover the same frequency ranges. Constants here will not differ from those characteristic of other short-wave regenerative receivers. To cover

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FIG. 2—HETERODYNE REGENERATIVE CIRCUIT USING A 2A7 TUBE

L1, L2, L3, L4, L5—See text for details. L1, L3 and L4 are identical for any given frequency range; ditto L3 and L5. Coupling between L1 and L2 should be variable.

C1—500-µµfd, variable condenser.

C2—See text. May be ordinary midget for short-wave reception only.

C3—250 µfd.

C4—1 µfd.

C5—300-µµfd, variable condenser.

C6—Same as C2.

R1—3 megaohms.

R2—300 ohms.

R3, R4—50,000 ohms.

RFC—Depends upon frequency band to be covered. For short-wave reception only, any good short-wave choke will be satisfactory. For all-wave work, two or three chokes in series, each designed to cover a part of the spectrum, should be used.
the wide frequency range mentioned above, Mr. Coupppez uses a tuning condenser \( C_2 \) consisting of a four-gang 500-µfd. condenser, all sections being connected in parallel for the lowest frequency range and either three, two or one section being used for the higher-frequency ranges up to 1500 kc. Above 1500 kc, paddling condensers built into the coil forms are placed in series with one tuning condenser section to cut the effective maximum capacity to 150, 100 or 50 µfd. so that the spread will not be too great. The changes in condenser capacity are automatically made by appropriate coil-form pin connections.

The antenna coupling coil, \( L_1 \), is made exactly the same as \( L_2 \), the antenna tuning condenser, \( C_1 \), always being connected in series. Tuning the antenna circuit increases both sensitivity and selectivity. Regeneration is controlled by variable condenser \( C_6 \), having a maximum capacity of 500-µfd.; a 500-µfd. fixed condenser is connected in series with it to give smoother control on the short wavelengths. Coupling to the following audio stage is apparently through an ordinary audio transformer.

The tuning procedure used with this type of circuit differs in some respects from that commonly employed for regenerative reception. The detector part of the circuit should not be allowed to oscillate; the best note for c.w. reception is obtained by proper setting of the heterodyne oscillator tuning condenser, \( C_4 \). The signal should first be tuned in by its carrier only, with the regeneration control well "down." Adjust \( C_1 \) to resonance and vary the coupling between \( L_1 \) and \( L_2 \), simultaneously readjusting \( C_1 \) and the detector tuning condenser, \( C_2 \), until the signal is strongest. The heterodyne condenser, \( C_6 \), should then be adjusted to give a satisfactory beat note, after which the detector regeneration may be increased, by adjusting \( C_6 \), until the signal is brought up to maximum volume. The loosest possible coupling between \( L_1 \) and \( L_2 \) usually will give the most satisfactory results.

The advantages of the separate beat oscillator have several times been emphasized in QST. Such an arrangement is particularly advantageous in an all-wave receiver such as the one used by Mr. Coupppez, because the loss of signal strength caused by detuning an autodyne detector to obtain a beat note is considerable at the lower frequencies. A similar, although not as pronounced, difference in strength between autodyne and heterodyne reception exists even at very high frequencies, as the experimenter can easily prove to his own satisfaction.

874 For Stabilized Bias Supplies

Recent QST dope on "B" eliminators as bias supplies for transmitters has inspired several of the gang to send in information on using the 874 voltage regulator tube to keep the bias at a fixed value when voltage variations because of grid current flow become bothersome. For the benefit of those who may not be familiar with the tube, the 874 is a gas tube designed to maintain a constant voltage across its terminals under varying load currents, when used in connection with a power supply of inherently poor regulation—such as the conventional "B" eliminator. At a working voltage of 90, the tube will operate over a current range of 10 to 50 milliamperes.

FIG. 3—PLATE AND BIAS SUPPLY USING AN 874 TUBE TO MAINTAIN CONSTANT BIAS

Fig. 3 is the diagram of a combination low-voltage plate supply and bias supply used by E. H. McDonald, W3EQS. A note from him says, "At present I am using a 'B' eliminator as a bias supply, and since the bleeder is of the order of 10,000 ohms, the regulation is fierce. After trying it I was almost ready to build one of the heavy-duty 'C' supplies when I thought of the old 874 voltage regulator tube. As this tube holds at 90 volts, it makes an excellent device for controlling the bias voltage of a 203-A or similar tube. A 5000-ohm automatic bias resistor is used in the grid return circuit and the 90 volts from the 'B'

FIG. 4—ANOTHER BIAS SUPPLY CIRCUIT USING A BH GASEOUS RECTIFIER AND AN 874 VOLTAGE REGULATOR

eliminator is used for fixed bias. The eliminator also supplies plate-voltage for the buffer stages and does the job FB.

"If a higher fixed bias is desired use two or more 874's in series. The regulation of this rig is darned near perfect."

V. L. Clark, W5ZW, furnished the diagram of Fig. 4. His "C" supply, which uses a Raytheon BH rectifier and the 874, has been giving satisfactory service for more than two years. The bleeder current is approximately 20 milliamperes,
the 874 being tapped in on the voltage divider at a point where it will draw 10 to 15 ma. Other taps for different bias voltages are also provided. The buffer condensers across the transformer taps for different bias voltages are also provided.

W52W's bias supply takes care of the entire r.f. end of his transmitter—47 oscillator, 47 buffer and p.p. 10 amplifier—and also provides bias for the receiver resulting from the use of the gaseous-conduction rectifier.

International Contest Results

(Continued from page 39)


F8PZ was disqualified for persistent off-frequency operation, reported by another contestant and substantiated by A.A.R.L. Official Observer reports. It is regretted that his score of 12,376 cannot be counted. Although W6FYT made a score in the vicinity of 23,000, no log was received from that station. W3ZD, although not competing, had a score of 11,100.

Notes of Interest

J2CX worked 249 different stations! Z9A had 244 QSO's! These two champs made more than one amateur happy by adding Asia or Africa for WAC awards! EA5BE, prominent Spanish participant, made 532 QSO's. A tidy number! Coincidence at O22Q: Betting the numbers 444444 twice and 222222 once. On each of the nine days of the tests G6QB used a different type antenna. G6LK's power supply consists of dry batteries; at the end of the contest there was more resistance than voltage! G6WV made six contacts in succession without touching the receiver—the W/VE hams were piled that thick!! ZT5R, being an Emergency Station, did not have much time for the tests; he was busy with traffic. D4BAR made 291 QSO's. D4BIU wonders why the Yankees use such a narrow portion of the 7-me. band; he found about 90 to 95% of the W's worked between 7000 and 7100 kos. W5EMK was visiting HB9J and did some of the contest operating there. W6's are rarely heard in Switzerland, but W6FYT and W6JJU were heard at HB9J several times. X1AA (who didn't hear that call?) made 553 QSO's. X1AM worked 291 stations. X1BC worked 160. NY1AB's snappy work will be remembered by all who heard him in the tests—and who didn't hear NY1AB? K4SA worked 309 stations, using 'phone on 14 mc. as well as c.w. on 7 and 14 mc. K4RD, with no more than 30 watts input, worked 169 stations (51 on 7 mc., 115 on 14 mc.). CM2JM made 251 QSO's, CM1ML 201 (with 20 watts input). F3MTA, only station on the air in Martinique, rolled up 284 contacts. ZL2CF and ZL4AI had a fast race for New Zealand honors; ZL2CI worked 344 stations, ZL4AI 326, but ZL2AI came out with a bigger score, thanks to contact with an additional district. ZL4AO and ZL2AI are located about 300 yards apart and were both on at the same time throughout the tests! The "longest" contest report came from HClLC: it consisted of several sheets of paper pasted together, measuring about 82 inches wide! HClLC worked 457 stations. What ham doesn't envy K5JT his...
110-foot poles! PAASD spent what little time he had available on 3.5 mc., working W2EHT and W1BKl. KAINA worked 180 stations, but only two of these used "break-in." Break-in should be more generally used, since it makes more contacts possible in the same number of operating hours. VK7RC is one of those hams who always strikes bad luck at contest time; the first three contest nights he had bad power QRM, and on the fourth night his territory was visited by the worst electrical storm in years; these things didn't help his score a bit! A common question: "What end of the band do you hear foreigners on?" Bill Conklin of W9FM/W9ZA made up two charts, one for the 7-mc. band, one for 14 mc., using the dial settings on his receiver to show where each foreign station heard came in. On 7 mc. in the a.m. hours, foreign stations were distributed over almost the entire band with the exception of the 7000-kc. end, where a fairly vacant space showed up. In the p.m. hours the majority of the foreign stations were logged between 7000 and 7200 kes., with a few scattering signals upwards to 7300 kc. On 14 mc. the a.m. hours found foreigners all over the band with very few "holes," while in the p.m. the entire band was covered, but there were more "open spaces." Eric Trebileoke, inveterate listener of Moonta, South Australia, logged 47 countries during the tests, bringing his total of "countries heard" to 97! A very complete log of stations heard was received from Germany Receiving Station DE1834D. W8AYD claims the prize for being the "most persistent ham"—he called 54 different stations, but didn't work a single one during the contest. The old evil of a.c. notes, while less than in previous years, was still present. . . do the offenders remove the filter, or in cramping up coupling and raising plate voltage do they blow the filter? A more potent factor in producing a real score is a real receiver, not brute power, or a broad note. VP2RT and VP2BX helped a few scorrers to add Antigua to their lists. ON4CSL in the Belgian Congo also furnished "another country" in several cases. DX CQ's by W and VE participants were found generally less productive than answering CQ's and "test" calls from foreign stations. Long CQ's wasted everybody's time and lost points for many. It has been suggested by several that W and VE stations be prohibited from calling CQ in future International Competitions. How does the gang as a whole feel about that? The comment found in oodles of logs: "I never heard so much DX in my life." J31W was only Asian heard at W1FH. WICMX heard 58 countries, worked 37 of them; he worked J2GX at 4:30 p.m. Eastern Time on 14 mc. W1WV's average on calls per QSO was 5: 200 calls and 40 QSOs. Best DX heard at W1DUJ on 14 mc.: KA3AB. W1BUX made WAC in thirteen hours. The original holder of the call 1MK was in the tests under the call W1HQK. The greatest thrill for W1QV was an R10 report from OK1AW. VK3MR came rolling in on the speaker on 7 mc. at W1DCI, on March 18th, from 3 to 4:30 p.m. On the same date W1CNU worked VK5SU and heard another VK between 5 and 6 p.m. E.S.T. W1DM, Concord, N. H., was QRM'ed by static reducers at the Rumford Press (printers of QST!), but he managed to hear 181 stations in 41 countries, all six continents. Although 30 countries were logged at W1DGC, there were no South Americans among them. Best foreign operators heard at W1CMX: NY1AB, ZS2A, EA6BE and nearly all VK and ZL operators—a bouquet for our friends from "down under"! W2BSR took his vacation during the contest in order to avail himself of the utmost fun—he rebuilt before the contest, but had to tear the rig all apart and rebuild again after the contest started—moral: leave well enough alone! W2ALB's 33 contacts were all by answering CQ's. W2FU suggests a "Booie Prize" for the U. S. hams who Q'ed by the hour. The greatest lesson W2DJM got from the tests was that it pays to use all bands. W2DC's only phone QSO was with ON4AU. W2BYP, W2BHZ, W3ZJ and W4AJX worked all continents. 154 foreign stations were heard at W2DZA, 219 calls made, 49 QSO's. W2CLM and W1DGC worked VK the long way around. W2QWE was operating portable at Princeton University, surrounded by BCI's numbering in the hundreds—imagine his grief! W2ALB's examples of good operators: ZS2A, EA6BE, EA1BC. To his mother W3AOJ gives 90% of the credit for his score; she was his "alarm clock," waking him in the wee sma' hours so he wouldn't lose out on the elusive DX. W3BAI recalls: EA5BE's beautiful sending, FM8IH ditto. . . . The eternal "book on key" artist, "key sit ters" we call 'em . . . . VK3MR coming in at 5:30 p.m. E.S.T. . . . Calling OM2AA—as futile as trying to thread a needle with a three inch awl. . . . Plate transformer couldn't take it! . . . Orchids to W3DRK for staying off 7 mc. to avoid QRM to W3BAI. . . . Real ham spirit! . . . W3DON loans his transformer to replace the burnt-out one. . . . 50 W/VE stations calling F3MTA on the 17th. . . . Over 40 prefixes heard and 140 stations! "Little score, big fun," says W3AWS. Bedlam: the self-excited boys smashing up and down the bands looking for the mythical hole in the QRM. W3BRU made his first ZL QSO after ten years of hamming. The contest nights reminded W3APJ of a drive over the Everglades, with "millions of frogs, big ones with bass voices, little ones with shrill peeps, all exercising their vocal chords." W3APJ worked 28 countries out of 41 heard. W4CBY's last six QSO's in the contest were each with a different continent! A disconcerting overture: W4AJX's 60-foot mast smashing to the ground three days before the tests! W4AIO and W4ABV divided time and made a local competi-

(Continued on page 70)
Calendar:

The business of the I.A.R.U. is conducted by three mediums. First, there is individual correspondence between the headquarters and the member-societies. Second, there are general letters sent by the headquarters to the officers of member-societies. Finally, there is the semi-annual official Calendar, in which the affairs of the Union are reviewed, and official acts proposed and acted upon.

Calendar No. 12 of the Union was issued June 30th. The principal subject under consideration was the representation of the I.A.R.U. at the coming C.C.I.R. Conference to be held in Lisbon from Sept. 22d to Oct. 10th. It will be the first such conference to which the Union will be admitted on its own authority; as has been previously pointed out, this constitutes a considerable forward step in the international recognition of amateur radio.

Unauthorized interference in amateur bands and an international solution to the problem proposed by the R.E.F. was the second major subject considered in this Calendar. The result of voting on a previous proposal for the admission to membership in the Union of the Liga Colombiana de Radio Aficionados (L.C.R.A.) of Colombia was reported as unanimously in favor. A cordial welcome to the roster of I.A.R.U. member-societies is extended to the L.C.R.A. on behalf of the rest of the Union membership.

The Japanese Amateur Radio League (J.A.R.L.) was proposed as the Union member for Japan, by the Headquarters. The R.S.G.B. proposed a change in the voting requirements, under the constitution; it also made a suggestion with regard to the establishing of qualifications for the issuance of WAC certificates. The question of geographic determination of continental land areas in this connection was discussed by the headquarters. General discussion by several member-societies on questions relating to the handling of QSL matters was presented.

Results of voting and the compilation of expressions of opinion on the part of member-societies resulting from this Calendar will appear in the December Calendar, and shortly thereafter in this department of QST.

WAC:

The world is WACing at a terrific rate these days. So far in 1934, 180 certificates have been issued — as many as in any previous year heretofore. The last hundred of those have been issued in less than two months. I.A.R.U. Hq is swirling with a whirlwind of new WAC certificates. The grand total of WAC Club members on July 20th was 1204. New applications arrive with every mail.

There are three new 'phone WAC's. Charles G. Myers, W3CCF, is the first American to accomplish the feat. His certificate was issued May 15th. On June 12th one was issued to I. E. Hill, who worked all continents on 'phone from SU6HL in Heliopolis, Egypt. He'd already done the same thing on c.w. from SU6HL and ST2D. Only 2nd a 'phone WAC certificate was issued to W. P. Ingersoll, W9BHT.

These bring the total number of 'phone WAC's to 11. First, there was ON4UU, March 11, 1930; then VK3HL, April 28, 1930; G5BY, June 15, 1930; G6NJ, Oct. 11, 1930; OK2VA, Nov. 29, 1932; G6XQ, Sept. 6, 1933; ON4AU, Oct. 31, 1933; and J5CC, Dec. 15, 1933.
issuance of more certificates in six months than in any previous year? Well, the last international DX competition had quite a bit to do with it: many Americans worked stations they’d never worked before. Did we mention, by the way, that it’s principally among the American membership that this boom is occurring? Time was when considerably the greatest number of certificates issued went overseas; now, U. S. hams are greatly in the majority.

But, in final analysis, most of the credit goes to one man — 42GX. The point is reached where we no longer expect to receive an application without his card among the lot; it actually appears at least eight times out of ten. And if he’s not an Oriental Santa Claus to the boys in Eastern U. S., then the New England humidity has finally submerged the last faint glimmer of reason left in this department. And that’s not impossible, either.

General:

Congratulations to the A.R.R.L. on its 20th anniversary on behalf of the Executive Committee of the C.A. were transmitted via an OK1BC-W3BUX-W1BDI route . . . . . Peruvian amateur regulations are similar to those in the U. S., writes Wray A. Gillette, OA4AA . . . . . The fundamental difference is that a license fee of thirty Soles or $7.50 U.S. is required! . . . . . The W.I.A. is planning a gigantic DX contest for the four week-ends of October, in connection with the Centenary celebration of the city of Melbourne . . . . . Full details on the contest rules next month; watch for them.

O2Z, OWNED BY H. TSCHERNING PETERSEN, POSTBOX 45, NØRENSUNDBY, DENMARK, HAS BEEN ACTIVE SINCE 1924, WAC SINCE 1929

EX4SAX in the Saar Basin has been active recently; QSL through the D.A.S.D. . . . . . W9EUZ recently worked CT1BG on 7 mc. in the middle of a hot Chicago afternoon . . . . . DX’ll come through at the doggonelest times, sometimes! . . . . . OA4V had his equipment confiscated and license cancelled, but has succeeded in regaining the license and frequency privileges of 7500 and 15,000 kc., ‘phone and c.w. . . . . . International amateur radio offers congratulations to one of its best known operators, Jesus M. de Cordova, EA996, on the occasion of his marriage to Victoria Lopez Marin . . . . . Eric W. Trebblecock, Moonta, S. Australia, recently heard five continents within ten minutes . . . . . OA4Z is on every morning on 14 mc., looking for DX . . . . . . Oddly enough, Pacific stations are only rarely heard in South America, according to CX2AF . . . . . . "Snowy" Harrison was forced to change his call from the old familiar VK7CH to YK3CN when he moved to Shepparton, Victoria . . . . . . He can be reached through the Bank of Australasia . . . . . . Peruvian amateurs request that such "bootleg" stations as OA4XX on 14 mc. be boycotted by amateurs generally . . . . . Working such stations only encourages their continuance, and the present Peruvian regulations offer no excuse for illegal operation . . . . . Of the 648 stations that W2BSR has worked, only 58 are W's . . . . . . Braaten doesn’t seem to be much of a traffic man! . . . . . . Amateurs handled official correspondence between the Canary Islands and the mainland for a time last May when the cable was broken . . . . . . In recognition of the support he has given DE official receiving stations by acknowledging their reports, the D.A.S.D. printed 250 special QSL cards for Jack de Cure, VK3WL and presented them to him . . . . . . XL1LY, President of N.R.R.L., told W1SZ the other morning that he had just completed making WAC in slightly over

(Continued on page 78)
CALLS HEARD

E. F. Conyngham, Kanaaga Harbor, Alaska
QTH 51° 50' N 176° 20' W

Conyngham, Kanaga Harbor, Alaska
QTH 51° 50' N 176° 20' W

ZD2A, Capt. G. C. Wilmot, Nigeria Regiment, Zaria
(Present address: Bryntirion, Ellesmere, Salop, England)

W6FKC, Seth O. Perkins, and W6ENV, 1606 S. Orange Grove Ave., Los Angeles, Calif.

W8AQ, George L. Schiel, 21 Midway Rd., Mt. Lebanon, Pittsburgh, Pa.

W2EXQ, Bill and Dick Peacock, 81 Westville Ave., Caldwell, N. J.

W8AQU, George L. Schiel, 21 Midway Rd., Mt. Lebanon, Pittsburgh, Pa.

W2EXQ, Bill and Dick Peacock, 81 Westville Ave., Caldwell, N. J.

W8AQU, George L. Schiel, 21 Midway Rd., Mt. Lebanon, Pittsburgh, Pa.

W2EXQ, Bill and Dick Peacock, 81 Westville Ave., Caldwell, N. J.

OK2HM, Ing. C. Haderka, Mexico her Olomouc, Czechoslovakia


BR81388, Donald W. Morgan, 15 Grange Rd., Kenton, Middlesex, England


OK2HM, Ing. C. Haderka, Mexico her Olomouc, Czechoslovakia

W8AQU, George L. Schiel, 21 Midway Rd., Mt. Lebanon, Pittsburgh, Pa.

W2EXQ, Bill and Dick Peacock, 81 Westville Ave., Caldwell, N. J.


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September, 1934
WE HOPE you like our new heading arrangement this month. The function of this department is to pass on to you the hottest news of amateur operating achievements, to discuss operating procedure, announce tests and ham meetings, encourage good operating, publish contributions in keeping with the true spirit and ideals of amateur radio, and support amateur organization. In short, we are concerned with the practical operating of the stations of all radio amateurs.

If you don't find a report of what you did in the way of 14-me. DX, or 1800-ke. 'phone, or on the other ham bands, herein, that will not be our fault altogether. We aim to find a way to record all outstanding work on all amateur frequencies. Your part of course will be to tell us or your Section operating procedure, announce tests and ham meetings, because that will not be our fault altogether.

Better communication results in all aspects of our hobby, amateur radio, can be achieved through better operating. The Radio Amateur's Handbook, and also The League's operating booklet (the latter sent free to A.R.R.L. members who request it) contains lots of operating information which is being overlook, if not by many hams, at least for the time, his first interest in amateur radio. We don't aim to reform or change the hobby of the 'phone man, the traffic man, the DX enthusiast, the rag chaser or the experimenter. It is our personal view that all hams should know all aspects of our hobby, and be tolerant of the other fellow's viewpoint; that most hams do and are.

We have noticed that sooner or later an amateur who starts in one branch of the game gets curious or fed up with it and turns to another. It is our aim to benefit all concerned along the lines of his natural interest.

**Briefs**

Information is received from G5GQ via W3BWT that a new station signing FB8C is now working in the 14-me. band. QRA is Paul Bour, Faravohitra, Tananarive, Madagascar. Siecem, D breasts!

There are eleven amateur stations at Schofield Barracks, Hawaii, within 400 yards of each other and all work 7 mc.!!

Have you noticed? You have nine times the usual chance to get a fellow if you call him after his QI? Then you have if you wait through a long (needlessly long) CQ?}

W9ACN calls attention to the listing of KWT as a "marker station" in June QST. It should have read 13,750 kec., he says. Also, some of the police stations are now assigned 1706 kec.

Amateur radio with the Kansas National Guard this year operated under the call W9NI rather than the well-known CX7 of past years. W6NI at Camp Whitfield, Ft. Riley, Kansas, maintained schedules with the following: W1EFD, W1A7W, W1GQ, W1ECW, W1DZK, W1D0A, W1DQI, W1D1G, W1D3F, W1EY, W1E9KQ, W1E9GW, W1E9X, W1F5B, W1F6A, W1F6E, W1F6F, W1F6J, W1E9XD, W1F6N, W1F6F, W1F6D, W1F6A, W1F6B, W1F6C, W1F6D, W1F6E, W1F6P and W1F6W. Most of these amateurs are in Kansas towns, and furnished daily contact with the homes of the fellows of the encampment. An average of about 300 messages per day was handled.

Two hams received their diplomas with the class of 1934 at Roosevelt High School, Seattle, Wash.: W7AEX, W7BHH, W7BRT, W7BTW, W7CP, W7DHR, W7EB, W7EC, W7EJ, W7EV and "Bk" of W7LD.

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**Expedition Notes**

**Archeological Expedition**

W. L. Lane, K7CL, is radio operator with the Alaska College Department of Interior Archeological Expedition to St. Lawrence Island. The expedition will be at the island excavating an old village site until mid-September. A type 30DXB Collins transmitter will be operated under the call K7CL on 7 and 3.5 mc. Schedules are desired with amateurs to facilitate traffic handling from eight members of the party. Operator Lane will attempt to contact as many hams as possible. QRA is Kukuilkik, St. Lawrence Island, Alaska; send QSL's to Box 459, Cordova, Alaska. Be on the watch for K7CL.

**Bol-Inda Expedition**

CPIGB of the Bol-Inda Expedition to Bolivia is getting into the States very well. Signals from CPIGB are usually found just outside the high frequency end of the 14-me. band. W6WO has logged the expedition several times, first on July 5th. W5DVW worked CPIGB July 7th at 10:15 p.m. E.S.T. On July 7th W8QDN took a message from CPIGB addressed to A.R.R.L. HQ. W2GQ reports contacts on July 9th and 10th and, under date of July 15th, advised that he was maintaining a regular schedule with CPIGB. W6CB made a contact on July 22d. The latest report on the expedition comes from W3EDP, Trenton, N. J., who made his first DX contacts on July 24th, took a message for Trenton, delivered and returned answer within a few minutes.

**Schooner Morrissey—W10XDA**

14-me. 'phone is being used practically exclusively on this year's trip of the Morrissey to Greenland. W2NV Q5O'd W10XDA on July 8th and 12th, and reports that W10XDA is contacting G5YH, G2SD and G5BJ as well as U.S. amateurs. W1CPX made contact on June 17th. W3ZJ has had several QSOs with the ship, handling traffic for the Navy Department. Under date of August 1st, W9E1B reports working W10XDA at Melville Bay, Greenland. He received two messages from operator Mr. W2VN and relayed them to his home in Brooklyn, N. Y. A schedule was arranged between W9E1B and W10XDA.

Word is received of a Polish Arctic Expedition to Spitzbergen to be out the entire summer of 1934.
at Sarasota. Our emergency transmittor is on the air we are going to run QSO's 0700, 1200-1300, 1800-1900 L.E.T., transmissions.

- Ind receiver for use in the hurricane season in case the lines go out—which they always do. Plans will be made to communicate with other Florida stations in the storm area and also to contact hams in Atlanta who can handle United Press stuff to and from this Section. As soon as our emergency transmitter is on the air we are going to work up tests with Atlantic to be all set when the blow starts."

C. A. Service, Jr., W4 -

1.75-mc. Code Practice

The Central Colorado Radio Association, Arvada, Colo., is conducting a series of code practice transmissions on the 1.75-mc. phone band, Call used is W0PWU, frequency 1967 kes. Automatic sending is used and special attention is given to beginners working for their licenses. The schedule is announced as follows: August 30th-4:30 p.m. M.S.T. each Saturday; September 6:00-6:30 p.m. M.S.T. each Wednesday and Saturday; October 3:30-4:30 p.m. M.S.T. each Sunday; November 7:30-8:00 p.m. M.S.T. each Monday, Wednesday and Friday. December (arrangements incomplete)—Experimental high-speed transmissions 5:00-5:30 a.m. M.S.T. each Saturday. Regular evening schedule to be announced later. If you are interested in these schedules, send them up in front of your receiver so as not to interrupt this service offered by the C.C.R.A.

Coming Meetings

Annual Field Day, Ottawa Amateur Radio Transmitting Association, Labor Day, September 3d, will be held at picnic grounds near Lanark, Ontario. Watch for signs at Lanark. All hams are invited with their YLs, YFs, Ma's, Pa's, etc. Family groups should bring their own eats. Refreshments will be served to outside guests. Bring portable receivers for hidden transmitter hunt, also 50-mc. gear. Prizes for best portable set and for all contests. Program starts at 2 p.m. E.D.T. If weather unfavorable, date will be postponed, and following Sunday, September 9th. Drop a card to W6SMX, 251 Fifth Avenue, Ottawa, if you will be there.

Marin Radio Amateurs, Field Day and Rendezvous, to be held at McNear Beach in Marin County, Calif., on September 16th. Cordial invitation is extended to all hams and SWLs in the San Francisco bay region. Program includes exhibits of transmitters and receivers, contests, swimming, dancing, and "gem-fishing"; 50-mc. demonstration also being planned. Come one, come all!

On 1.75-mc. 'Phone

An excellent piece of 1.75-mc. 'phone work has been carried out by W6JD1, Burlingame, Calif., for over five months. He transmits on rf regular weekly schedule to E. H. Dell, U. S. Government Teacher at Kalskag, Alaska, sending letters and messages from Dell's friends and relatives in California. The schedule has been most reliable with only one miss in a twenty-week period; the miss then was occasioned by work on the speech equipment. FB, W6JD1!

W2CXL says "tell the OM's to quit using 100-foot masts for antennas. How can they expect to get rid of QSB with such 'high-strung' antennas!" Hi.

The Michigan Department of Conservation credits "the amateur radio network" with making it possible to keep a forest fire near Traverse City down to a 1000-acre burn. Soon after the fire was discovered and an order given, the state conservation commissioner radioed a report to Lansing through W8AEQ, Traverse City. The report was received by W8JO, Okemos, and two hours later another radiogram said the fire had been placed under control. This is just one example of the work being done by Michigan amateurs in cooperation with the Conservation Department. W8JO is heading the work.

DX Data

Charlie Perrine, W8CUH/W0AD, relates: "TZ8R was worked some half-dozen times during June, usually the poorest month of the year for Africa. This makes the first year that Africa has been in continuously all year long, QSO's having been had during every one of the last twelve months. Trans-Pacific work has been hampered by poor conditions, although the poor reception has been mostly reported at the Oriental end. Speaking of trans-Pacific work brings to mind a relays we stepped into the other day. Q8O V88AQ on 14 mc. at 1600 GMT, a message was taken from H.A.R.T.S. for Jack Clare of the B.E.R.U. Immediately following the VA with V88AQ, a 'CQ G' was sent, raising G2MA going with his bug, as usual; and the QSP was effected inside of five minutes! J2G is doing yeoman duty in providing W's with WAC."

W6FMU reports that W6XZU has worked all continents on 'phone with 10 watts input to the final stage! This was between October 23 and June 24.

56-mc. Notes

Real DX on 56 mc! W8EQV, Columbus, Ohio, reports logging the following stations on 56 mc. at about 6:45 p.m. E.S.T. on June 20, 1934: W1HQY, Taunton, Mass., W1GTD, Uncasville, Conn., and W2BRI, Valley Stream, L. I. Each station was on a different frequency, and W8EQV feels it could not have been a "rebroadcast." W1HQY, the greatest DX, was using a pair of '10s oscillator, modulated by a pair of '40s. Antenna was a Pickard, about 30 feet above ground. W8EQV was using a super-regenerative receiver, '37-'38 tube line-up. The report checks with W1HQY's log!

W6AM is now using a pair of '45s on 56 mc. to move local traffic around Southern California after picking it up with the regular 7-mc. rig. In Los Angeles it is common practice to hear a score of 56-mc. stations in one night.

W3QV advises of some good 56-mc. work by W3AJF, Glenside, Pa., who has been heard several times by W3B1D, near New Tripoli, Pa., and W3CCH, Mt. Penn, Reading, Pa., 55 and 45 miles distant respectively. On Sunday, July 8th, W3AJF was also heard by W2VII, portable at Sam's Point, N. Y., approximately 115 miles west line, 3RS equipment '45s push pull, modulated by a pair of '250's.

W3AJV wants to hear from home working on 56 mc. in cities on route to the west coast, with ideas of lining up a relay. If you will work with him, or in lining up a coast-west route from your locality to connect together into a national route, drop him a card.

Automatic Relay Work

C. D. Kenter, W3XZ, sends some interesting dope on a "re-broadcast" system which he and W3COT have in operation. W3COT in Haddonfield, N. J., three miles from W3ZX, is equipped with a 56-mc. transmitter and two 14-mc. receivers. One 14-mc. receiver is always set on
W3ZX, the other is used for outside reception and includes a mixer system for rebroadcasting 14-me. signals to W3ZXG on 56 mc. At W3ZX the gear consists of a 14-me. transmitter, a 14-me. receiver, and a 56-me. receiver with mixer to feed the 14-me. transmitter with the 56-me. signal from W3COT and to monitor him at all times. In addition to working quite a few Middle West and West Coast stations, they have worked X1G, G5BJ, GPY, CT1BY, K4SA and ON4AU. This system is found desirable by station Q5O's also, since, while the station worked is transmitting he is received both at times. In addition to working quite a few Middle stations worked is transmitting he is received both 


tivities Managers have been appointed in most A.R.R.L.


's signal went direct to W9USA, while W9USA's signal was received at W3COT and rebroadcast on 56 mc. to W3ZXG.


36V has a remote control system at the present time. G6DL, one quarter mile from Gi5J, will be the 56-me. remote point.


The Official 'Phone Station Appointment

At one convention we found that some of the gang have had the erroneous idea that "O.P.S. is just a scheme to get voice stations to handle traffic." Nothing against traffic, but that isn't the basic idea at all. The A.R.R.L. plan is designed to give all 'phone men a real national organization of their own.

The O.P.S. group constitutes "national" voice organization at the same time an operating code and qualifications are not lost sight of. Through our "parties," tests, round tables, Section "before breakfast" dubs, etc., the operator who keeps schedules and passes on O.P.S. applications and makes suitable recommendations. Where S.C.M. has not yet appointed a P.A.M., voice operators should apply for the post, recommend candidates who are qualified or inquire of the S.C.M. who is their own A.R.R.L. voice-representation. If your Section Manager hasn't made this appointment it is quite possibly because you fellows working on 'phone haven't given him your ideas and asked for it yet.

The phone station appointment (outlined fully in Operating an Amateur Radio Station booklet) does not require traffic handling of any phone station operator ... any more than a WAC certificate requires the DX-minded holder to handle traffic ... or the Official Broadcasting Station appointee is required to do things out of his field. Naturally, since "traffic" is just putting conversations in formal shape for a relay, OBS, DXers, O'O's, OPS, etc., may all handle and report some, required or not! Of course we're glad to have the dope on anything all our stations are doing ... but we call for activity reports. These may or may not include traffic. The O.P.S. appointment does not represent unattainable standards. It stands for above-average practices in station adjustment and operation, thus helping to raise the general level of courtesy and efficiency in ham phone work.

So O.P.S. appointment is not connected with a traffic requirement, but has to do with operating fun at the same time one subscribes to high operating ideals in station practice, and at the same time it lays a sound basis for truly national phone organization.

RE TRAFFIC HANDLING BY VOICE

We have been asked about "phone traffic." Sure thing, handle as much as you like to ... but don't handle it because we told you to, or because you think you have to; you don't have to. A.R.R.L. doesn't believe in high pressuring or "forcing" ham activities. A hobby consists of constructive communications work that we like to do, not that we are obliged to do. Results of forced efforts would not last long. Success in A.R.R.L. organization has always come from volunteer cooperation along the lines of natural interest. The "traffic hound" whose specialty is message handling gets his fun from his tangible accomplishment and the schedule which goes with it. He aligns himself naturally with the O.R.S. group, for that consists of the operators who keep schedules and who have the traffic to handle. With most of us who use "phone, traffic work is incidental; the emphasis is normally placed on rag-chewing and personal friendships, contact over the air supplemented by visits, the finest of personal and fraternal spirit. In reporting activities, by all means report any messages you may have handled in addition to giving the high points of your month's experimenting, visiting, and operating.

While on this subject, we must add the suggestion that all hams who use "phone read Radiophone Traffic Handling" (page 51, June 34 QST). It contains many thoughts for making all phone communications more effective, traffic work included.

Who remembers 'Yuk's' article in January 1916 QST, "Oscillating Audions," in which he informed us that "the most sensitive audion bulbs are those which turn blue at a telephone voltage of about thirty"? When?

--- W1AY/W9FEN/W3COT ---

A.R.R.L. Official Observers

NEED a frequency check? Each volunteer Observer is appointed by his SCM to help all hams keep on assigned frequencies. One qualification of his appointment is that he is required to have an accurate frequency meter. Also Observers aim to help brother amateurs by calling attention to a.c. notes, poor spacing, violations of good practice, improper broadness, over-modulation, poor speech quality, etc., in the right way to obtain maximum cooperation in bettering operating conditions, and ham enjoyment, while they operate their own stations. Observing work over the air is supplemented by sending of postal card notifications requesting cooperation. Some radiotelephone operators are asking that O.O.'s spend more time in the 'phone bands. More properly equipped men are perhaps needed recruited from the 'phone bands. A.R.R.L. Section Communications Managers (page 5 listing) will welcome applications for appointment from properly qualified hams working in the 'phone bands.

Give one of the following men a call when you need to ask QRG?


52 QST for
Counting Ham Traffic

A.R.R.L. traffic totals may include all traffic handled on amateur frequencies (and amateur frequencies only) which is handled with full data included by any standard form of message. That is, A.R.R.L. message form, or N.C.R. or A.A.R.S. form (when in drills or net operation using an amateur frequency) may be used, the principle being that when all essential data required by those agencies are included a message may be considered complete. In whatever volunteer work it is engaged, a station has an amateur status, and the total is a strictly "amateur" total if handled under ham-band conditions on amateur frequencies.

CLASSIFY YOUR AMATEUR, A.A.R.S., AND N.C.R. TRAFFIC

Traffic handled under a government (non-amateur) call, on a non-amateur-band frequency, should not be counted in "amateur" totals reported to S.C.M.s, but should be classified separately. Both the amateur total, and the "army" and "navy" totals, as the case may be, may be sent to your A.R.R.L. Section Manager, who invites these reports. Such totals must be clearly and separately classified, since in our B.P.L. it is our desire to avoid placing amateur-band work in direct competition with that accomplished on special frequencies.

Last December, A.A.R.S. Headquarters wrote us and queried the absolute fairness of reporting totals handled on non-amateur frequencies. It is not only the criticism that amateur operators should not be placed in competition with paid or regular army or navy operators that A.R.R.L. amounr avoid, but attention has recently been drawn to the fact that, given a special clear channel outside amateur-band QRM, it is easier and pleasanter to handle traffic reliably, and an unjust advantage given the operators holding such special permission over those who have to get their traffic through without the advantage of a "cleared channel."

The frequency of the transmitter is the criteria for determining the status of a station. When the transmitter is on an amateur frequency the work can be reported as "amateur" even when you work expeditions, government control stations, etc., that may be on non-amateur frequencies. Stations working with amateurs part time or full time in N.C.R. drills, or A.A.R.S. nets, using a government status and government frequency, are invited to report this work under its properly assigned call for use by the service you are operating in.

A total of 500 or more, or just 100 or more deliveries will put you in line for a place in the B.P.L. * May-June.

About Handling Messages

Message texts should be transmitted exactly as received. The blackest sin an operator can commit is to change a message. Do not accept messages unless and until you have to get your traffic through without the advantage of a "cleared channel."

The N Prefix

Wondering about the number of N stations in the amateur bands these days? Or perhaps you handled a message with N2DYV or N1AMG in the preamble? For a United States amateur station to use the N prefix (in place of the W or K), the amateur must be a member of the Naval Communication Reserve; in addition, the use of the N must be authorized in writing by the Commandant of the Naval District, in accordance with N.C.R. regulations. Information on how to join the Reserve may be obtained by writing Lt.-Comdr. William J. Loc, Office of Chief of Naval Operations, Navy Department, Washington, D. C.

The N prefix is authorized only for use in the 1715- to 2000- and 3500- to 4000-kc. amateur bands. Its use is not confined to Naval Reserve drills or Naval Reserve traffic, however. It may be used, when authorized, by a reservist, in general amateur communication with other United States amateurs. Stations using the N prefix are subject to all the regulations of the Federal Communications Commission for amateur stations. The N prefix (when heard) indicates that these amateurs are active members of the N.C.R. This prefix is a special identifying distinction granted by the United States amateur stations whose reserve-member operators have met the qualifications.
Traffic Briefs

WASHINGTON—W6HRN worked the Hubbard Alaskan Expedition, K7ALT, at False Pass, Alaska, on June 16th.

The Yacht Scaranoche has been granted authority to communicate with amateur stations. Information on work with this ship will be appreciated.

STATION ACTIVITIES

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCOM, Jack Wagner-seller, W3GS—Note new address of S.C.O.M. on page 5. Watch for S.C.O.M. Bulletin to be mailed all O.R.S. and traffic stations Sept. 1st. Due to an error, By2's total of 506 was omitted in last month's report. By258, alone, makes BPL this month. ADE is outstanding in all O.R.S. makes BPL this month. DQP, DBN, ERF, ESH and seller. W3G5—Note new address of S.C.O.M. on page 5. Thanks for first-time report. BWT has

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCOM, E. L. Hudson, W3B4K—CXL keeps 15 daily schedules. BHT has 9 schedules. ASO spends afternoon cottage on Chesapeake. EFW/OZ handles DX traffic. BGI works 28 and 56 m. DML is new O.R.S., Eft has new receiver. DTO is building new transmitter. DRE has power leak trouble. EOG is working for O.P.S. appointment. HPQ has learned Morse. ERZ was on U.S.N.R. cruise, December. New O.B.S. on 7130 kc. JY1ALT, at False Pass, Alaska, on June 16th. Traffic: W3CTZ.

CENTRAL DIVISION

ILLINOIS—SCOM, Fred J. Hinds, WBAPY-WWBR—R.M. is BAND and 9ERU. AE, RTY, IQJ, RDU, MFA and ANQ: rebuilding. BR is on 28 for O.P.S. and 3.5-mc. e.w. HQH is on e.w. and 'phone. PVG got back his old call. HBP, DLO worked a couple of VEs. OXA is c.e. AND not ERU plan a busy Illinois season this fall. Transmitter all set at KJY. KEH received cards from "IT" and 'VK.' RCQ has new KK-20. NDB using Collins matchcover. KIT wants to know if anyone has seen his father. PNE is back on 14 m. OOD is moving to California. DDO and ANQ applied for O.R.S. New 22 final at DSS. OVO created a 7-mc. Zepp. DQJ and CKC are taking portable to camp. SJG worked J2B. HUM had portable at Boy Scout Camp. WC lost his appendix. AFN got R9 from LU. HC and KU. Experimenting on 28 mc. at BYZ. IEP and NIU went to Mich. with portables. JO is putting 212Ds in final of new rig. DBO is making a few RCL short-wave receivers. Pena power at 1ZP. PTW replaced the '10s with '45s. MLH is at 564 for summer. Condenser mike at AD. W3HAS reports from 1ZP to HSM. W3HAS works.


INDIANA—SCOM, Arthur L. Braun, W9TE-HBK is on at Marion. EGQ is experimenting. NBS uses a 59 ess. AM has trouble with 14-mc. rig. CKG operates on all bands. AXH likes 2090 end of 'phone band. SEL is new Indip/ham. SFQ is a doctor at Brownburg. FQ keeps a few schedules. LSZ is grinding rocks. GFS has new transmitter and receiver. P&F and receiver. PEF is planning to build a new rig. PEG has new 40-ft. high antenna. MQQ was heard in Russia. LLV works at Logansport temp. MFW is going to join C.C.C. HSP is trying "50's suppressor grid mod. HFP plans 28-mc. rig. FQ, EUG, CBX, OXQ on 14 m. JY1 is reappointed O.P.S. AFA has new rig working. MQQ has pair 600's with 500 watts input. ARK has new receiver. JZP is going to camp Knox. OKX is QRL service work. KPN wants e.e. receiver. R9 gets out PB. Phone used interested in O.P.S. write the S.C.O.M. Rebuilding: MQV, HUO.

Traffic: W9NW1B 1 MQV 2 HTP 20 CEG-JOQ 1 AXH-FQ 6 DFT 12 GFS 1 PEP 32 MCO 4 MQV 17 HPX 6 KPN 5.
KENTUCKY—SCM, Carl L. Plummer, W9OX—The usual XK is gone and he is a ham fraternity at large more in the loss of 9ETD, who passed on, July 2d. The absence of his well-known and friendly voice on the air will be keenly felt by many his friends. ACN has worked 124 countries to date. AUK received Siberian QSL on QSO of two weeks ago making his work this month 60 plus and traffic business again. EDQ is building new equipment. Sixty mile wind on Friday 13th fails to flatten BWJ’s 73-ft. mast. CIM is trying for W.A.C. HAX is on duty in Chicago until Sept. 10th. CDA is going strong for Bine. PXZ reports entire Paducah gang coming to PANIC. BAN still has an A battery in captivity. BAY, the big whiskey man, is working on PANIC beer nowadays. AZM reports EQV made a bug for the YLs at PCU and away. OZM puts 1000v at 150 mils on P.P. ‘10s! KPL reports LTS new in Benton Harbor. LAL reports with ELD on Boy Scout camp traffic. EGV signs HCC at lake. KAT is after schedules again. KOX is over the pre-Sam peak fever. PTOR reports there were about 30 hams at camp, including HIN on 7 mc.

Traffic: WSDVC 233 QT 210 BTP 203 DWB 157 KOX 117 EGX 114 HBF 112 IFO 104 MV 100 GUC 99 FTV 83 LAL 84 IOR 50 GCS 49 HCC 23 ND 51 HA 28 IPX-2JX 25 FAL 19 MAH is B9 in the outdoors department. Sept. 10th 14 DCQ-DSQ 9 JCS-LFA 8 DYG 7 ARR 6 GRN-HFU-IFE 5 AJJ-IXM 3 FWW-FX-GHP-KYS 2 CM-IKM-JXJ-JIU 1. WBAAM 72 ADY 56 PGC 36 DDK 10 KPE-15 CEK 9 HCC 20 HMK 0 OOG-FX4. OHIO—SCM, Harry A. Tammonds, WBWB—Chief RM W8VP, J. Clayton Nicholson, Cambridge, Ohio. Central Division Convention, Sept. 7th, 8th and 9th, Columbus; see you there. Write Percy D. Jones, 109 East 5th Ave., Columbus, for information. Cleveland amateurs will handle amateur radio at National Air Races, Aug. 31st to Sept. 4th inclusive. Lakewood Radio Club is sponsoring work. SCM. BAH will be in charge as in 1929. Dist. No. 7: VP’S, R.M., new address: 700 N. 17th St., Cambridge. HMR’s new antenna doesn’t help valley location. Dist. No. 9: DUV, R.M., reports new hams, MFI and MDU. Dist. No. 5: CIG says two would-be hams rode bicycles from East Liverpool to visit him. W9UQ worked Fiji Islands. KLP attended ham outing at Clinton, Pa. BMK is first Ohio O.R.S. to get job as life guard. FGY, R.M., handled long haul relay on 14 mc. Dist. No. 4: UW, R.M., has daily schedule with KESWQ. KJN reports several bug-finding hams at Chilton. AMF will be at Camp Knox during Aug. Dist. No. 8: R.M. PV, BKE, is a newbyed. Congratulations, DQC wants a job, BUR, O.S. 28-mc. phone, portable, every week-end. KYQ put up new antenna. Dist. No. 3: APC, Acting R.M., AEK gets all XPDC reports. LCT schedules entry to WPRA. Dist. No. 1: PVC, KWA, JTJ, LWZ, IDG, JMV reports by radio. Dist. No. 2: RKM is cruising on U. S. S. Wilming­ton, N.C.R, EEE, R.M., will cruise with N.C.R. with XK. ANU sends papers for O.R.S. Dist. No. 6: R.M. GSO, JTW is new O.P.S. DZO is moving to new location in Lancaster. EQC reports trunk line circuit: 0M2AA, KKJPT, 6FVQ, 8GJQ, SEQC, 25BZO, 4K4AN, FB, OM1 IQZ will be pounding brass at Camp Perry. Dist. No. 1: KZL sends first report. BBQ does some PB 14-mc. phone work. CHO says, “A.A.RS.’ FGG schedules HWT daily. RN is still on KF8N. HRA keeps baseball schedules with JCO, Detroit. Club meetings of Cleveland Heights meets every Wed. at FPK, 14532 Superior Road. All hams welcome! BON, R.M., was appointed in charge of operators for Air Race work. GJP reports for T.M.C.A., Wireless Assn. at Ashville. Regular schedule every Wed. night. LAC reports that DZV stays up in his plane this hot weather. LAC rewrites. HKV spent week-end visiting CFO at Clifton, Pa. At annual election of officers of T.M.C.A., Wireless Assn. BF elected Pres., A.W. Second Vice-pres., S. W. Secretary-Treas., and A.W. as LAC Activities Manager. Visitors always welcome! UW wins state honors and makes BPL. This report rounds out four years for S.C.M. BAH without a miss!!

Traffic: W8VP 58 BHM 4 EQB 14 DUV 4 AQ 18 FGV 9 (UW 628 ICX 116M W 27 AMP 4 IYO-DCQ 5 AKW 14 LCY 414 DHH 1 LZX 40 JMV 38 KRM 3 ANU 2 ISK 24 JTV 5 BHI 34 EQC 35 IQS-GSO 3 BAH 4 KZL-1CB 1 CIO 30 FGG 4 HRA 8 FFK 6. WISCONSIN—Acting SCM, Carl F. Thoms, W9LFK—Acting SCM’s DATO and LFK. ATO has new antenna for KRP handled traffic for astronomers. LRB works schedules from Y.M.C.A. camp. SDK is new Hancock station. JNU likes Collins antenna system. OXP qualified for O.R.S. KJR worked VK, ZL, CM, X, PY and VP. PQU is looking for schedules. NSM blew filter condensers. JGI’s neighbor’s d.c. fan causes QRNN from his well-known and friendly voice on the air will be keenly felt by many his friends. ACN has worked 124 countries to date. AUK received Siberian QSL on QSO of two weeks ago making his work this month 60 plus and traffic business again. EDQ is building new equipment. Sixty mile wind on Friday 13th fails to flatten BWJ’s 73-ft. mast. CIM is trying for W.A.C. HAX is on duty in Chicago until Sept. 10th. CDA is going strong for Bine. PXZ reports entire Paducah gang coming to PANIC. BAN still has an A battery in captivity. BAY, the big whiskey man, is working on PANIC beer nowadays. AZM reports EQV made a bug for the YLs at PCU and away. OZM puts 1000v at 150 mils on P.P. ‘10s! KPL reports LTS new in Benton Harbor. LAL reports with ELD on Boy Scout camp traffic. EGV signs HCC at lake. KAT is after schedules again. KOX is over the pre-Sam peak fever. PTOR reports there were about 30 hams at camp, including HIN on 7 mc.

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DAKOTA DIVISION

NORTH DAKOTA—SCM, Fred J. Wells, W9JPV—KB6 uses Goyder Lock. PGO joined C.C.C. JZJ worked on 40 mc with 5 kw at Fort Rucker. EML is putting in Collins coupler. FVV will have 1.7-mc. 'phone. FSF has new Class "C." OEL has 50-watter in final. EH2 is putting in high power. RPD has new power supply. PVA visited S.C.M. SAW uses 71s F.P. PPL sent FB 1.05 V. MZE is working on new phone. HJC ordered new K20. AVT will be on 1.7-mc. 'phone. PRU reports by radio. AOX is getting ready for 3.5-mc. traffic. RQX has new M.O.P.A. DGS reports J.R.R.C. is being reorganized. New hams: SGN, RYU, SEQ. QRL will use JRW. FSW, E8J, and EFN are active.

Traffic: W9EBE 73 PGO 21 JZJ 18 PDC 13 LH5 15 FVV 6 FSF 3 OEL 14 PQW 16 EIIK 1 NAW 3 PFA 1 SAW 7 PRU 1 JVP 32 DGS 10 EFN 2.

SOUTHERN DAKOTA—SCM, Mike Strahan, WP9PI—IQZ reported by radio for Pierre gang. PFI has 212D. RWY and SEB are new Pierre hams. OXC moved to basement. GRJ got new ops ticket. CFU is putting up new Herta. GTG is building new receiver. FLO went fishing. DGR is vacationing in Yellowstone Natl. Park. 1QD is spending month in east. PHD is rebuilding. Ex5CRT shows many hams active on 56-mc. traffic. TY reports SCB new YL ham at Vayland. SCB visited HIA and reports stratosphere. HIA reported phone. QGI called in S.D. GPB moved to Sioux City. OED visited TY and SCB. Miller Radio Club organized with ten members. DNS will have KE20 final.

Traffic: W9QZ 10 PFI 1.

NORTHERN MINNESOTA—SCM, Robert C. Harrahberger, W9JIE—6GMT visited LAY for two weeks. FEP is putting in windmill battery charger.


SOUTHERN MINNESOTA—SCM, Francis C. Kramm, W9DNL—HCC finds traffic on 7 mc. DEI lost antenna by lightning. FCI will attend radio school. RHT is working for O.R.S. MOW is our first O.P.S. GNU has new super. PDL blew filter Friday the 13th. BTZ put in 800. RAB may get job in Bolivia. BN keeps four schedules. DH hopes to have 'phone on soon. AIR is home after operating on river. FYA is back to radio after trying commercial art. EGG's antenna blew down. MXW will be on with 500 watts. FJL is proud father of a baby YL. Congratas. PJU uses P.P. '45s final. JZJ is building 3.9-mc. 'phone. PEV heard a 23-mc. signal. GIE concentrates on 56 mc. FNK uses '03A final in portable. HRT reports Camp M-H.A.R.C. July. 6MC, and MZN gave up their bachelor standings. FWN schedules with GTS. KDI attended N.G. camp. DMA worked lots of 14-mc. DX. OAK works 270 volts in can. ELA worked all continents. ADQ uses 28-mc. 'phone. GXX of Hills. EMA and MN are at hospital in Rochester. MOW is prospective O.R.S. PAS has flea-power 1.7-mc. 'phone. MNO crouches two new hams. RBW has new YL and bug. Club News: Fairibault Club moved into new club rooms. St. Paul—Minneapolis clubs had lots of 56-mc. activities at their picnic. Rochester Club has big interest in 56-mc. Traffic: W9KBE 32 JZJ 29 W9DNL 28 H9DK 26 W9JIE 24 W9QZ 23 W9U 19 W9PE 19 W9L 14 W9KBE 12 W9QZ 11 W9L 9 W9KBE 7 W9QZ 6 W9L 5 W9KBE 4 W9QZ 4 W9L 3 W9KBE 3 W9QZ 3 W9L 2 W9KBE 2 W9QZ 2 W9L 2 W9KBE 1 W9QZ 1 W9L 1.

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MISSISSIPPI—Acting SCM, W. P. Allen, W5VJ--CWQ visited 4PL for a week. DEJ was operated at Boy Scout Camp with pair of 'OlAs with 270 volts on plates. DDL is on with 50 e.c. GQ changed to 59's parallel in output. AKP is on in Booneville. EHF attends N.G. camp. DXG works 7-mc. 'phone. (Most of this report furnished by SCM.)

Traffic: W5DJE 143 CEK 4 KC 10 DEX 2 AXU 5 BZ 62 CMQ 42 BPL 4 HR 17 BID 23 CTR 7 DLD 4.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Robert E. Haight, W2LU—BZZ is organizing N.Y.S. Traffic Net. EGF FB total with FB skeds. LU is on 3600 kcs. BJX reports for M-H.A.R.C. PQQ is new O.R.S. IKE schedules with GTS. JZJ has handled traffic for EZJ. Camp Smith, GRY operated EGE, White Plains. CC total 300 schedules with V5KHG! UL is after Class A ticket. GQG schedules with K5Y and BYL. FCT worked CTIGU with 4.08 watt input. EXO lost power equipment. GNU reports new Ozingham ham. EFG. ACY is DX King of Schdt'y. CJS plans visit to A.R.R.L. ACA is on 14,332 kcs. DC on 'phone, handled traffic from WIOXD and LUSDR. DHE has 30 watts output. BBL spent vacation experi­ menting. FXQ building a new rig. DMF reports with new ham. GTW reports 8MFU, new call, Matamoras. Pa. GBP is using portable at Alton Bay, N. H. QY is on 56 mc. DTB captured W.A.C. ADC is on 14 mc. DVS invested Germany. BCT does work for JAC. JVP is on S.C.M. FPP contacts S.C.M. DYC and 8AW, Detroit.
visited 2LU. GWY has RK-20 last stage. DWQ contacts S.C.M., with club's new transmitter, BXH is new member, M-RIA, R.C. CWT, ENE, GFI, and UN are active on 56 mc. COY is on active duty with NCR; trip to Cuba. DWO is working at N.B.C., Radio City. CBT uses pair '10s P.P. final. BWG is building super, FDQ blew '66s. EGA uses at Long Beach for summer. HFG is on 3580 kc.

NEW YORK CITY AND LONG ISLAND—SCM, E. L. Baumach, W2AZV—ELR BLEPs for seventh month. EYQ is trying new antenna. DJP has c.e. rig built by DUP. FF will be on with 500 w. rig. GDF visited 9USA. A machine shop class. EVA reports AK1'K gets into Conn.

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BPH's shack gets HOT trip to Cuba. DWO is working at N.B.C., Radio City. CBT uses pair '10s P.P. final. BWG moves to Kingston. graduated. CBB has temporary Hartley rig going for 2 C,JS S.C.M. with club's new transmitter. BXH is new member.

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MAINE—SCM, John W. Singleton, W1CDX—HTG uses 1.7-mc 'phone. CDX is DXing on 14 mc. GRC has received EFY's schedule with 7k hit by lightning. EFY is traffic manager of "73" Radio Club. AQV is QRL Bates. HUX is building o.c. rig. IDN has lots of fun with 56-mc. rig. ALO is active on 56 mc. HXO has a Harvey transceiver. 1FT is new Wildom ham. FXX is new O.R.S. FBP blow lamp of speech apparatus. IAP and IBM are new Augusta hams. GBM and EBM are running a concession at Skowhegan. Bangor and Lewiston Fairs.

Traffic: W1BTD 59 GQ 17 CDX 41 GEC 12 CBU DHH 11 BNC 4 ELY 7 AQV-IBM-HUX-1DN 1.

EASTERN MASSACHUSETTS—SCM, Joseph A. Mullien, W1AST—ASI and CNA are on 56 mc. with portables. ABG and BEQ are on 56 and 3.5 mc. KJ claims first legal QSO between moving auto and plane. EVJ is QRL orchestra work. BWB is QRL summer business. RE works on 1.7 mc. Hot weather doesn't bother FRO's traffic total. GCL reports heavy damage to outfit from lightning. 5k is QRL Signal Unit at Fort Devens. DOP reports heavy damage to power supply. BR is O.P.S. Nr. 13. HKY is building Tri- tet. AZP is DXing. FFO will be next O.R.S. ACD works portable at Lonesome Lake, N. H. IDU just got ticket. CRH of Somers is operating WUBL, U.C.C. station at Seaside, DHZ has hard luck with 56 mc. DK! is building Tri-tet.

Traffic: W1ABG 37 RE 67 EVJ 24 BMW 1 RE 3 HZQ 4 FRO 145 CRA 27 HKY 1 BZQ 24 FPO 35 ACD 9 CEL 72.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—Thanks, gang. Will do my best. ASY (the former SCM) wishes to thank all those who assisted him during 1933-34. EFM has new Silver 5B super. GHU blew power pack. New equipment: BNL- and RK 20; COI-59 Tri-tet; DVTW—SW3. ZB is experimenting on 28 mc. A3D had schedule with Port Devens. FN'T lost antenna and chimney in storm. EBF maintains A.A.L.S. schedules daily. Please note: monthly reports are expected from every O.R.S., O.P.S., R.M., O.B.S. and O.O. Failure to do this will mean cancellation of appointment, in cases where interest no longer exists. In out of fairways, out of fairways to the rest of the game. Let's go, boys!


NEW HAMPSHIRE—SCM, Basil Cutting, W1APK—The SCM visitted FUR, owned by Prof. Fieldard; he has a wonderful outfit at Seabrook Beach. BAB is getting active again. AGO has dynamic mike. KJQ is going to outfit from lightning. EMT has rig built on class 1. AFU plans to visit Twin State Radio Club. reports visit from W7CPI. DJ A has new steel trans­

Traffic: W1AN 145 ERQ 63 FEF 124 HIJ 6 GHT 53 AOD 1 COI-59 Tri-tet.

REHOE ISLAND—SCM, Albert J. King, W1QQR—GNT reports dukes doing FB. CRP has '52 final. A3Z was hurt in auto accident. GOG has portable at Sheldron­ville. HRC has been assigned WLGK in A.A.L.S. CAC is rebuilding. FAA moved to Pittfield. IRG is G7N's offspring.

Traffic: W1C8 68 CPV 55 HRC 32 GOG 22 ASZ- QR 10.

VERMONT—SCM, Harry Page, W1ATF received visits from BD and BLP. GAE is arranging sched­

Traffic: W1CNF 23 GAE 11 GXP 5 ATF 3.

NORTHERN DIVISION

ALASKA—SCM, Richard J. Fox, K7PQ—RNA, BNP A and RBN; new hams at Reddichan. DGR complains that high frequency acts erratic at 35 to 75 below zero. CAN reports 14 mc. excellent for east coast work. BNW reports visit from W7CPL. DIA has new steel trans­mitter frame. EBR is QRL commercial work. CF erases a 3.9- mc. 'phone crystal. AOC puts out a wicked signal on 3549 ke. PQ schedules W1CWF at 7 at Lake Onnlor daily, HJU is on the air from Guard Island Light.


IDAHO—SCM, Don Osebillough, W7AVP—BDS sends FB report from Northern Idaho. Thanks, Doug. DCG has been working JX. EKX has new Gross transmitter. EKX is building portable. A1Q is vacationing in hills. EEM has W1CVF built on 7 at Lake Crillon daily.

Traffic: W1AVB 190 EJF 14 VRS 46 ASZ 19 GHT 100 VRS.

OREGON—SCM, Ray Cummins, W7ABZ—DAY is now A.A.R.S. ANV apply for O.P.S. CHB is vacating on at Sealdean. DHZ has hard luck with 66 mc. DK! is with EY at C.C.C. camp. CIE's new rig sure works.

Traffic: W7ABZ 190 EJF 14 VRS 46 ASZ 19 GHT 100 VRS.
the DX. BHY returned from Notre Dame. DBZ built 4-tube super. RE returns to air after long absence. DVK has new Collins transmitter. WL has new antenna poles. BUF schedules ZL's on 'phone. AVV will soon have kw going. BUB is in Medford C.C. camp. BMN is rebuilding 147-CQ. BWD is vacating in Calif. EJO owns drugstore in Portland. CBD contacts ZL's and VK's with ease with new rig. AIG is rebuilding. DNF is vacating. MF is new WLYO, A.S.N.C., A.A.R.S. DDG is new O.P.S. AZQ has gone 'phone for good. ARNQ welcomes a new SCM in WATMP Frank. Black, and all reports are to be sent to him. I have fully enjoyed serving the amateurs of this great state of Oregon, and will miss the friendly contacts that one gets in the S.C.M.'s office.

Traffic:

* WTDAY 1 DP 13 WR 30 DHZ-DXK 1 EJY 8 CTK 78 BHV 1 WL 6 AVY 52 BUB 45 BMN 7 EJO 22 CHJ 12 COU 34 MPF 141

WASHINGTON—SCM, Stanley J. Bolleau, W7AYO—APS says mostly ragchewing this month. RL has good supply. ECX is troubled with power line noise. BBK re, l,D was away from home this month. DZX is joining back on N.C.R. cruise to W6. BBB handles lot of K7 traffic. DRY is going to work again! CBI, a real O.T., is on the air again. GHD has made new rig on way. KZJ is on the air again. KXZ-IVT-TEV-PD-IDW-KEY-IVU 4

PACIFIC DIVISION

HAWAII—SCM, A. O. Adams, K6EQW—BAZ schedules BUA on 14-mc. phone. YAF schedules VE5ER on 5.5-mc. phone. CIB and VG are rebuilding. BFI/ECN is doing nice work with new rig. CRT left for Coast. HOQ expects his orders any day. GUA says, "nothing like P.P. '60s." HLP finally mastered "bugle" and has new rig on way. GHA is going to work again! JHI of Palm Springs is on in final. LY is coping on 28 me. ANN worked G2KK, but needs more water. ON. says Collins antenna network FB. CUH/QD-IRT-DZR-BVZ-BQF-GJA-V0 1

SANTA CLARA VALLEY—Acting SCM, Barton A. Wood, W6DBB—DBB put up single-wire fed hexas. HOQ schedules L.A. and San Jose. IED worked all continents with a '10. CUZ worked G, ON, FS, D4, JA, OA during last month. BMW is fighting forest fires. GBI uses unity-coupled rig. FYD has c.w. transmitter. HZQ is rebuilding to higher power. HJP has '03A same, 86-me. no one has ability for two-way contacts with BPL, CEP, DUW, DZE, EEX, FZF, HC, KPR, heard HBB and was heard by AOF. Successful communication between San Jose and Mt. Hamilton was also accomplished.


EAST BAY—SCM, P. W. Dann, W6QX—RJ got emergency equipment ready for strike area. EJA is handing P.L. traffic. EX contacts east coast and 150 at night. HWP of Richmond reported. DHS was called to active duty with C.N.G. FS had FB time at A.A.R.S. Hamfest at Yosemite. HRN gives the S.C.M. following dope: HRG is on 14 mc. IEW is on 14-mc. 'phone. F6Q's 50-watter went into F1Q. ATJ is going to L.A. on vacation. FJQ has plenty of grief, GXM, star traffic hound from L.A., was visitor at S.C.M.'s, as well as COF from Hughson. AHF is just home from Orient. GQX is going to work again! CBI of Palm Springs is on in front. EBQ is going to work again! HRT is going to get Class A soon. BLQ is on 1.7-me. 'phone. Gordon Anderson (Call please, OM) reports FB reception at Yosemite. KNO says IGA and AOF visited him. KNO and HZM are new O.R.S. GAO is doing fine in his new brass for commercials. GAO is doing fine in his new store in Georgetown. Our greatest sympathy and regret to BFMR in loss of his father, JIDI is Unit Control in Petaluma. BHZ lost new '66s. BNA is recovering from operation. GQX is expecting fifty. JDJ has one schedule. KZJ is U.S.N.R. man in Inverness. CAL worked four districts on 28 mc for 3 months. JZQ is working again. KBI is active again.


SACRAMENTO VALLEY—SCM, George L. Woodington, W6DBW—DVE—DVE used portable rig on vacation. CMA sent good report on A.A.R.S. activities. CXX, CZZ, and KKL are on 1.7-me. 'phone. KME is new call. IMJ is going to Tri-tet. KCA is c.w. 1MV builds transformers. EOU is going to work with W. N. G. O. D. station. GYM is going to C.C.C. camp. KBD is building brass for commercials. GAC is doing fine in his new store in Georgetown.

Traffic: W6EBW 55 GAC 29 CGJ 12 IZL 8 DVE 4 KCA 3 GY 1.

ARIZONA—SCM, Erneso Mendosa, W6LBF-QC—
ALU is promoting for Flagstaff N. G. encampment. JIG worked his first Cuban QSO reports from Camp Moctar at Parker. KOL is on 3.5 mc. with 45-46 MOPA. FIP says Army will furnish him Comet pro! HCX is trying Collins coupling. ISO uses Goyder lock system. KSE is new member. IOK is rebuilding to c.c. P.P. 10 final. IZU has new super. GBS and BLP had all-night session with Budlong of HQ’s at recent Federation of So. Calif. meeting. KRU is new Tucson ham. DQ is completing new rig. FFP is on 7294 kc. GYM has e.o. outfit. JVO is rebuilding to c.c. P.P. 211 job. KIR (ex-5528-ZZBC) may soon sign as an X in Mexico. DPS was home for visit from L.A. radio school. JIK reaches back east with 45s. IMR is on 14 mc. and received card worked from Belgium. GZU and EFC are on 14-mc. ‘phone. FEA has three complete ‘25 rigs. EAW is on 1.75 mc. BRI had her face lifted—by old Sol! GBN is overhauling receiver and generator’s gas engine. BFA schedules Army portable QC for traffic to Mexico. LAD has GBS and had GBS and LAD is strictly portable. JHF stays on 7 mc. exclusively. KBJ ordered new Westinghouse cabinet. CEC and BNV are about to return to the air, at Sunnymead, Calif. Club meetings at Phoenix are every other Wednesday at 7:30 p.m., M.S.T., at C. of C. Bldg. More O.R.S. and O.P.S. are wanted. Let’s have more applications!

Traffic: W6AUU 900 IIG 74 QC 44 KOL 7 FFP 5 HCX-1BO 4.

PHILIPPINES—SCM, Newton E. Thompson, KAIIX—P.A.R.A. meeting was held at KAIJR, June 24th.

Traffic: KA1IR 1641 NA 642 EE 522 CM 327 AN 239 LG 225 RC 175 CS 101 SX 100 FS 96 XA 60 JR 12. KADB 258 GJ 276 KMM 372.

SAN DIEGO—BPH—SCM, Harry A. Ambler, W6EOP—FWJ handled considerable Asiatic traffic through K6EQW via #AZU. BPH-schedules portable at Y.M.C.A. camp. KBU has new e.o. rig. FEP is southern terminus for trunk line F. KBD is rebuilding to 800 final. BOW schedules EZD in Utah, Idaho and LD are rebuilding ‘phones. CNK is looking for new receiver. GTM worked F and VO. FKT reports Fallbrook Radio Club active. BAS had SW3 stolen. AKY had SW3 and transmitter stolen. HQM worked VO. BAM says 14-mc. DX is good. DNW returned from camping trip.


WEST VIRGINIA—SCM, G. H. Lavender, W6DZN—AAY ops at Fresno G.C.C. camp. GXL is building portable. KEV is building a.r. super. BXB worked a VK. GEO is heard again. JIN is in S. F. strike area with N. G. FFP is in race for S.C.M. GQI has new rig. DQR is on sea with U.S.N.R. SF keeps busy shooting trouble for hams. IKG was elected secretary of Stockton Radio Club. KGO went to sleep during a QSO. GJJ works in lumber camp. FV and CQI work ‘phone. IIP can’t tune his feeders. HJJ is on 3.5 mc. DXL after five years of rebuilding, is still at it. In 1919 DZN was QSO QI; the last QSO was July, 1934, marking 15 years between contacts. BBQ is working trans- Pacific. HAX was seeing a sweet signal. CVL has portable to move rig out of house. During labor strike Manteca Power was shut off. Better start making plans for cou-

Virginia—SCM, R. N. Eubank, W3AAJ—ant schedules K5AA daily, K5AF Tues. and Fri. BZB makes Third-Class Phone ticket. DQB is c.c. ’47–46. BTR and BB are on 14 mc. ECO has 47 e.o. DBI is Petersburg S.W. Club. CKM is on 3.5 mc. EGD is building c.c. ‘phone. EHL uses ‘47. ENO is QRQ summer school. MQ is building 56-mc. rig. BAG has Tri-tet. EPIK is on 3785 kc. DZW is building s.s. super. BYA is WILQ. DSCU schedules HYA and CYK. JSI schedules BYA. OAI helps ‘em set in band. BIW has new HK0 rig. APU is building 1.7-mc. ‘phone. EPS reports for first time. CYK operates 3.9-mc. ‘phone. AMB is QRL Scout Camp. EBK has power supply trouble. BI will have rigs at N.G. Camp. VA. Beach. BEB uses 1.7-mc. ‘phone on the G. Major’s wife. HAX had GGS and BLP for visitors. GFK installed Tri-tet. CMT’s O.R.S. is looking for new receiver. GTM worked at K6EQW via #AZU. BPH-schedules portable at Y.M.C.A. camp. KBU has new e.o. rig. FEP is southern terminus for trunk line F. KBD is rebuilding to 800 final. BOW schedules EZD in Utah, Idaho and LD are rebuilding ‘phones. CNK is looking for new receiver. GTM worked F and VO. FKT reports Fallbrook Radio Club active. BAS had SW3 stolen. AKY had SW3 and transmitter stolen. HQM worked VO. BAM says 14-mc. DX is good. DNW returned from camping trip.


WEST VIRGINIA—SCM, C. S. Hoffmann, Jr., W8HD—EIK-WLHG has honor of being temporary Alternate Army N.C.S. Ed. Day of WLM spent vacation with EIK. DPO’s W.A.C. certificate arrived! A baby girl arrived at home of HD/WLHF, S.C.M., June 27th. FQB desires to join A.A.R.S. HWT is new O.R.S. JRL works with the second unit. HWT is new O.R.S. JRL is in Indiana. BDZ, AEI, AJJ and FE are rebuilding. FJ will have rigs at N.G. Camp, Va. Beach. BEB works on Hamfest. BGS is on 3.5 mc. EGD is building c.c. ‘phone. EHL uses ‘47. ENO is QRQ summer school. MQ is building 56-mc. rig. BAG has Tri-tet. EPIK is on 3785 kc. DZW is building s.s. super. HYA is WILQ. DSCU schedules HYA and CYK. JSI schedules BYA. OAI helps ‘em set in band. BIW has new HK0 rig. APU is building 1.7-mc. ‘phone. EPS reports for first time. CYK operates 3.9-mc. ‘phone. AMB is QRL Scout Camp. EBK has power supply trouble. BI will have rigs at N.G. Camp. VA. Beach. BEB uses 1.7-mc. ‘phone on the G. Major’s wife. HAX had GGS and BLP for visitors. GFK installed Tri-tet. CMT’s O.R.S. is looking for new receiver. GTM worked at K6EQW via #AZU. BPH-schedules portable at Y.M.C.A. camp. KBU has new e.o. rig. FEP is southern terminus for trunk line F. KBD is rebuilding to 800 final. BOW schedules EZD in Utah, Idaho and LD are rebuilding ‘phones. CNK is looking for new receiver. GTM worked F and VO. FKT reports Fallbrook Radio Club active. BAS had SW3 stolen. AKY had SW3 and transmitter stolen. HQM worked VO. BAM says 14-mc. DX is good. DNW returned from camping trip.


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ROCKY MOUNTAIN DIVISION

U T A H - W Y O M I N G — S C M, Arty W. Clark, W9GQC-IDM—Utah: 6HVU built 28-mc. rig. JYD and KDI keep schedules. KOP built Collins coupled. GQG built Dudding Radio WXXV when FAE left. BTK is one of the "sawyers" at Yellowstone Park. DGR left for N.C.R. cruise. IAL built portable receiver. KFW took portable on trip to canyon. ZSBZ went to W6KBC. DUKC is loaned from DODR. EKR gets results from low power. ARK and CRR appeared on opening program at KWWY, Sheridan. EMQ is new Rock Springs station on 1.75-mc. phone. BJS is first O.P.S. in Section. DLE is catching ether. COE is first "O.R.S." for mountain trip. CSE says, "Too much fishing." We regret to announce the death of 6JXU, Earl N. Richards of Henefer, Utah. His brother amateurs will miss him greatly.

Traffic: W9FRN 277 GQC 343 BSE 166 KDI 74 BTK 57 HVU 18 AFN 5 JYD-KKM 2. W9CCH 63 CSE-DIE 7 BJS 25.

COLORADO—SCM, T. R. Becker, W9BTO—PWO is rebuilding phone. GQG is moving out of state. I9GZ built a tri-tet. ECV is on with new c.rig. EHC is using Tri-tet. FXQ is now at Craigmore. DNP handled a mess of D.A.V. convention traffic; P.P.A.R.A. furnished him some operators, including KI, DYT, KNE, IAK, and K5KOG. JPS is 14-mc. receiver. PGS blew his jh. HIR is on phone. SAX is new ham. IPH has elaborate frequency measuring set-up. BYK changed Q.R.A. LYE is in Texas. HYY is building condenser mile. KRG is vacationing in east. FYY and HKR are building tri-tet. JCA is back in Denver. ESSA is enjoying vacation. FA has his QRA with APQ. EMU is on vacation. AAB is QRL photography. JB helps keep KGPX on the air. BTO goes fishing. JNV is back from fishing. We regret to announce the death of 6JXU, Earl N. Richards of Henefer, Utah. His brother amateurs will miss him greatly.


SOUTHEASTERN DIVISION

A L A B A M A—SCM, L. D. Ellwell, W4RNE—SN worked a VK on 14-mc. phone. JBA made good in Atlanta. QSO Party. DS, Chief R.M., is QRL A.A.R.C. RS and BZG are rebuilding. EO moved back to B'ham. ANT is starting on c.rig. soon. GL, R.M., reports the Mobile gang rebuilding; i.e.—BXX, CRF, CQM, CQV, GL, OA, and CBI. COU passed 1st class radio-tel. exam. CIQ is on being moved to new club room of M.A.R.C. CUE, station of B'ham Club, is new O.B.S. APF is serving third term as club president. BOJ is headed for N.O. camp. BKM is preparing "phone party". BJO-EF has his K5B2G. JRV is a 14-mc. receiver. PGS blew his bl. HIR is on phone. SXA is new ham. IPH has elaborate frequency measuring set-up. BYK changed Q.R.A. LYE is in Texas. HYY is building condenser mile. KRG is vacationing in east. FYY and HKR are building tri-tet. JCA is back in Denver. ESSA is enjoying vacation. FA has his QRA with APQ. EMU is on vacation. AAB is QRL photography. JB helps keep KGPX on the air. BTO goes fishing. JNV is back from fishing. We regret to announce the death of 6JXU, Earl N. Richards of Henefer, Utah. His brother amateurs will miss him greatly.
receiver. AVK reports silent key. Lloyd Flood, W5DEY, ex-W5BLB, who was killed in dynamite explosion. DPK, Shawnee, reports for first month on the air. ASB is back after year’s absence. ETA is new Ponca City ham. AVB takes vacation up north in lake country. ATB has pair of VKs.

Traffic: W5CZE 266 EFR 91 BQZ 71 AMT 45 EIEP 32 CON 25 DTO-BEKK 13 AIR 11 BDX 7 6 EIES-DDW 5 BWN 2 CFA 1.

ON TAILO DIVISION—SCM, David H. Calc, W5BHO — PF is spending summer at Tex. Univ. BWM reports 8IS new call in San Ant.

Traffic: W5LIN 200 BFA 69 BJ 15 MS 12 CVW 7 ADZ-PF 6 BWM 5 DPX 2 BFP 25.

NEW MEXICO—SCM—ET has new 8. New Mexico College of Agriculture and Industry.

Traffic: W5DUI 15 DLYV 5 CJP 58.

ON TAILO DIVISION

ONTARIO—SCM, S. B. Trainer, Jr., VE3G7T—QB, new R.M., leads Section in traffic. JT, new Chief R.M., for Ontario, relayed W5K message to H.R.E. Prince of Wales which IB got from VE4RF. DQ is still active, building rig on 1.7-mc. phone, for one of its KW. DLG has been QRL power company. CSR has ‘52 final. EAD0’s family moved from Pueblo, AOE and ASR are building rig, phone. RVY is new ham in Olive. N.M. CSR, AOE, and BNT are going to National Guard camp. AOP is taking portable to schedule DUT.

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Probationary Period? Yes!

Riverhead, Long Island

Editor, QST:

I should like to take advantage of the invitation in the editorial columns of July QST for discussion on the question of restricting the activities of beginners in amateur radio. There is no doubt that we are in dire need of some sort of restrictions. A few hours of scanning the high-frequency amateur bands should convince almost anyone.

In any highly specialized field of endeavor it is common practice to put beginners on a probationary period during which they gain practical experience. Consider, for instance, a medical student. When he graduates from college, do they hand him a thermometer and a bag of instruments and let him run wild? . . . Before a doctor can go out into practice he must serve as an intern in a hospital for about two years. In this period he learns to put his theoretical knowledge into actual use. Suppose you wanted to become an airplane pilot. Would you study a set of more or less standard questions and answers, take an examination, and, having passed, step proudly into the cockpit of a plane and "give it the gun"? Of course not! Yet in amateur radio thousands of fellows who don't know what it's all about are going on the air without any previous experience.

It may safely be said that about ninety percent of the amateurs at the time of passing the examination for an amateur operator's license know practically nothing about radio. True, they have satisfactorily answered the questions asked, but what does that mean? Nothing at all. Anyone with a good memory should be able to pass the exams whether he knows what he is talking about or not. It isn't a test of one's knowledge of the subject. Many 'phone amateurs in the 4-mc. and 14-mc. bands, who are supposed to have superior technical knowledge, seem to lack a thorough understanding of what is going on in their sets. Just listen to the twaddle bounding back and forth in these 'phone bands some time when you feel in the mood to be amused. Even amateurs of many years' experience sometimes have the most fantastic ideas of the simplest radio phenomena.

New amateurs should certainly be kept out of the DX and the traffic bands until they have become proficient in handling a station. The best of equipment in the hands of an unskilled operator may cause unnecessary havoc, and most beginners start out with the flimsiest of makeshift apparatus. It is just such stations that are likely to have notes covering half the band, making life miserable for everyone else, or, worse yet, to be operating outside the bands and giving amateur radio a black eye.

It is well known that in most foreign countries certain restrictions are put on the activities of beginners in amateur radio. Probably the most familiar example is in the case of England, where, before an amateur can go on the air at all, he must operate for a given period with an artificial antenna. This arrangement gives him all the advantages of actually being able to tune and operate a transmitter without the disadvantages of improper radiation. There is no way to become accustomed to the feel of handling apparatus except by actual practice. However, some discretion should be used in selecting the place for this practice. If you were going to learn to drive a car you wouldn't pick New York's busy Times Square as a nice place to do it. You would naturally go where there was as little traffic as possible, where you wouldn't be so likely to get into trouble.

... The ideal solution for minimizing interference from beginners is, of course, the artificial antenna arrangement. However, rather than to impose quite such a drastic restriction on beginners, I should recommend that, after passing an examination such as is now given, they be issued a provisional operator's license, for a period of two years. This license should allow operation in the 1.8-mc. band only. At the end of one year, but not before, the holder of such a license, providing he can prove a certain satisfactory amount of actual operating activity, should be eligible for a practical examination. This should be an actual test in operating technique, to show whether or not the candidate is fit to be allowed in the higher frequency hands. Upon successfully completing the test he should be issued a regular operator's license.

... I believe that a procedure such as outlined above would tend to raise the general standard of amateur radio. To open our crowded bands to anyone who can pass the present exams is exceedingly undesirable, but to allow the same privileges to the holder of a class C license, where the chances of dishonesty in taking the exam are so great, is a rank crime.

—Arthur M. Braaten, W2BSR
Editor, QST:

After reading your editorial in the July issue asking for a discussion of the problem of occupation of the amateur bands by new amateurs, I must raise my voice against the suggestion appearing therein.

Restriction of operation in the higher frequency bands, merely because the operator is inexperienced, seems to me to be unjust. In my opinion, the larger part of the interference to be found in the 7- and 14-mc. bands is caused not by new men, but those in the game long enough to know better. Almost invariably, the new man is the one who has taken to heart the now famous precautions and rules for obtaining a p.d.c. wave free from annoying wabbulation, and can quote QST and the Handbook on this question. He is enthusiastic, and perhaps the greatest desire he has is to work some DX. Should he be denied this thrill by being relegated to a band which is less desirable from this standpoint? No, OM, he deserves more welcome than that. There's room in these bands for every ham who is willing to put out a decent signal. QRM resulting from overoccupation of the bands must be answered by a demand for more space, use of more selective receivers, and a little courtesy and consideration for the other fellow.

If we must resort to discipline in the form of restriction, a good plan might be to require any man who has received a notice from the authorities on account of gross infractions of the laws, to spend a probationary period where he may repent and improve his equipment.

I heartily approve the method used to restrict phone operation in the prize phone allotments. This same method might be used to advantage for the c.w. man. Let him demonstrate his technical ability by examination, and let him answer the questions correctly that assure the licensing authority that he knows what causes bad signals and that he knows how to overcome them; but keep these examinations open to the new man. If he passes, let him go immediately into the DX bands and not into the less efficient lower frequency bands to let his enthusiasm cool and keep him from making frequent foreign contacts.

I believe the majority of the men feel the way I do about this question. They will put up with crowded bands so long as these bands are not cluttered up with rotten, illegal, selfish signals, for which there is absolutely no excuse in these days of crystal control, stabilized oscillators and low cost filtering devices.

—John J. Ormston, Jr., W2CFN

Editor, QST:

I have every desire to avoid acrimonious discussion with any member of the amateur fraternity, but I feel it is my duty to take exception to a statement appearing in the unsigned “editorial comment” of the magazine “Radio” in its June issue.

The statement referred to appears in the second column. Reference is made in this column to verbatim remarks of several senators as reported in the “Congressional Record” of the Legislative Day of April 26th. This is a very indefinite way of indicating the actual date when the remarks were made in the Senate, for, as a matter of fact, due to recesses taken from day to day, the Legislative Day of April 26th continued over many days, namely, from April 26th to May 9th, inclusive. If the writer of this editorial had knowledge of what actually occurred, it would have been much more accurate to have made reference to the date of the “Congressional Record” upon which these remarks were made, which was May 1st, the date the Madrid Telecommunication Treaty was acted upon in the Senate and the Resolution of Ratification was agreed to.

The statement referred to in the editorial reports that when the Madrid treaty ratification came up for discussion in the Senate, several senators stated that many amateurs had protested the new restrictions, “but since the organization they believed was speaking for the amateurs did not oppose the treaty, they had come to the conclusion that it should be ratified.”

No senator made any such statement during the treaty discussion referred to. All the remarks made upon the floor of the Senate regarding protests of amateurs appear in the “Congressional Record” of May 1st, the exact copy of which remarks follows, to wit:

“Mr. PITTMAN, Mr. President, this matter has been under consideration since 1926. About that time there was held in Washington an international convention dealing largely with the same subject. However, there were certain regulations provided by that convention, dealing particularly with telegraphic communication, which were opposed in the United States. First, permanent committees were appointed to work out the problems. At the meetings articles of convention were worked out, which were then taken up at Madrid. At Madrid the convention now under consideration was adopted.

“I may say that by this convention it is intended to regulate the three forms of communication—the telegraph, cables and wireless. The convention has been very carefully worked out for the purpose of preventing interference in the various countries, and facilitating communications and deliveries as between connecting companies. It has also dealt with the bands or wavelengths so as to overcome any conflict as between different nationalities.

“I may further say that only one thing was brought up before the committee that caused the committee to hesitate with respect to this treaty, and that was the protest by the amateur broadcasters. They felt they were discriminated

(Continued on page 68)
In spite of Jim Lamb’s articles in past issues of QST about single signal reception and quartz crystal resonators for use therewith, we still get enough query letters each week to indicate quite definitely that few indeed of the general run of amateurs have a thorough understanding of many of the essential details necessary for the proper functioning of this type of circuit. Perhaps the greatest misunderstanding centers around the resonator crystal and its holder. It is surprising to us how many amateurs do not realize that the crystal must not be under pressure, as in the case of the crystal used in an oscillator, for resonator purposes, we have found an air gap of approximately .003” to be essential. In order to properly maintain this air gap, we have found it most practical to separate the holder plates by means of two carefully ground glass parallel bars or spacers, the crystal itself being placed between these two spacer bars. From our correspondence, it would seem that many of the amateurs assume that we are using three “trick” crystals, apparently concluding that the spacer bars are quartz crystals.

In an earlier model filter, we used a bakelite spacer ring surrounding the crystal. This ring was carefully ground so as to provide the .003” air gap between the crystal proper and the plates, and it was startling how many amateurs complained to us that upon opening their crystal holders they were surprised to find that we had been careless in using a spacer that was thicker than the crystal and consequently prevented the holder plates from touching the crystal — how they had to “file down” the bakelite spacer ring until it was thinner than the crystal!

Of course the necessity for carefully washing the crystal in carbon tetrachloride after handling is just as important as with transmitting crystals. While not thoroughly realized, this point has apparently gotten over better than some others.

Then there is the matter of polarity of the crystal holder. When using a holder with horizontal plates, it is important that the holder be inserted in its socket the same way at all times; otherwise it is necessary to re-balance the bridge circuit. The necessity for this will readily be understood when we realize that the capacity between the bottom plate of the holder and the metal chassis is quite large, relative to the capacity between the upper plate and the chassis, and consequently will have a very appreciable effect upon the setting of the neutralizing, or balancing, condenser.

Of course, the importance of having the I.F. amplifier lined up and tuned to exactly the crystal frequency cannot be stressed too much. If the I.F. amplifier is lined up to a slightly different frequency, there will be a marked attenuation of all signals when switching from the straight super to single signal. When properly lined up, the well-designed Lamb type of single signal filter circuit will cause an attenuation to a pure D.C. signal of but 3 db. Of course the attenuation to a modulated signal is extremely great, due to the tremendous selectivity and will vary with the setting of the selectivity control.

We are very much sold on the merits of the single signal receiver for c.w. reception and are incorporating in our new De Luxe ham receiver, that we mentioned on this page last month, the same type of Lamb single signal filter circuit we are now using in our FBXA and AGSX receivers, the crystal.

We have, however, designed a new resonator and crystal holder which is molded of our own low-loss R-39 material. This holder, together with a slightly revised crystal, has been in experimental production and test for several months and will be included as standard equipment in the FBXA’S, as well as in the new receivers this fall.

JAMES MILLEN
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NEW YORK CITY

Correspondence Dept.
(Continued from page 64)

against. They were heard, however, in the matter, and those who were inclined to support them very frankly came to the conclusion that under this treaty the amateurs received protection such as they did not have before, and their supporters thereupon withdrew their objection to the treaty. Their protest was based on the ground that amateur broadcasters, who have accomplished so much for the science, are allowed in most places to send messages to a third person. We have made no objection to that in this country, but in most places in Europe radio broadcasting is owned and controlled by the government, and they do not desire the competition by amateurs in the absence of regulations governing it and in the absence of provision for licensing. On the other hand, without this treaty, which does allocate a set number of bands or cycles for the use of the amateur broadcaster, they would have no protection whatever in the use of radio, but might be stopped in any country whose government saw fit to stop them.

"So I feel that the only protest that arose has been absolutely satisfied, so far as the committee is concerned. I may say that the committee brought before them a number of experts of the Government who explained this matter in detail and completely. I think that there can be no objection to the treaty."

"Mr. Warren. Mr. President, because of the fact that at one time I expected to be a member of the delegation which negotiated the pending treaty, and because of the further fact that I attended many sessions of those engaged in the preparation of the United States proposal, presented to the Conference which drafted the treaty, perhaps, it is not inappropriate for me to say a word at this time in behalf of its ratification.

"The treaty in some respects represents a very great advance over international regulations of communications. Until this treaty was negotiated, although wire and radio communication had been coming technically closer and closer together through the years, there had been separate agreements dealing with the two forms of communication—a wire convention, to which the United States had never been a party, and a radio convention to which the United States had been a party since 1912, I believe. In the pending convention both forms of communication are dealt with. I may say that the plan of this convention responds to the thought and purpose and to the proposals of the United States Government and of the delegates of the United States at this international gathering.

"The convention is composed, first of all, of provisions which deal only with the general principles relating to communications. It next has an annex embodying general regulations which seek to amplify and make effective the general principles contained in the convention. Then there is a second annex dealing with what in this country our communications companies are disposed to regard as managerial or operating functions. Such authorities are all grouped in this annex to which the United States is not a party, and the United States adhering only to the terms of the convention and to the general regulations.

"I am fully persuaded that the delegate who represented the United States at this conference dealt with the subject matter with intelligence and with the utmost regard for the interests of the United States. I think we may safely ratify what they, under the guidance of our State Department, have worked out; and I concur in the hope of the Senator from Nevada (Mr. Pittman) that the treaty may have the approval of this body."

"Mr. DILL. Mr. President, I merely wish to say a word about the treaty. I had early in the session a considerable number of complaints from amateur radio operators and organisations of amateurs interested in radio, but the Senator from Nevada has explained that the hearings entirely satisfied these amateur radio complainants, as I understand."

"Mr. Pittman. Mr. President, I cannot go so far, probably, as to say that it satisfied all of them, but those on the committee who were looking after their interests and caused the hearing to be had advised them that they thought the treaty afforded to them more protection than they ever previously had."

"Mr. DILL. I may say that since the hearings I have had no further complaint, so I take it that they are satisfied."
The "EAGLE" Three-Tube Short Wave Receiver

"Band Spread" over any portion of the tuning range — only finest material used throughout. Employs one 32 R.F., one 32 detector and one '35 Pentode Amplifier, 15 to 200 meters — four coils. The "EAGLE" is economical — two dry cells will operate the filaments. See March or April 1933 QST for full description of this most excellent value in short wave receivers.

"Eagle" completely wired and tested...$11.95 Three tubes tested in your receiver...$3.00

GROSS C C TRANSMITTER — OUTPUT 25-30 WATTS

The "CW-25" transmitter kit due to its low cost makes it possible for anyone to own a short wave transmitter. Schematic hook-up and parts layout sheet as well as tuning instructions are furnished, thus enabling the most inexperienced operator to wire and put the set on the air, for real results. The "CW-25" is supplied with a shrivel finished sturdy metal chassis under which all parts are mounted, making the wiring and components dustproof. A plug-in crystal holder is furnished with the kit. Only one milliammeter is required for tuning the transmitter and each stage is provided with a jack for this purpose. The "CW-25" uses only 4 tubes as crystal oscillator, one '46 as buffer or doubler and two '46's in the amplifier stage, set of three coils supplied with kit for 20, 40, 80 or 160 bands. $13.95

GO-DEVIL

The new Mechanical Key Sensation. Has many features — will do anything the highest priced key will. Tungsten Contacts come in and try it. Price $6.00

NEW!!!

Gross Crystal Holder

WHITE CERAMIC commercial type crystal holder priced at less than ordinary Enduro cost, heavy duty, 1½" ground, enabling the most inexperienced operator to wire and put the set on the air, for real results. The new Mechanical Key Sensation. Has many features — will do anything the highest priced key will. Tungsten Contacts come in and try it. Price $6.00

NEW TRANSMITTING KEYS

Solid Silver Contacts

Black shrivel cast base ½ K.W. contacts...$1.45
Chrome cast base quarter inch contacts...$1.95

EXTRA SPECIAL MOUNTED UNCASED TRANSFORMERS

500-750-1000 volt each side of C.T. 300 watts...(see page 14 June QST)...$5.50
5000 ohms..$1.44
Silver plated...$1.65
Silver plate to Single Plano...$1.29
Plano to 500-200 Ohm Line...$1.29
Plato Push Plugs to Push Pull Grids...$1.55

A New Line of very Attractive Nickel Plated Cased Audio Transformers for Sub-Panel or Base Mounting Specialty Priced

Double Button Mike to Grid...$1.45
Mixing Carbon Mike Transformers...$1.29
500 and 200 to 500 and 200 ohms...$1.75
5000 ohms...$1.00
11000 ohms...$1.44
15000 ohms...$1.89
20000 ohms...$2.00

Hoyt Antenna Meter...$1.45
Cased...$1.75

White Leonard Vitreous Resistors

8½" long with variable sliders — will dissipate 200 watts.
1000 ohms...$0.99
2500 ohms...$1.05
5000 ohms...$1.05
10000 ohms...$1.10
15000 ohms...$1.29
20000 ohms...$1.44
30000 ohms...$1.49
60000 ohms...$1.65
100000 ohms...$1.89

Hoyt Antenna Meter

Hot wire antenna meters, 2½" mounting hole, flange 3½" diameter, supplied in 1½, 3½ and 5½" lengths, wired or un-wired. Both antenna meters when you can buy them at this special price...$2.95
See August QST for MA and volt meters

NEW!!

Gross 40 Watt Telephone & C.W. Transmitter

Uses inexpensive '10's in Class B and Class C. Write for data on this and other Gross transmitters.

Universal Antenna Coupling System Inductances

Wound on threaded double X natural bakelite tubing, can easily be tapped. With clip supplied, ea. $1.75
(Use one coil for single-wire feed and two coils for two-wire systems)

Low C 40-80-160 Meter Amplifier Coils

(See transmitter by GRAMMER page 46 May QST) Plug-in, wound on threaded natural bakelite tubing, will tune with 50 or 75 mmf. condenser any size each...$2.00

GUARANTEED TUBES

666 tubes that carry our full guarantee — ISOLANTITE top — Heavy duty rectifiers...$1.45

RAYTHEON RK-20

The New RF Pentode Power Amplifier Tube in stock...$15.00
(see page 14 June QST)

SPECIAL TUBES!!

CARBON PLATE 203-A...$8.75
888 or 871 Isolantine top...$5.95
81's...$1.50
½, ¾ and 1 watt Neon Bulbs...$0.35
NEWTYPES RCA 801 Tubes...$5.75

20% deposit with all C.O.D. orders. Remit by M.O. Include postage.
CONDENSERS

FOR

High Frequency Circuits

FOR use in both receiving and transmitting circuits at high frequencies, General Radio condensers find wide application. G-R parts have been the choice of leading amateurs for years. Correctly designed, carefully manufactured and inspected, G-R condensers can be relied upon to give many years of service.

TYPE 368

Used in receiver and low-power transmitter circuits — hard rubber insulation — panel or baseboard mounting — small and rugged — three capacitance ranges: Maximum of 15 μf, 50 μf, 100 μf and priced at 75 cents to $1.75.

TYPE 568

For receiver, frequency meter and low-power transmitters the Type 568 Condenser is widely used. Heavy construction — brass plates — cone bearings — removable shaft of bakelite for ganging and isolating circuits — low resistance rotor contacts — Isolantite insulation. Type 568-D, 175 μf max. capacitance and Type 568-K 50 μf max. capacitance. Either type $4.00.

TYPE 334

The standard amateur condenser for years. Soldered brass plates — hard rubber insulation placed in weak field — heavy end plates and tie rods — adequate bearing surface — made in a wide range of capacitances in both 500 and 2500 volt types and as special “band-spread” units, either single or double-section.

Only several of the numerous General Radio condensers are briefly described here. For detailed information concerning the complete line of G-R condensers and other amateur experimental equipment write for Bulletin Q-9.

General Radio Company

30 State Street
CAMBRIDGE, MASSACHUSETTS

"Mr. Pittman. I think they are."

"Mr. Dill. Aside from that, I have had no objection, and I think, as the Senator from Maine has said, there is much to be said in favor of this convention."

"Mr. White. Mr. President, will the Senator yield?"

"Mr. Dill. I yield to the Senator from Maine."

"Mr. Whitt. I, too, have had representations from amateurs with respect to this treaty. I recall that in 1927 the amateurs were greatly disturbed at that time as to the provision to be made for them in the then pending radio treaty. The delegates from the United States then did everything possible in behalf of the amateurs of this country. I also feel sure that our delegation did everything possible for them at this Madrid Convention. I am fully persuaded, Mr. President, that if it were not for the provisions inserted herein in their behalf, the amateurs of the world and the amateurs of America would have, so far as international correspondence goes, a very much more difficult time than they now face under the terms of this treaty. In other words, I think, as does the Senator from Nevada, that this is a shield and a protection to them in their international interests."

"Mr. Dill. That shield and that protection, however, come largely from foreign countries rather than from the Government of our own country. I think that the governments of foreign countries have been more unfriendly to amateurs, probably, than has our own Government."

"Mr. Whitt. I think the Senator is quite right, and when I refer to a 'shield and a protection' I mean that the United States has secured from foreign countries concessions in behalf of amateurs which could not be had except under the terms of this treaty."

"Mr. Dill. I feel that with the continued development, the enlarged development, in fact, of the use of the short wave the amateur's claim becomes even more worthy of consideration than when the number of frequencies available were fewer than they now are. Personally, I am strongly in favor of the ratification of the treaty."

"The President. If there be no amendment, the convention will be reported to the Senate."

"The Senate convention was reported to the Senate without amendment."

From the above it must be apparent that the editorial comment referred to is a distorted report of what actually took place. If there were any further remarks made on the floor of the Senate in relation to amateur protests, a most careful search on my part has failed to disclose them.

All I ask is that you, or any other amateur, compare the copy of the verbatim text, as given above, with the statements made in the column of "Radio" to which I have heretofore made reference, and I am confident that you, or they, will realize how distorted the statement made in "Radio" actually is. There has been entirely too much misrepresentation of facts concerning the Madrid Treaty, and it is time that the truth be known.

If I had not been following the course of legislative affairs at Washington so closely, as I have over a number of years beginning in 1911, I might hesitate to make these definite assertions, but I feel that I am in a position to speak authoritatively concerning them.

—Charles H. Stewart, W3SZ

Pirates on Ten?

141 Alton Ave., San Francisco, Calif.

Editor, QST:

Is nothing sacred any more? Imagine my surprise upon returning home from a fishing trip
Simplicity can be overdone

THE SIMPLEST SHORT-WAVE SUPERHETERODYNE

Would have plug-in coils
would have multiple tuning control
would lack a speaker
would have a separate powerpack
would have a limited tuning range
would be without pre-selection.
It would be easy to make but—
would tend to be noisy
would be helpless against image interference.

THE GENERAL ELECTRIC K-80 ALL-PURPOSE RECEIVER IS NOT SO SIMPLE

It has 2 integral stages of inductively coupled pre-selecting amplification to erase noises and images. YOU HEAR STATIONS UNOBSCURED BY THE USUAL IMAGES. Admittedly, this requires a 4-section tuning condenser.

It has a single tuning control.

It has a noiseless 1-stage i. f. system and every other modern provision for noise-suppression, such as doublet-antenna facilities and complete shielding.

It has a wide-range automatic volume control. Input changes of 50,000 to 1 change the output very little. The absence of images, and low noise, permit full a. v. c. operation.

It has a high-gain audio system, supplying up to 6 watts to an integral dynamic speaker.

It has super-fine tuning over a continuous range of from 550 kc. to 18,000 kc.

C. W.? Of course! See the coupon.

GENERAL ELECTRIC

Say You Saw It in QST — It Identifies You and Helps QST
last week to find two heard cards from Los Angeles reporting my 28-mc. signals on days when I was 270 miles from my transmitter! And to-day a third card came, again reporting my signals, and this time W8. I wouldn’t care if I had never been on ten meters, but gosh, I’ve been plugging away there for three years, and believe me, I highly value the few reports and worked cards I have received. One of the fellows down south later worked this pirate using my call, and he says the culprit is using PP ’0’s and a SW-3 receiver. Imagine! after I’ve cut and cursed those many moons to get my crystal rig down there and to get a receiver that would work to my satisfaction, this fiend comes along and right off the bat starts being heard and working fellows!

It really wouldn’t be bad, but the crowning ignominy is the fact that all his work is done in the evenings when there is the least possible chance for 28-mc. DX!

Here’re a few points, OM: get crystal as soon as you can. Preferably about 29150, since mine is 28940, and I wouldn’t want to QRM myself on the East Coast. Get on in the daytime, preferably week-ends, and listen closest when 14-mc. signals have great strength, or when the skip on 14 mc. is only about five or six hundred miles. Arrange your antenna preferably for low-angle radiation, but most anything will work. Tell any DX you work that you will QSL, and when I get their card I will be glad to send them one, because, after all, I am interested in whom I QSO. And finally, send as well as you can—I’d like to become an A-1 operator.

—Byron Goodman, W6CAL

International Contest Results

(Continued from page 46)

tion of it. A comparison, by W4MR: Getting a DX QSO through the solid wall of QRM and intense competition was like carving out a place to stand on the side of a solid wall of granite! W3ATC accomplished his aim—WAC. W6CXW made WAC in 3½ hours on 7 mc. W6CVZ and W6ADP split operating time, but their scores are not to be sneezed at! The log book at W6EWC, and in many other shacks, we’ll wager, looks like a call book after the contest. Not a single CQ left for’r a call after the contest. Not a single CQ left

W6CQI’s filter departed this life, and no radio store within 75 miles reporting my 28-mc. signals on days when I was 270 miles from my transmitter! And to-day a third card came, again reporting my signals, and this time W78. I wouldn’t care if I had never been on ten meters, but gosh, I’ve been plugging away there for three years, and believe me, I highly value the few reports and worked cards I have received. One of the fellows down south later worked this pirate using my call, and he says the culprit is using PP ’0’s and a SW-3 receiver. Imagine! after I’ve cut and cursed those many moons to get my crystal rig down there and to get a receiver that would work to my satisfaction, this fiend comes along and right off the bat starts being heard and working fellows!

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International Contest Results

(Continued from page 46)
REMINISCENT of the moral pointed out in the saying that a path would be beaten to the door of the maker even of a better mouse trap, are some statements contained in a letter to an impatient customer, written by a distributor of CARDWELL condensers and later relayed to us.

"We have your letter... regarding our inability to ship Cardwell condensers. We wish to state that our stock has been completely depleted here owing to an extremely unheralded demand for these condensers — the reason being increased popularity... etc. We ask that you bear with us until this material comes in from the factory."

Whether it be mouse trap or variable condenser, a product will receive the recognition it merits, and "increased popularity" and "an extremely unheralded demand" are won only by superior quality and performance.

A new generation is discovering and appreciating in CARDWELL condensers virtues long known to engineers and Amateurs who pioneered where others now follow. Don't doubt it, the time-proven CARDWELL is your best bet.

Send for literature.

Any reliable supplier should cooperate with you to enable you to get what you want. He can get CARDWELLS for you if he does not keep them in stock. Get what you want — insist on CARDWELLS. Order direct from us if your dealer will not supply you, or let us tell you where you may buy.

CARDWELL "TRIM-AIR" MIDGET CONDENSERS
CARDWELL MIDWAY "FEATHERWEIGHT" CONDENSERS, RECEIVING and TRANSMITTING
CARDWELL "STANDARD" MODELS FOR RECEIVERS and MEDIUM POWER TRANSMITTERS
CARDWELL 16-B TRANSMITTING CONDENSERS FOR LARGER TRANSMITTERS
CARDWELL HIGH VOLTAGE CONDENSERS FOR COMMERCIAL RADIO-TELEGRAPH and BROADCASTING STATIONS
CARDWELL S-2244 OIL DIELECTRIC FIXED CONDENSERS FOR HIGH FREQUENCY FURNACES and TUBE BOMBARDERS

THERE'S A CARDWELL FOR EVERY TUBE, PURPOSE and POCKETBOOK

THE ALLEN D. CARDWELL MFG. CORP'N.
83 PROSPECT STREET, BROOKLYN, N. Y.

"THE STANDARD of COMPARISON"

Say You Saw It in QST — It Identifies You and Helps QST
The Colonels Lady
and Judy O'Grady

may or may not be "daughters under the skin" ... but its a sure bet that their auto radios function equally well ... that is IF they are equipped with Centralab Suppressors.

For Centralab Suppressors work mighty well against the asthmatic wheezings of a decrepit collegiate car of early vintage ... and they do a real job filtering out the umpty-umph horsepower impulses of a sixteen cylinder Rolls-nice.

Central Radio Laboratories
MILWAUKEE, WIS.

Centralab
MOTOR RADIO NOISE SUPPRESSORS

the many forms of QRM found around power houses; but he enjoys ham radio just the same! W6CLP found that 777 was the serial number used by each of the following: CM2OP, CM2JM, LU1CH, LU2FC, ZL2CI, VK4UU and VK5PK. ... 852 was a popular number with the W's. W6AUT used his house number for a serial. W6KIP is ex-8JQ of the Spark Days, but still has plenty of ham pep to work DX. W6EXQ made WAC three times during the fray. High spots at W6QD: ZS2A rolling along working all districts on his bug ... J2GX complains of bad power leak or he could have done better. ... ZL2CI, ZL4AI, ZL4AO playing tag jumping from one frequency to another trying to clean up the band ... when one would change frequency, sure enough the other two would be there also. ... The first J worked on 7 mc. by W6QD was J2IX, the YL operator of Japan, and a fine one, too. W6GWW spent more time calling ZS2A than in working all those listed in his contest log, and still he couldn't raise him! W6EYI found J signals the most consistently p.d.c. of all countries heard. W7DL needed an African for WAC ... the contest did it! W7BB WAC'ed during the tests. To work four DX stations W7AVM made 79 calls! H7LJU was nearly R9 at W7JZ during the entire contest period. W8CJU didn't call CQ once during the tests, but he worked them just the same. W8CRA worked 128 stations in 48 countries, all continents, raising his countries-QSO'ed total to 94. W8DVW heard 60 countries. W8CCW heard 62 countries in the first two days of the tests! W8DVX estimates he used nigh onto $10 worth of gasoline running back and forth from the station to his work. W8BTI and W9CPQ WAC'ed three times! W8AYO dug a moral out of his experiences: "Be not dismayed when it seems your signals are not getting out of the back yard, for thine hour will come in due season." Patience, me lads! W8BBM made WAC. W8HUD heard at least twenty-five chaps using 852 as a serial. W8AZD added ten new countries to his list. A contact with ZS2A made W8ANQ eligible for WAC. W8FAD on 7 mc. succeeded in raising only one station in each continent—except Asia; but he is satisfied: it meant two new continents. W8AAT heard all continents for the first time. W8CU heard 46 countries in four continents. Observations at W8ZY: Three VK's worked in succession with same Serial, 777. ... About 90% of all W stations seemed to be between 7000 and 7050 ke. ... Sewing machines should be equipped with interference eliminators, likewise automobiles. ... A.R.R.L. should get a bonus from power companies. ... Most satisfaction: Connecting D4BAR with a W6 on 7 mc. ... Unusual: Working K6COG at Noon E.S.T. on 14 mc., and ZL4AI at 11:30 p.m. E.S.T. on 7 mc. ... Hearing J2GX on 14 mc., R8! All continents were snagged at W9UM, W9PM, W9FLH, W9GYK, W9AZZ, W9FUM, W9RH, W9ELL and W9IJ. W9KA raised his countries worked to 42. Mrs. L. W. Mida, W9LW, is the
RACK PANELS

Last month we introduced our new relay racks. NOW we are pleased to present our line of rack panels in both aluminum and cold rolled steel in all sizes. The aluminum panels are ideal for light weight units where large holes are required. Steel panels for heavy units and power supplies. Both types have the same black crystalline finish, with standard mounting slots, 19" long and ½" thick.

<table>
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<th>Aluminum</th>
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<th>Width</th>
<th>Steel</th>
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<td>PA 1</td>
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<td>PA 7</td>
<td>7 lbs.</td>
<td>3.00</td>
<td>12¼</td>
<td>PS 7</td>
<td>11 lbs.</td>
<td>1.70</td>
</tr>
</tbody>
</table>

BE NONCHALANT—when the R. I. strolls in to loc’ things over—Have a LEEDS type L-B FreGmonit on your operating table—it will eliminate embarrassing questions and provide two useful services as well. Complete with 2 tubes and large calibration chart.

$19.75

Complete kit $11.45. Shipping weight 9 lbs.

May we recommend the WING Transceiver for mobile installation. A rugged cast aluminum box and quality parts insure satisfactory operation under the most difficult conditions. Price $16.50—with tubes................. $18.25

Navy Type Telegraph Key

List $3.60. Navy knob — ¼” Tungsten contacts. Only a few left at.............$1.15
With regular knob...........$2.95
Leeds transmitting key, special............. $4.65

A new line of tubes for the transmitting amateur. Type 866 heavy duty rectifier $1.50. Type 250 — $1.20. Type 281 — $1.10. Type 210 — $1.15. Type 210 HF is particularly suited for ultra high frequency work, as it provides insulation that can be sawed or tapped to fit your requirements. See complete description and prices.

LEEDS BLACK CRYSTALINE FINISHED CANS

Made of 20-gauge steel with removable top and bottom covers. Sides are of one piece with the free corner welded. Top and bottom covers may be fastened tightly in place with screws for which holes are provided.

<table>
<thead>
<tr>
<th>Type</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-1</td>
<td>4 lbs.</td>
<td>$ .70</td>
</tr>
<tr>
<td>G-2</td>
<td>5 lbs.</td>
<td>1.10</td>
</tr>
<tr>
<td>G-3</td>
<td>7 lbs.</td>
<td>1.45</td>
</tr>
<tr>
<td>G-4</td>
<td>11 lbs.</td>
<td>1.85</td>
</tr>
</tbody>
</table>

HOT OFF THE PRESS

Our new 10-page descriptive folder Bulletin No. 73. It contains complete information on all LEEDS equipment, together with our new line of accessories for “commercial type” construction. 5c in stamps brings this to you post haste.

BETTER YET

A thin dime — a tenth part of a dollar, brings to you our Bulletin 73 together with an armful of valuable information from the nationally known manufacturers of the equipment you are interested in, together with our discount sheet. Don’t forget the manufacturers’ own bulletin is the final authority on any line of equipment.

NEW

A nifty code practice oscillator for beginners. Our new C P O oscillator operates on two dry cells, 1 nickel, brings to you our Bulletin No. 73. Remember MYCALEX is the only low loss insulation that can be sawed, drilled or tapped to fit your requirements. See complete description and prices.

GUARDIAN KEYING RELAY

GUARDIAN KEYING RELAY operates on 6 to 15 volts A.C. $3.30 or D.C. Special $1.75

GUARDIAN Keying Relay operates on 110v. A.C. $4.50

LEEDS ALWAYS LEADS

We are all set to anticipate the 1935 demand for accessories to match the new rack type receivers and transmitters that will be the sensation of the season.
To OUR READERS who are not A.R.R.L. Members

You should become a member of the League! That you are interested in amateur radio is shown by your reading of QST. From it you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on the page opposite the editorial page of this issue. We should like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio. You will have QST delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

A bona fide interest in amateur radio is the only essential qualification for membership.

______________________________________________________________
AMERICAN RADIO RELAY LEAGUE
West Hartford, Conn., U. S. A.

I hereby apply for membership in the American Radio Relay League, and enclose $2.50 ($1.00 outside of the United States and its Possessions, and Canada) in payment of one year’s dues, $1.25 of which is for a subscription to QST for the same period. Please begin my subscription with the....issue. Mail my Certificate of Membership and send QST to the following name and address.

______________________________________________________________

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may send him a sample copy of QST?

______________________________________________________________

Thanks

highest scoring YF operator. W9JO heard 41 different countries. Losses? Everyone had ’em. W9DFY lost ten pounds, the friendliness of his YF, $4.00 on bets, and a perfectly good milliammeter. W9AUH landed a J, something he had been trying to do for eight long years. W9QLV’s list of calls heard is an inspiration for anyone. W9DQD chose the serial number 321 because the first ZL he ever worked was a 3, the second a 2, the third a 1. In the 1933 tests he took his number the same way from the first three VKs worked. W9GBJ started the contest using the same $.05 ’10 that he used in the Sweepstakes! Then half way through the contest his YF presented him with a new 800 . . . nice YF! W9CYA didn’t have to ask for any repeats in numbers, nor did any of the stations worked by him! W9IH didn’t send a single CQ throughout the whole contest. CE7AA is recommended as one of the best operators in the tests by W9IH. W9FYY worked all continents twice. W9BJB can now boast WAC, thanks to J2GY. 80% of the stations heard at W9ELL were worked. W9GDI worked all continents twice, within twenty hours, and added five new countries, his total 62. W9CQ worked all continents in eight hours, and his total countries worked was boosted to 42. W9DHM heard 45 countries. The serial numbers heard the most by W9FO were 222 and 777 (six stations each). VE1EP added two new countries. VE2AX took a week of his vacation to participate. VE2HG made over 200 calls for his 13 QSOs, but didn’t call a single CQ. VE3WA heard J2IN on 14 mc. from 4 to 6 p.m. E.S.T.

—E. L. B.

Field Day Results

(Continued from page 38)

The Starved Rock Rock Radio Club, W9IEP-W9NIU, made a mad dash 350 miles north to Bear Lake, Michigan. Got a great kick hearing W9MKS, another portable from our own club. Hope to have R9 sig. everywhere next year.

W6DAN (Al) and W6EFK (MB) kept W6FFC on the air in a small cottage at San Diego. Eagerly looking forward to the next. In these days of high power the Field-Days are refreshing. Operating ability was stressed, and it was great fun. W1AWY and W1BLZ were at Holbrook Pond, East Holden, Me.

Ludington Amateur Radio Association: CA, PLO, HG, RO, BO, JM and TP all operated WS1XT. Mosquitoes were bad! A generous supply of Flit helped. Maybe it oiled up several wrists as well!—WSIFQ.

—F. E. II.

Typical Technical Questions

(Continued from page 38)

will be the maximum capacity of the condenser plus that portion of the minimum capacity contributed by the circuit. Thus the maximum capacity will be 165 µfd. This gives a capacity ratio, minimum to maximum, of 5.5 to 1. Taking the square root of this ratio gives a frequency
The Newest Member of a Distinguished Family

COLLINS 30FXB

A radiophone and telegraph transmitter embodying the latest refinements and developments of the past six months. The 30FXB meets all the requirements of a modern installation — plenty of power, high fidelity, and multiband operation without neutralization adjustment. Installation is simplicity itself — merely connect antenna, power, key and microphone, and you are "on the air."

Completely Self Contained

TECHNICAL DATA

POWER OUTPUT — 100 watts nominal rating (203A).
FREQUENCY RANGE — 1500 to 15,000 kc. (standard) New isolantite coil forms are used.
FREQUENCY CONTROL — Crystal oscillator with isolation of oscillator from amplifier by a buffer stage.
POWER SUPPLIES — 1000 and 1250 volts at 400 MA DC for modulators and power amplifier. 400 volts DC for crystal and buffer.
MODULATOR — Two 830B or 203A tubes are used in Class B.

FIXED NEUTRALIZATION — All neutralization adjustments in the 30FXB Transmitter are fixed at the factory so that the user does not have to do any balancing of the various circuits. Shifting from one band to another is merely a matter of changing the plug-in coils and setting the dials to the calibrated position.

SPEECH AMPLIFIER — The 7C Speech Amplifier designed primarily for use with a crystal microphone is furnished as an integral part of the 30FXB Transmitter. Thus, no external apparatus, except the microphone and telegraph key, is required and the installation is neat, self-contained and compact.

ANTENNA TUNING — The 2C pi Section Antenna Matching Network is furnished as standard equipment. This provision makes it possible to connect the 30FXB to any available antenna and to accomplish efficient energy transfer with proper attenuation of harmonics.

DIMENSIONS — 60" high, 203/4" wide, 20" deep.

SURPRISINGLY LOW PRICED
WRITE FOR FULL INFORMATION

COLLINS Radio Company
CEDAR RAPIDS IOWA, U. S. A.

New York Office — 136 Liberty Street, N. Y. C.

Say You Saw It in QST — It Identifies You and Helps QST
THE IMPROVED CATHODE-RAY OSCILOSCOPE
Linear sweep model for broadcast stations and advanced amateurs, physics labs., etc.

- Controlled linear sweep 0-150,000 C.P.S.  
- Controlled external sweep.  
- Freq. locking device for sweep frequency.  
- Picture centering adjustments.  
- Wide range focus adjustments.  
- Complete component shielding.  
- Unit is self contained and includes batteries and 110v-50 cycle power supply.  
- This instrument embodies all features ordinarily contained in only the highest priced Cathode Ray equipment.

COMpletely EQUIPPED READY TO USE
F.O.B. Newark — $97.50

Bliley Crystals — New Reduced Prices
BC-3 mounted crystal in holder, 80- and 40-meter band ......... $3.95

RK-20's in stock ................................ $15.00

DUPLEX POWER SUPPLY
110v. 250 ma.  
550v. 250ma.  

Uses four 83's in a bridge rectifier — completely filtered in both voltage legs.

$35.00

PLATE TRANSFORMER — two 75/4 and two 2 1/4 volt fil. windings — 750-750-160 mils. .......... $3.50

Due to Demand, We are Forced to Repeat Our August Sale
The prices now extended to Sept. 30th

K&R 150-210's ... $1.00
K&R-281 ........ $1.00
K&R-250 ......... $1.00
Pinball resistors R.M.A. 1-Watt — 12 for ....... $1.00
16 henry-100 ma. filter chokes .......... $1.00
C.C.A. 8 mfd-450 volts — Electrolytic Condenser, 2 for ....... $1.00
3 wire shielded mike cable — 11 ft. .......... $1.00
No. 12 Enamel wire, 200 ft. ........... $1.00
Comb. fil. trans., 22 K-3A-7 1/4-2A  ........... $1.00
4" Glass tubes, 12 for .................. $1.00
3, 5, 6, 7-mica condensers, 8 for .......... $1.00
5 tubes dial base, 10 for ........... $1.00
Transposition blocks, 12 for ........... $1.00
Tubes — all types, 10 for ........... $1.00
500 ma 5 mfd K.F. choke .......... $1.00
K&R 866 HD ......... $1.35

We are specializing in transmitter construction to customers' orders and specification. Write for quotation on your favorite transmitter.

KALTMAN & RROMANDER
62 Court St.  
Newark, N. J.

Standard Frequency Transmissions

<table>
<thead>
<tr>
<th>Date</th>
<th>Schedule</th>
<th>Date</th>
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</thead>
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<tr>
<td>Sept. 5</td>
<td>BB W9XAN</td>
<td>Oct. 5</td>
<td>BB W6XK</td>
</tr>
<tr>
<td>Sept. 7</td>
<td>BB W6XK</td>
<td>Oct. 6</td>
<td>BX W6XK</td>
</tr>
<tr>
<td>Sept. 8</td>
<td>BX W9XAN</td>
<td>Oct. 7</td>
<td>C W9XAN</td>
</tr>
<tr>
<td>Sept. 9</td>
<td>C W6XK</td>
<td>Oct. 12</td>
<td>A W9XAN</td>
</tr>
<tr>
<td>Sept. 14</td>
<td>A W6XK</td>
<td>Oct. 19</td>
<td>B W9XAN</td>
</tr>
<tr>
<td>Sept. 21</td>
<td>B W9XAN</td>
<td>Oct. 24</td>
<td>C W9XAN</td>
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<td>Oct. 31</td>
<td>BB W9XAN</td>
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Standard Frequency Schedules

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<th>Freq. (kc)</th>
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<td>8:40</td>
<td>4000</td>
<td>8:40</td>
<td>4000</td>
</tr>
</tbody>
</table>

The time specified in the schedules is local standard time at the transmitting station. W9XAN uses Central Standard Time, and W6XK, Pacific Standard Time.

TRANSMITTING PROCEDURE

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

2 minutes — QST QST QST de (station call letters).
2 minutes — Characteristic letter of station followed by call letters and statement of frequency. The characteristic letter of W9XAN is "O"; and that of W6XK is "M."
1 minute — Statement of frequency in kilocycles and announcement of next frequency.
1 minute — Time allowed to change to next frequency.

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

WWV 5000-Kc. Transmissions

The 5000-kc. transmissions of the Bureau of Standards' station, WWV, are given every Tuesday from 12:00 noon to 2:00 p.m., and from 10:00 p.m. to midnight, E.S.T. These transmissions are accurate to 3/4 cycle (one in ten million).

— J. J. L.
THE LATEST AND THE BEST

The latest edition (11th edition, published January, 1934) is approximately 50% larger than the first edition, and represents probably the most comprehensive revision yet attempted. Seven chapters have been re-written entirely and the remaining ones re-arranged and revised so completely that the edition bears little resemblance to its predecessors. New receiver circuits and designs are presented, together with a thorough treatment of the recently-developed "single-signal" sets. A completely re-written 36-page chapter is devoted to all that is new in the world of transmitters. New circuits and layouts are given, all problems which face the transmitting amateur being discussed in a lucid and comprehensive manner. The radiotelephony chapter represents all new material. New designs for Class B modulators and speech amplifiers are featured; new and simple methods of determining the right operating conditions for any modulator are included. Still another new chapter is that on antennas. Containing a wealth of fresh data on radiators and feeder systems it is the most comprehensive treatment of the amateur station antenna in existence. All other chapters have had their share of attention to bring the book up to the minute. Even the power supply section has been revamped from first to last with new designs, circuits and explanations being added.

Each chapter occupies from six to thirty-six pages — indicating the thoroughness with which each subject is treated. In addition there is an appendix containing a fund of useful data. Then there is an index of several pages, by which the valuable information is made available more easily. This particularly important feature has been compiled and cross-indexed with great care and thought. In wealth of treatment and profusion of illustration the HANDBOOK is a big book. Printed in usual textbook style it would bulk double the number of pages and cost at least four times as much, but its publication in the familiar QST size makes for economy and enables distribution at a very moderate cost.

223 ILLUSTRATIONS
260 PAGES, 6½ X 9½

PRICE
$1
POSTPAID

THE RADIO AMATEUR'S
HANDBOOK
AMERICAN RADIO RELAY LEAGUE, WEST HARTFORD, CONN.
Design of the Voltage Divider

(Continued from page 31)

condenser or other component whose operation may be impaired by heat. Likewise, the resistors should be kept away from wood or other material which might char or even catch fire. It is a good idea to mount the units on the supporting clamps with which resistors of this type are usually equipped.

Another point to remember is that the voltages designated for the various taps will be obtained only when the current values are as specified. Although current values deviating moderately from those intended may be tolerated, it is advisable to calculate in advance, as accurately as possible, the actual current that will be required at each tap when the power supply unit is placed in operation. The plate voltage and current ratings of the tubes which are to be supplied from the divider provide the proper basis for this preliminary.

—J. J. L.

I.A.R.U. News

(Continued from page 47)

two hours with three watts input! At the time he was in the vicinity of Oslo ... . . . Amateu rs travelling past the Azores (steamers of the Cosulich and other lines always stop there) are cordially invited to drop in on H. J. Smith, CT2BK, at Rua do Pedro Homem 63, Ponta Delgada, S. Miguel, for a visit — a welcome is assured . . . . . . . New members of the TBTOC Club: Roy C. Corderman, W3ZD, and H. T. Tuin, PA0DC; E. H. Fritschel, W2DC, also achieved his membership with the aid of PA0DC . . . . . . Latest QSL addresses: for Roumania, Radio Club Craiova, Dr. Alexander Savopol, YP5AS, Pres., Str. Rosetti 6, Craiova, Roumania; for Uruguay, Uruguayan Short Wave Code Gang, Box 37, Montevideo, Uruguay . . . . . .
Since its recent announcement to the amateur trade, the new Turner Crystal Microphone (Brush Patents) has been accorded an enthusiastic welcome. The better amateur stations from coast to coast have been quick to appreciate the extraordinary microphone value which it offers.

Now at moderate cost you can enjoy the finest microphone performance. Exceptionally flat frequency response and no carbon hiss to spoil your signals. Requires no energizing current. Unusually strong and durable.

The Turner Type G Crystal Mike lists at $20.00. Net to amateur, $13.78. If your jobber is not yet supplied, send order direct. Money will be refunded if the instrument is not entirely satisfactory.

The Turner Type G is arranged for either spring or base mounting. Prices on either type mounting quoted on request. SEND FOR FREE CIRCULAR

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JACOBS SEPARATOR

U. S. Patent No. 1,950,179 March 6, 1934
The logical Spreader for the rapid, efficient and durable construction of 2 wire radio frequency feedlines used in conjunction with Hertz antenna systems. Made of polished, hard rubber they provide 6" separation, and the job of constructing a feedline is cut down to a fraction of the time required by the methods now in use. $1.00 per dozen.
CHARLES F. JACOBS (W2EM) 270 Lafayette St., New York.

Mercury Thermostats for Crystal Ovens
Accurately calibrated to operate at 100 degrees Fahrenheit. Wholesale price to amateurs $3.95 postpaid upon receipt of M.O.

Canady Recording Lamps for motion picture sound recording in use all over the world. Latest type $15.00 Net.
CANADY SOUND APPLIANCE CO.
1957 So. Sagamore Road Rocky River P. 0., Cleveland, Ohio

---

Technical Training Station

Port Arthur College
Port Arthur, Texas

Studio Technique Guaranteed
KPAC
500-Watt 1260 Kilocycles

In 3 to 7 months we train you to secure Commercial Telegraph Second-class, and Radiotelephone First-class government licenses. Course consists of Wireless Code, Radiophone, Microphone-Studio Technique, Service, Police, and Aeronautical Radio. We are authorized to teach RCA texts. At completion of course you receive practical studio technique experience in our commercial broadcast studios located in administration building, and experience as an operator on K-P-A-C (500-Watt Commercial transmitter located on the campus and owned and operated by the college), and WPA, 4000-Watt Commercial Wireless Station. Return coupon for details.

PORT ARTHUR COLLEGE
Port Arthur (world-known port) Texas
CALLS HEARD
THOUSANDS OF THEM FROM ALL OVER THE WORLD!

How well are YOU getting out?

New lists are published each month from Asia, Africa, Europe, Oceania, North and South America.

CALLS HEARD not only tells you that you have been heard in these continents from month to month, but it tells you how WELL you were received—BOTH QSA and R RATINGS ARE GIVEN ON EVERY CALL!

CALLS HEARD covers all Amateur bands from 1.75 mc. to 28 mc., and tells you the exact time and frequency to use for QSO with any continent.

CALLS HEARD will send you a QSL card verifying the reception of your signals each time your call appears in the lists.

CALLS HEARD MAGAZINE guarantees to add new thrills and pleasures to the finest of all sports—Amateur radio. It's a big twenty cents worth, Gang. Twelve issues of CALLS HEARD MAGAZINE are yours for $2.00, or six months for $1.20. The foreign rate is $2.50 a year. Subscribe now and keep your files complete. You’ll regret it if you don’t.

CALLS HEARD MAGAZINE, INC.
Winston-Salem, N. C.

Edited by W4CTO, ex9ABC, 9EN, 7UW

Due to the highly specialized nature of this magazine it will not be available at newsstands

SANGAMO
ACCURATE
CONDENSERS

Available in 5000 volt construction for use in short wave transmitters
Write for catalog sheet
SANGAMO ELECTRIC CO.
SPRINGFIELD, ILLINOIS

The Simple Solution of Break-In
(Continued from page 80)

"underload circuit breaker," would open, thereby automatically shutting off all plate voltage and bringing succor to the scene in the nick of time. Also, should the switch accidentally be closed before the filament switch, the plate voltage would not be applied until the "circuit breaker" closed, which in practice gives the tube filaments about a three-second jump on the plate voltage. This, as any clever rascal can see, is far better than no jump at all.

Thus it is that all conditions for extremely satisfactory break-in operation with crystal control are very easily fulfilled with a little thought and logical application of the result. The monologue QSO is dying a slow death but a sure one, and why any attempt should be made to prolong its life under present conditions is a mystery.

Each part of an amateur station should operate in coordination with every other part, and this cannot be accomplished when the transmitter and receiver are getting in each other’s way.

MORE KINKS

There are one or two other features incorporated in the installation here that, while they have nothing particular to do with break-in operation, might be worth mentioning.

One, is the use of protective fuses in the secondary of every power transformer. Flashlight bulbs are a lot cheaper than tubes, meters, and transformers, and it's an ancient stunt. If one gets a peek at the cartons the bulbs come in, they may be chosen by current ratings at which they will burn brilliantly (which ratings, by the way, have nothing to do with their voltage ratings—unless one knows the make as well). And they burn out at a bit more than rated current. Both Westinghouse and G. E. print the current consumption of their bulbs on the small cartons, and three handy ratings are 0.150 amp., 0.300 amp., and 0.5 amp. When screwed into miniature porcelain sockets, the voltage they will stand after blowing is both remarkable and most gratifying. Such fusing for the occasion is well worth the time and cost of installation, many, many times over—and completely repaid the first time one blows. For example, this type of fuse rated at 150 ma. is shown connected in the center tap of the grid-bias unit transformer. Don't worry—if a filter condenser shorts out the instantaneous plate current is well over that.

The next trick was described in March 1933 QST, and consists of bridge rectification of high voltage with low-voltage mercury vapor tubes. Instead of using three 83’s, two 82’s and an 83 are used with fine results. This still allows a current rating of 250 ma., since the 82 plates are in parallel; and it doesn’t call for so many 5-volt windings on a transformer. With an r.m.s. voltage of 1250 from the plate transformer (using 750 volts on one side of the center tap and 500 on the other, the center tap being cheerfully ignored, of course), there is a voltage peak of 1750, which
STEP AHEAD ON 5 METERS WITH HAIGIS EQUIPMENT

AT LAST!

A NON-RADIATING
Super-Regenerative
56-60 MC. RECEIVER

COMPLETE ELIMINATION OF RADIATION
PLENTY OF ADDITIONAL GAIN

Original Circuits Associated with the r.f. amplifier make possible complete suppression of radiation via the antenna from the fully shielded detector. This is accomplished in a manner which permits plenty of amplification in the r.f. amplifier. Other features eliminate all radiation from battery cables. — Conventional methods at best are only partially effective and usually result in loss of sensitivity. — No QRM next door from this unit.

Uses a 76, a 36 and a 41. Requires 6.3V AC or DC for fil. 135 V for “B” supply. Equipped with volume control and on-off switch.

COMPLETE INSTRUCTION BOOK

$26.90 NET

THE HAIGIS LABORATORIES, INC. — MAPLE SHADE, N. J.

PIONEERS IN THE ULTRA-HIGH FREQUENCY FIELD

THE PORTAPHONE

A TRANSMITTER-RECEIVER —
FOR THE 56-60 MC BAND

WITH SPACE FOR ALL BATTERIES
INCLUDING 150 VOLTS FOR “B” SUPPLY

Another new Haigis Circuit — Well designed — Ruggedly Built — Carefully Tested — Card holders for field notes or logs. Uses a 30 and a 33.

COMPLETE INSTRUCTIONS

$13.50 NET

TYPE AM DELUXE MODEL

with all its additional features — capable of supplying .100 amp. to Antenna — As previously advertised in QST.

$19.20 NET

Radio Operating
Radio Servicing —

Classes open for Fall term —
September 4th

Prepare for the new Government Radio Operating license examinations; Radio Operator, Marine and Broadcasting. Also Radio Amateur Telegraph and Telephone. Resident courses.

Write for Booklet

NEW YORK YMCA SCHOOLS
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AT LAST! A REAL MICROPHONE

At a Reasonable Price, DEL-RAD-7B

Your choice of high quality condenser or Astatic Crystal head. Complete as illustrated, with pre-amplifier, tube, shielded cable and plug, to connect directly into your present speech amplifier.

ONLY

$49.50

LIST

Regular Discount

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405 Del. Ave., Wilmington, Del.

“Time Payments on Receivers & Transmitters.”

THE RADIO SHACK

PYRANOL TRANSMITTING CONDENSERS 2 MFD-2000 V. $2.50

Polished Desk Mike Stand..................$1.95
Db. Mike........................................2.75
TRIPPLET METERS
3½” Bakelite case milliammeter 0-5 mills to 0-1000 mills $3.75
VT 803A........................................$9.00
860’s Tubes (heavy duty)....................1.69
RCA 850 (used)...............................12.00
Baldwin Type “C” Phones...................$9.50

Johnson 50w Socket..........................$1.90
2½ V. 12 Amp. Transformer.................1.25
TRIAD 310’s....................................$1.25
TRIAD 841’s....................................1.25
TRIAD 250’s....................................1.25
Sickles SM Kit.................................$1.20
4P DT Switch..................................$1.84
Audio with Mike winding....................1.20
Thordason Screen Grid Audio Coupler...$1.25

Mail Orders Shipped—Send Money Order. Complete Stock of Amateur Supplies. Write for Quotations.

THE RADIO SHACK 46 Brattle St. BOSTON, MASS.
Don't Worry About That Exam!

CANDLER SYSTEM Will Make It Easy for You

The better class Amateur and Commercial will tell you Candler Training in Code Fundamentals is as necessary to Skill and Speed as is a knowledge of Ohm's Law to an understanding of Electricity.

CANDLER shows you how to apply certain Psychological Laws in learning code quickly, increasing speed and copying behind. No "robots' work. Here's what they say:

"As champion Radio op for 13 years, official speed 56½ wpm., and holder of all-time American Morse speed record of 70 wpm., I can say that I never had any other training except CANDLER SYSTEM HIGH-SPEED TELEGRAPHING and 'MILL' COURSES."—T. R. McGee, 23 Raviale St., Boston, Mass.

"CANDLER SCIENTIFIC CODE and "MILL" COURSES made it possible for me to win the Radio championship in Class "R." — Jean Hudson, W5BAX.

"CANDLER Specialized Training helped me to pass rigid, competitive test for this position."—Richard D. Watson, Chief Operator, WHSW, Bird Expedition.

"I owe my position as code instructor, Air Corps, Primary Flying School to CANDLER Specialized Training. I instruct over 200 student fliers in code every 4 months which requires absolute accuracy."—Carl W. Muller, 46th Squadron, Randolph Field, Texas.

"I'm working trans-Pacific circuit between Honolulu and Frisco. Am combination op — American Morse and Continental. Hold a 1st class license. I could not have done this without the aid of CANDLER Specialized Training."—James Light, U. S. N. Radio Station WAILUPE, Honolulu, T. H.

Any skilled Amateur or Commercial will tell you the superiority and importance of CANDLER SYSTEM Training. FOR FREE—New BOOK OF FACTS. Contains inside information that will aid you.

CANDLER SYSTEM CO.
Dept. Q-9
6343 S. Kedzie Avenue, Chicago

QST to All Hams

CORNELL-DUBILIER CONDENSERS ARE YOUR BEST BET. MADE BETTER, WORK BETTER, LAST LONGER.

HIGH EFFICIENCY LOW COST

TYPE TD

TYPE 86

Get a copy of catalog No. 126 listing the finest and most complete x-mitting line and COMPARISON VALUES. 73 W2AFS

CORNELL-DUBILIER CORPORATION
JOBBER'S DIVISION
4373 Bronx Blvd., New York City

Say You Saw It in QST — It Identifies You and Helps QST

Automatic V.T. Regulation Control

(Continued from page 37)

must be used to maintain an equivalent regulation. The number of tubes which must be used in parallel, at any given voltage, will depend on the regulation desired, and also on the amount of load current. Probably a safe value of average plate current per tube used in the regulator would be 40 ma.

A single 2A3 is more than the equal of two '45's in parallel; in fact two 2A3's in parallel are the equal of five '45's in parallel. But as 2A3's cost several times what 45's do, on the basis of tube costs it is preferable to use 45's.

As the output voltage is lowered, it may be seen that it becomes necessary to increase the number of tubes in parallel to maintain good regulation, so that at low voltages it would be preferable to use batteries for bias, rather than an a.c. supply with this type of regulator.

The value of the resistor $R_1$ is not critical, so long as it is large enough to maintain the current drawn from the power supply at a very low value. Any value from a few hundred thousand ohms up to several megohms is satisfactory. The voltage divider $R_2$ can have practically any value, from a few thousand ohms up, as the current drawn is practically zero.

This type of power supply may also be used to supply grid bias to a Class-C stage, and has the advantage over using an unstabilized power supply, or a grid leak, in that the grid voltage will remain constant regardless of the value of grid current.

FOR PLATE POWER SUPPLIES

This type of regulator may also be used to keep the output voltage of a plate power supply constant, particularly to supply power to a variable load such as the plate circuit of a Class-B audio stage. The circuit used is the same as that used to stabilize the C-bias supply, except that the value of $R_1$ is reduced so that the current through the regulator tubes with no external load connected is at least equal to the maximum average current which will be supplied to the load.

When a load is connected, the current through
BC-3 Mounted Crystals

<table>
<thead>
<tr>
<th>McBand</th>
<th>Supplied to specified frequency within:</th>
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<td>Exact Freq. ± 1Kc ± 5Kc ± 10Kc</td>
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<td>7.0, 3.5</td>
<td>$7.50</td>
</tr>
<tr>
<td>1.7</td>
<td>$8.40</td>
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Special Crystals also manufactured between 20Kc's and 15Mc's.

Now you can get Bliley BC3 40 and 80 meter band mounted crystals manufactured approximately to your desired frequency at a saving of 20%. Increased public acceptance and greater production facilities enable us to pass this price reduction on to you.

Using the same fine grade of raw materials, Bliley craftsmen employ the same exact care in cutting, grding and mounting the finished product. Finally, precision tests insure that you obtain the finest crystal at any price.

Join the thousands of amateurs who keep their transmitters locked on one chosen frequency with Bliley Crystals. Bliley Electric Co., 208 Union Station Bldg., Erie, Pa.

See Our Display at the 1934 World's Fair Radio Amateur Exhibit

LOW RANGE FUSES

- Littelfuses for Instrument Use: 1/100, 1/32, 1/16—20c ea. 1/8, 1/4, 1/2—15c ea. 1, 2—10c ea. For millimeters, beam rectifiers, etc. Use 1/8 for radio B circuits. High Voltage
- Littelfuses: 1000, 5000, 10,000 volt ranges in 1/10, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2 amps. Available, Price $3.00 to $1.45 ea.
- NOW—$100 PROTECTION GUARANTEE. Get New Cat. #5.

LITTELFUSE LABS. 4059 Ravenswood Ave., Chicago

DON'T BUY ANY ANTENNA SYSTEM

before getting details of the two new patented and guaranteed LYNCH "HI-FI" ANTENNA SYSTEMS (High Fidelity)

Reception completely revolutionized on wave lengths from 3 to 650 meters. It's fun to fooled—but it's more fun (and better business) to KNOW. Investigate before you buy.

At Leading Radio and Dept. Stores,
or Write Us for Full Details

ARTHUR H. LYNCH, INC.
227 Fulton St., New York, N. Y.

WHAT ARE YOU DOING ON THE NIGHT OF THURSDAY, SEPT. 6?

Perhaps you don't know yet. Maybe to the movies... for a ride... or visiting... but how many of you are going to take an hour or two to devote to your future in radio... on that night or any other? You would never have gone into radio if you didn't expect to "go someplace." But it takes specialized training to get to the top... and if you have the ambition, CRI can help you get there.

This is the Only School in the Country That Offers a Complete Course in ADVANCED PRACTICAL RADIO ENGINEERING

CRI courses are planned for experienced radio men who feel the need of more intensive training and education. Our home study courses were prepared by some of the greatest "minds" in radio, and our residence school is staffed by experienced, college-trained engineers, with modern working equipment at your command... let us suggest the course most adapted for you and how you can pay for it.

Free Illustrated Catalog Sent on Request

CAPITOL ENGINEERING
14th and Park Road, N. W.
Washington, D. C.
Dept. Q-9

Say You Saw It in QST — It Identifies You and Helps QST 83
COUPLING TRANSFORMERS
AD-92 for Coupling one 45 to RK-20 suppressor grid. List price, $7.50
AD-75 for coupling a pair of 2A3's or a pair of 45's to RK-20 suppressor grid. List price $7.50
(List prices subject to 40% discount at authorized Delta Distributors.)
Write for latest catalogue today
DELTA MANUFACTURING COMPANY
190 Willow Street, Waltham, Mass.
F. S. Dellenbaugh, Jr.
G. E. M. Bertram
Ch. Eng'r
Pres. &
Treas. &
Gen. Mgr.
UNIT OF RAYTHEON MANUFACTURING COMPANY

TRUVOLT RESISTOR
Safe for Amateur Work
1,000-volt breakdown provides an unusually high safety factor—plus these extra exclusive features:

1 — Patented design permits larger wire and open-air cooling. 2 — Double spiral winding insures perfect electrical contacts. 3 — Sliding clips provide exact adjustments to desired voltages. 4 — Full-length protective guard.

Write Dept. Q-9 for FREE New Catalog and Vest-Pocket Volume Control Guide.

the resistor $R_1$ will tend to increase. This will cause an increase in the bias of the regulator tube, which will decrease the current through it so that as the positive load current is increased the regulator current is decreased, thereby maintaining the load on the power supply practically constant, regardless of the load current. Fig. 3 shows the stabilized and unstabilized load curves for a power supply employing a Type 80 tube and a single-section filter with condenser input. In this case, the bias resistor was adjusted so that the current through the regulator tubes on no load was 60 milliamperes. This required a value of about 700 ohms for $R_1$. Curves are shown for a single tube and for two tubes in parallel. It may be seen that the regulation is practically the same for either the single tube or two in parallel, indicating that the number of tubes which must be used in parallel will depend solely on the peak load current. It might be advantageous to place a filter condenser across the output of the regulator, to take care of the peak current demands, and thereby reduce the maximum value of current which will be drawn from the regulator.

**APPENDIX**

\[
I_p = K \left( \frac{E_p - \frac{E_p}{\mu}}{\mu} \right)^{\frac{1}{2}}
\]

where $I_p$ = plate current

$K$ = a constant

$E_g$ = grid voltage

$\mu$ = amplification factor = 3.5 for the Type 45.

For a desired terminal voltage of 200 volts, cut-off bias voltage is:

\[
E_p = \frac{200}{3.5} = 57.2 \text{ volts (negative)}
\]

\[
E_p = 257.2 + E_p
\]

\[
E_p = 257.2 - E_p
\]

\[
E_p = \left[ \left( \frac{I_p}{K} \right)^{\frac{1}{2}} + 257.2 - E_p \right] \mu.
\]

Substituting representative values in Equation (1),

\[
K = 0.000614 \text{ for two Type 45's in parallel}
\]

\[
E_p = 0.777 \left[ \left( \frac{I_p}{0.000614} \right)^{\frac{1}{2}} + 275.2 \right].
\]

The Convention Season

(Continued from page 28)

auditorium of the Naval Armory—and that's some bunch of hams!

The proceedings started off with a virile address of welcome by the mayor of Perth Amboy, augmented by remarks on the part of the president of the Chamber of Commerce. Then Henry J. Kelley, president of the T.C.R.A. and hamfest general chairman, made a brief opening speech. (One of the best features of this hamfest, as a matter of fact, was the brevity of all the speeches.) The Nomads, a musical group of hams (we were
"HOW CAN I BECOME A RADIO AMATEUR?"

Does your answer come easily, freely, briefly? No blame to you if it doesn't — amateur radio is a complex and diversified pursuit, and it cannot be considered in a word.

The easiest way to answer that question is to suggest that your inquirer secure a copy of the League's special beginner's booklet. It is by far the best answer you could possibly give him, too, for the 32 pages of the new third edition of "How to become a Radio Amateur" outline the entire field of amateur radio, make learning the code easy, and tell how to build a simple station, with clear illustrations and easily followed building instructions — and there's concise dope on getting licenses and operating properly, too. In short, it answers the question — thoroughly, yet simply. An inexpensive introduction to amateur radio and preliminary to the Handbook. The price is 25c, postpaid. No stamps, please.

(No. 8 in the series entitled The Radio Amateur's Library)

AMERICAN RADIO RELAY LEAGUE, West Hartford, Connecticut

BIRNBACH

Highest grade, highly glazed porcelain with nickel-plated brass hardware. All standard types, including FEED-THRU models for panel mounting (plain or jack). Write for Data Sheets Q-9

BIRNBACH RADIO CO., Inc. 145 Hudson St. New York City

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Radiotelegraphy Radiotelephony

Radio Servicing Radiotelephony

SECOND PORT 1007 Carondelet Street U. S. A. NEW ORLEANS, LA.

WORLD-WIDE ANTENNAS

Complete with coils for amateur bands—list price $7.80

RCA — DEFOREST TUBES

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ELECTRAD — YAXLEY — TRIPLET METERS

Prompt Service Satisfaction Guaranteed

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2-volt Model ... $18.75

6-volt Model ... $17.95

Tubes .......... Type 53 ................................ $1.26

*RK-24 originally designed for army use. replaces type 30 and gives two to three times more power output with the same plate voltages.

MT-5 Pickard type coil for 56 MC, operates .......... $29.50

NEW HIGH FREQUENCY EQUIPMENT

TRANSMITTERS — Type MO-71 with 2-3 watts output and Type MO-45 with 5-10 watts output. Both types are class C modulated and mounted on 17" black lacquer chassis. Either unit wired and tested for 56 MC, complete with tubes.............................. $24.50

5-10 METER RECEIVER — Type HF-3 a 3-tube non-radiating receiver employing a stage of tuned radio frequency with plug-in coils to cover frequencies up to 10 meters. Type HF-3 receiver with one set of coilsless tubes, .......... $26.50

RK-20 POWER AMPLIFIER as described in QST for August, complete with two tested tubes and coils for one band ........................................ $69.50

Write for our new High Frequency Bulletin describing the above equipment in detail

HARVEY RADIO LABORATORIES

12 Boylston Street Brookline, Mass.

Say You Saw It in QST — It Identifies You and Helps QST
IMPROVE YOUR ANTENNA EFFICIENCY with a JOHNSON TYPE "Q"

New 5-Meter Antenna. The famous "Q" principle applied to a novel and highly efficient 5 m. antenna system. Easily converted for portable or home station use. Accurately matched impedances throughout. Successfully used with a 200-foot transposed transmission line! Ask for Bulletin 101. List Price, $6.80

Regular-Band "Q" Systems. Models are available for 10, 20, 40, and 80-meter transmitters. Users improve reports 1 to 2 db. WBAM says, "Compares favorably with elaborate beam antennas." WE-I- "Little foreign DX before I installed 'Q.' now WAC several times over. W9-- "Would rather give up half my power than do without 'Q.'" (Call letters on request). Hundreds of similar comments from enthusiastic users. List Prices, $6.25 upward. Ask for Bulletin 100.

Constant Length Antenna Wire. No. 12 Enamelled Copperweld Wire. The strength of steel with the conductivity of copper. Corrosion-proof. No sagging or elongating. List Price, $6.50

These and other JOHNSON products are available from your regular Distributor

E. F. JOHNSON COMPANY
Manufacturers of Radio Transmitting Equipment
WAASECA, MINNESOTA, U. S. A.

SUPER-QUALITY AT LOW COST!

SHURE MODEL 40 C Studio Type CONDENSER MICROPHONE

Meets the most exacting demands for broadcast service, yet is not too expensive for the amateur "phone transmitter. Rugged quality inside and out. Smart modern style and finish. Complete with tubes, shielded cable, and suspension adapter. Write for full details. List Price, $6.75

(Bullet-Type, $6.00 list) Subject to usual discount AT YOUR JOBBER

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For mobile 5-meter operation—USE A NEW WING TRANSCIEVER

The only outfit especially adapted for auto use. We have a special clamp to mount the set directly on steering column of auto. Also special "Picard type" antenna transformer with clamp for permanent car installation.

Unit construction on a solid cast front panel and cast aluminum box insure reliability under all operating conditions. We also have field tested and have available 2½ meter coils for our transceiver.

Dealers—send for attractive new proposition.

CHAUNCEY WING’S SONS
GREENFIELD, MASS.

about to say a ham musical group, but that wasn’t the case at all), offered some brief introductory music, followed by Walter Jablon of Hammarlund in a technical talk. De Soto, of Headquarters, discussed the international situation.

The club contest, with representatives of the associated clubs as contestants, was a high spot of the evening. Parts for an emergency Hartley transmitter using a Type 30 tube and powered with two B batteries were given each contestant in a well-wrapped package. The one who first lit a flashlight bulb in a loop of wire with his assembled transmitter won—and the job was done in something like eight minutes. It was a remarkable spectacle; the first time this reporter, at least, has seen a ham use his teeth as well as his hands in building a radio set, for example.

Following a talk by Mr. Bailey of Cornell-Dubilier, there were more contests for the 'phone and c.w. men. The long-winded 'phone men were required to blow balloons until they burst, the first "bang" acclaiming the winner. The rag-chewing c.w. men "ate" strips of cloth several feet long depending from a central rod. After this, Dr. Haigis discussed his transceiver in impromptu fashion, the Nomads inserted incidental music while a man pounded himself with a couple of spoons in ratchety rhythm, and John Reinartz took another thousand people with him to the far North along with MacMillan and Byrd. The program wound up with remarks by Director Fuld and local A.R.R.L. field officials.

Then the free beer . . . Lord, but it took a long while to trickle a thousand thirsty hams past that bar . . . sandwiches . . . rag chewing (without the rags, this time) . . . and home in the smallest of the wee hours. Garguantuan, this harvest, and good.

—C. B. D.

Louisiana State Convention
(Delta Division)

New Inn Hotel, Shreveport, La., Sept. 1st-2nd

THE Shreveport Radio Club extends a cordial invitation to all Louisiana radio amateurs to come to the annual state convention. Registration fee is $1.00 if tickets are purchased by August 26th; after that date rates will be $1.50 for men and $1.00 for the ladies. The tickets will take care of your admittance for contests, banquet, prizes and other interesting parts of the convention. Further information from Claude E. Gardner, President, Box 1076, Shreveport, La.

Roanoke Division Convention

Hotel Roanoke, Roanoke, Va., Oct. 5th-6th

THE Roanoke Division has the reputation of doing things right, and the Roanoke Amateur Radio Club has made it known that this year’s
To enhance the appearance of your station, to facilitate your reference work, and to preserve the records of the advancement of the radio art, you need a BINDER. You need one for this year's issues and one for each of the accumulated year's issues that you have. It will accommodate twelve issues of QST and a yearly index. The QST Binder is covered in deep maroon cloth. It is cleverly designed to take each issue as received and hold it firmly without mutilation. It permits the removal of any desired issue without disturbing the rest of the file.

A GOOD INVESTMENT AT

$1.50 POSTPAID

AMERICAN RADIO RELAY LEAGUE
West Hartford, Connecticut
Appearance is much easier to imitate than performance.

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MALDEN, MASS.

PANJII- BAKELITE- RUBBER- ALUMINUM
All Sizes Cut to Order
BAKELITE TUBING & RODS
Drilling, Engraving & Special Work
ALUMINUM CANS—Stock sizes, Special sizes, made to order.
ALUMINUM CHASSIS—Threaded brass studs for 6/32 screws.
Length from ½" to 6"—price 5c to 30c.
Insulating bushings for all size shafts or Bakelite—15c.
Bakelite tubing Threaded to Specifications.
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MFG. CO.
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REMEmBER
To take advantage of the special offer of membership-subscription and a copy of the 11th edition of the "Handbook" for...

ONLy A FEW DAYS LEFT

$3

WE STOCK 'EMI
NATIONAL CATHODE-RAY OSCILLOSCOPE
AND
5 METER PORTABLE TRANSCEIVER
Amateur discount 40% on all National items
Write for our free catalog

CAMERADIO
603 GRANT ST.
PITTSBURGH PA.

Say You Saw It in QST — It Identifies You and Helps QST

NATIONAL CATHODE-RAY OSCILLOSCOPE

Ultra-High-Freq. Gear

(Continued from page 10)

and reception are certain to be genuinely worth while.

Well gang, what say to some hot activity on the ultra-ultra high frequencies? There is plenty of fun to be had and a whole new set of records to be established. Needless to say, all dope on contacts made and new gear developed will be given a particular welcome here at Headquarters.

Ontario Division Convention

King Edward Hotel, Toronto, Ont., Oct. 5th—6th

THE Wireless Association of Ontario, Queen City Amateur Radio, Riverdale Radio Club and the North Toronto Radio Club are sponsoring a convention at Toronto on Friday and Saturday, October 5th and 6th respectively. Plans and details which have been formulated indicate that those who do not attend will be missing something. Therefore, the clubs extend a most cordial invitation to all amateurs to be present and participate in all of the activities during the two days mentioned. There will be distinguished guests amongst whom will be our own General Manager Reid. A.R.R.L. will be represented by Mr. Clinton B. De Soto, Asst. to the Secretary. Sam B. Trainer, Jr., Chairman, 4 Shorncliffe Ave., Toronto, Ont., will appreciate a word from those who desire further information.

Central Division Convention

Neil House, Columbus, Ohio, Sept. 7th—8th—9th

COLUMBUS will be the Mecca for all hams on the above date, because the Columbus Amateur Radio Association is preparing for a convention that will be the talk for months to come. Put those dates down, fellows, and remember that a cordial welcome awaits you.

The best of technical talents will be there. Good lectures for everybody. Plenty of stunts, entertainment, etc. Those who attended the hamfest early this year know what the committee can do. Talk this convention over with the next ham and see if the lucky man with an automobile will arrange to take a carful with him. The motto is "ON TO COLUMBUS." Further information may be obtained from F. Gibb, Chairman, 85 East Long St., Columbus, Ohio.
Johnny Q. Ham, one fine summer day,
Started to swim from Class B to Class A.
The "blub's" show his fate, so dear reader take note:
If you try the same trip, better hire the boat!

**THE RADIO AMATEUR’S LICENSE MANUAL**

Indispensable for the already-licensed amateur. A necessity for the beginner. Full and complete dope on renewal and modification procedure, the Class A Exam (with questions and answers), portable procedure, etc. All the dope on every phase of amateur licensing procedure and, of course, the complete text of the new radio regulations and pertinent extracts from the basic radio law.

Going over your first ham ticket? You need the Manual for its instructions on where to apply, how to go about it in the right way, and most important of all, for the nearly 200 typical license exam questions and answers.

Get a copy of "The Radio Amateur’s License Manual" and be sure to get your ticket.

(No. 9 in the series entitled The Radio Amateur’s Library)
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 display for the purpose of soliciting business as 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 15¢ 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) Advertisement shall not appear in the 20th of the second month preceding publication date.

(6) Provisions of (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products advertised.


a.ppreciated. WSDED, Holland, Michigan.

QSL cards, two color, cartoons, message blanks, stationery, WIRELESS code classes for beginners and advanced. Complete training for amateur license. $1.50 weekly. Hart., 114 all kinds parts. Write for list. Fred Elser, 1625 Grandview, Glendale, Calif.


For sale by Maleco. Fine instruments for amateur samples. Maleco, 1512 Eastern Parkway, Brooklyn, N. Y.

TRADE: condenser, resistors, etc. for any good firearms and cameras. James Cee, 28 Laymon Apts., Dayton, Ohio.

WHAT the Amateur needs. Some places where he can sell for cash, furnish free labor, buy new or used parts and sets at bargain prices. We offer these services, Active Hams in charge of HWF HWD 9FI5. Largest stock of used parts in the country. Send for price list and complete description. Billey McMurdo—Silver Cardwell Sylvania Ward-Leonard Thordarson Cornell-Dubilier. Walter Ashe Radio Co., St. Louis, Mo.

TRADE QSLs, SWLs printing for meters, tubes, ham apparatus. W5ERN.

QSLs, SWLs, with personality plus. Free samples. W8OOOC. W8EHN, 1827 Cone, Toledo, Ohio.


QSLs! QSLs! Made to your specifications! Samples? Stamps appreciated! Hatry and Young, Hartford.

QSL cards, two color, cartoons, message blanks, stationery, snappy service. Write for free samples to-day. W1BEF, 16 Stockbridge Ave, Lowell, Mass.

QSLs, two colors. Samples. Printer, Cortworth, Iowa.

KAZA-W6QVU selling out. Fone and CW transmitters. National single signers, 989's. $8.50 each of you individuals or apparatus in quantity for profit, even if by an individual, is commercial and takes the 15¢ rate. Provisions of paragraphs (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

WANTED—to exchange 1932 Harley Davidson 74 motor-cycle, perfect condition, for 75 or 100 watt phone xmitter and receiver. Write description. V. J. Cheek, W4ADN, W2, Athens, Georgia.

MOTOR generator, perfect combination for 75 or 100 watt phone xmitter and receiver. Write description. V. J. Cheek, W4ADN, W2, Athens, Georgia.

PHOTOGRAPHIC (QSLs—$2.15 per hundred. Two color printed QSLs, original designs, $7.50 per hundred. Message cards, and stationery, QSLs by Maleeo. Finest in country. Jiree samples. Sooooo.

90 Say You Saw It in QST — It Identifies You and Helps QST.
WANTED! Transmitting tubes and parts, trade museum.
W6FZQ.

WANTED—to buy F8B, reasonable. W6GLR, Mason City, Ia.

BRAZILIAN Quartz, clear, for making piezo-electric crystals. F. Beumgardt, 193 Broadway, New York City.

TRANSMITTERS manufactured to order. Transmitters reconditioned. Holmen C. Miller, Box 105, Palo Alto, California.
TRADE 3/4 x ¾ R.B. Graflex camera 11.5 for r.f. power amplifier, complete. W2DYT.

COMPLETE Class B phone, W6KQO.


QSL 75¢ a 100. 2 colors. W5DGE, 1816 S. Ave., N., Minneapolis, Minn.

CRYSTALS—3600-1715. 1" x within three kc. $1.95. Standard holder, $7.75, W2DBQ, 1104 Lincoln Place, Brooklyn, N. Y. FLASH!! New Sargent receiver, 8-14 Super-het—15-500 meters, a real amateur job—Complete with 8 tubes, 8" dynamic speaker crackle cabinet $49.50, prepaid. Sargent 3 tube amateur special—Kit $19.75, Wired $19.75. Write for Circular showing Graphite Anodes long life transmitting tubes—1000 hour guarantee 35 types—$80 $65.50, $11.242A $11.50, 132 $19.75, 80 $32.50, 216 $39.75, 204A $95.00. New model Haigis Transmitter receiver $19.20, Fairview, N. J.

CRYSTALS: Premium, guaranteed. M0-80 meter, $8.75—211, 242A $11.50, 852 $19.75, 860 $32.50, 212D $65.00, 204A $95.00. New model Haigis Transmitter receiver $19.20, Fairview, N. J.

CRYSTALS, Hi0-8(f meter. Trade for tubes, meters, transformers. Cheviot, Ohio.

Selector $17.64 Prepaid, RME9-D $112.50 Prepaid. Write, in holders, Watters, $7.50; 203As and 854s, new. Amateur Service, Fairview, N. J.

Say You Saw It in QST — It Identifies You and Helps QST

HINTS AND KINKS

“HAMS”... HERE IT IS... THE HANDBOOK that you have been waiting for!

Sixteen pages of real data about resistors and rheostats... how to select voltage dividers, bleeder resistors, element rheostats, power supply systems, etc. Ingenious tables and charts eliminate formulas and calculations and save 90% of the work. The Handbook also contains data on a new AC-DC Meter-Monitor, a Class-B Modulator, Multivolt resistors, wattage and resistance charts, etc., and much other useful information.

PRICE 10¢, Postpaid
Send in your order direct or see your dealer for the biggest dime's worth you ever received.

Ohio
MANUFACTURING COMPANY
631 N. Albany Ave.
Chicago, Ill.

PROFIT BY THE EXPERIENCE OF OTHERS—Thousands of Amateurs Have Read HINTS AND KINKS

If you haven't yet gotten a copy of this indispensable compilation of the money-saving ideas of 189 experimenters, you'll be glad to know that the original supply, exhausted in less than six months, has been replenished by a second printing. You'll find in it hundreds of good ideas which amateurs have found helpful. It will return its cost many times in money savings — and it will save hours of time. Many of these little dodges would probably never occur to you. Order your copy at once.

HINTS AND KINKS
FOR THE RADIO AMATEUR
No. 10 in the A.R.R.L. series entitled The Radio Amateur's Library

EIGHTY PAGES IN ATTRACTIVE PAPER COVERS
50 cents, postpaid anywhere (no stamps, please)

THE AMERICAN RADIO RELAY LEAGUE
West Hartford, Connecticut

Say You Saw It in QST — It Identifies You and Helps QST

91
Your Nearest Dealer

Your nearest dealer is entitled to your patronage. You can trust him. He is equipped with a knowledge and understanding of amateur radio. He is your logical and safe source of advice and counsel on what equipment.

Patronize the dealer nearest you—

<table>
<thead>
<tr>
<th>ALLENTOWN, PENNSYLVANIA</th>
<th>CHICAGO, ILLINOIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Electric Service Co.</td>
<td>Mid-West Radio Mart</td>
</tr>
<tr>
<td>1024 Hamilton Street</td>
<td>520 S. State Street</td>
</tr>
<tr>
<td>Complete stocks transmitting equipment</td>
<td>All standard lines carried in stock</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BALTIMORE, MARYLAND</th>
<th>CLEVELAND, OHIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Electric Service Co.</td>
<td>Northern Ohio Laboratories</td>
</tr>
<tr>
<td>303 W. Baltimore Street</td>
<td>2073 West 85 Street</td>
</tr>
<tr>
<td>Everything for the amateur</td>
<td>Wholesale Distr. for National, Hammarlund, Thordarson, Cordwell</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BOSTON, MASSACHUSETTS</th>
<th>CLEVELAND, OHIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutter &amp; Cross, Inc.</td>
<td>Radio Servicemen's Supply Co.</td>
</tr>
<tr>
<td>99A Milk Street</td>
<td>206 Prospect Street</td>
</tr>
<tr>
<td>All OM's, OW's, and YL's welcome — W1HRF</td>
<td>Wholesale Distributors catering to Amateurs, Dealers, Servicemen</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>BROCKTON, MASSACHUSETTS</th>
<th>DENVER, COLORADO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ware Radio Supply Company</td>
<td>Inter-State Radio &amp; Supply Co.</td>
</tr>
<tr>
<td>913 Centre Street</td>
<td>1639 Tremont Place</td>
</tr>
<tr>
<td>Hammarlund, Sylvania, Ohmite, Raytheon, Triplet Meters</td>
<td>Amateur Radio Headquarters in the Rocky Mountain Region</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>BUFFALO, NEW YORK</th>
<th>DETROIT, MICHIGAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dymac Radio</td>
<td>Radio Equipment Sales Co.</td>
</tr>
<tr>
<td>359 Capen Blvd. — Tel. Univ. 9380</td>
<td>14036 Woodward Avenue, Highland Park</td>
</tr>
<tr>
<td>Complete Stock Amateur Parts — Standard Discounts — W8AWK</td>
<td>A complete stock of amateur, shortwave and service parts</td>
</tr>
</tbody>
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<thead>
<tr>
<th>BUFFALO, NEW YORK</th>
<th>DETROIT, MICHIGAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kronson Service Company</td>
<td>Radio Specialties Company</td>
</tr>
<tr>
<td>143 East Genesee Street</td>
<td>171 E. Jefferson Avenue</td>
</tr>
<tr>
<td>Western New York's largest wholesale distributors — W8EHF</td>
<td>Ham Supplies — National &amp; Hammarlund Sets and Parts</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>CHARLOTTE, MICHIGAN</th>
<th>DETROIT, MICHIGAN</th>
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</thead>
<tbody>
<tr>
<td>General Engineering Corporation</td>
<td>Serlin</td>
</tr>
<tr>
<td>Everything for the Transmitting Station</td>
<td>1419 Broadway</td>
</tr>
<tr>
<td>Detroit's Pioneer Radio Merchants</td>
<td></td>
</tr>
</tbody>
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<thead>
<tr>
<th>CHICAGO, ILLINOIS</th>
<th>ERIE, PENNSYLVANIA</th>
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</thead>
<tbody>
<tr>
<td>Allied Radio Corporation</td>
<td>Jordan Radio Laboratory</td>
</tr>
<tr>
<td>833 West Jackson Blvd.</td>
<td>1019 East Fifth Street</td>
</tr>
<tr>
<td>Complete standard lines always in stock — W9NRY — W9RZI</td>
<td>Amateur, service parts, including Billey, National, Raytheon. WBCXG</td>
</tr>
</tbody>
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<thead>
<tr>
<th>CHICAGO, ILLINOIS</th>
<th>HARTFORD, CONNECTICUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago Radio Apparatus Company</td>
<td>Radio Inspection Service Company</td>
</tr>
<tr>
<td>415 South Dearborn Street (Est. 1921)</td>
<td>227 Asylum Street</td>
</tr>
<tr>
<td>&quot;CHI-RAD&quot; Operating W9RA and W9PST — Amateurs since 1909</td>
<td>Yes, we'll take your old set in trade</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHICAGO, ILLINOIS</th>
<th>JACKSONVILLE, FLORIDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newark Electric Company</td>
<td>Glover Weiss Co.</td>
</tr>
<tr>
<td>226 W. Madison Street</td>
<td>Radio Headquarters for Southeast</td>
</tr>
<tr>
<td>Chicago's oldest radio parts store — established 1921</td>
<td>Distributors: RCA Victor, Stromberg-Carlson, Standard Ham Lines</td>
</tr>
<tr>
<td>John T. Wallace, Technical Adviser</td>
<td></td>
</tr>
</tbody>
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<thead>
<tr>
<th>CHICAGO, ILLINOIS</th>
<th>KANSAS CITY, MISSOURI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burstein-Applebee Company</td>
<td></td>
</tr>
<tr>
<td>1012–14 McGee Street</td>
<td>&quot;Specialists&quot; in supplies for the Amateur and Serviceman</td>
</tr>
</tbody>
</table>

This advertisement is paid for by the firms listed above. Qualified dealers Say You Saw It in QST — It Identifies You and Helps QST
Is Your Best Friend

you should buy. His stock is complete. He can supply your needs without delay. His prices are fair and consistent with the high quality of the goods he carries. He is responsible to you and interested in you.

You can have confidence in him

KANSAS CITY, MISSOURI
Radio Laboratorties
1515 Grand Avenue
Amateur Headquarters — Complete Stock — Quality Parts

MANCHESTER, NEW HAMPSHIRE
Radio Service Lab. of N. H.
1008 Elm Street — Tel. 218-W
Branches — Portland, Me. and Barre, Vt.

MILWAUKEE, WISCONSIN
Radio Parts Company, Inc.
332 West State Street
Complete stock Nationally Known products

NEWARK, NEW JERSEY
Kaltman & Romander
69 Court Street
Drop in for an over-counter QSO

PEORIA, ILLINOIS
Klaus Radio & Electric Co.
707 Main Street
Amateur Radio Department

PHILADELPHIA, PENNSYLVANIA
Freeland Radio Supply Co.
5 N. 7th Street
"If it's radio we have it"

PHILADELPHIA, PENNSYLVANIA
Radio Electric Service Co., Inc.
N. E. Cor. Seventh & Arch Sts.
All nationally advertised lines in stock

PHILADELPHIA, PENNSYLVANIA
Eugene G. Wile
10 S. Tenth Street
Complete Stock of Quality Merchandise

PROVIDENCE, RHODE ISLAND
W. H. Edwards & Company
32 Broadway, Room 23
Amateur Equipment — National, Hammarlund, RCA Tubes

ST. LOUIS, MISSOURI
Walter Ashe Radio Company
1100 Pine Street
W9FIS in charge of the oldest and largest parts store in St. Louis

ST. PAUL, MINNESOTA
Lew Bonn Company
2484 University Avenue
Rex L. Munger, W9LIP, Sales Engineer

SAN ANTONIO, TEXAS
Straus-Frank Company
Distributors for nationally advertised amateur products
RCA-DeForest transmitting tubes

SAN FRANCISCO, CALIFORNIA
Offenbach Electric Company, Ltd.
1452 Market Street
"The House of a Million Radio Parts"

SPRINGFIELD, MASSACHUSETTS
T. F. Cushing
349 Worthington Street
An amateur, endeavoring to sell good parts

SYRACUSE, NEW YORK
Roy C. Stage, W8IGF
Complete stock of standard Ham & BCL parts
Standard Discounts. Free technical service

TORONTO, CANADA
A & A Radio Service Supply
101 Queen Street, West
Canada's foremost radio supply house

TORONTO, CANADA
Wholesale Radio Company, Limited
1133-39 Bay Street
Canada's Largest Amateur Supply House

TRENTON, NEW JERSEY
American Radio Co.
5 N. Broad Street
Central Jersey's leading radio parts store

WASHINGTON, D. C.
George's Radio Co.
816 F Street, N.W.
Washington's largest distributor of radio parts

ZANESVILLE, OHIO
Thompson Battery & Radio Service
128 Main Street
Distributor radio equipment for amateurs and servicemen

Say You Saw It in QST — It Identifies You and Helps QST
You Are Protected When You Buy From QST Advertisers

"Advertising for QST is accepted only from firms who, in the publisher’s opinion, are of established integrity and whose products secure the approval of the technical staff of the American Radio Relay League."

Quoted from QST’s advertising rate card.

Every conceivable need of a radio amateur can be supplied by the advertisers in QST. And you will know the product has the approval of the League’s technical staff.
These A.C. solenoid relays are ideal for remote control of transmitters, for control of crystal ovens, and for any general remote control application except for keying. **These relays will not operate in keying service.** Silver-to-silver double break contacts are used throughout.

The maximum contact rating is 10 amperes at 220 volts. The relay coils are wound for 115 volts 60 cycle alternating current. Relays for other voltages can be supplied on special order. Use coupon below when ordering.

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Poles</th>
<th>Normally</th>
<th>Circuit Diagram</th>
<th>Price</th>
<th>Type No.</th>
<th>Poles</th>
<th>Normally</th>
<th>Circuit Diagram</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A107</td>
<td>1</td>
<td>Open</td>
<td><img src="image" alt="Circuit Diagram" /></td>
<td>$3.50</td>
<td>$4.50</td>
<td>A177</td>
<td>1</td>
<td>Closed</td>
<td><img src="image" alt="Circuit Diagram" /></td>
</tr>
<tr>
<td>A117</td>
<td>1</td>
<td>Closed</td>
<td><img src="image" alt="Circuit Diagram" /></td>
<td>4.50</td>
<td>5.50</td>
<td>A207</td>
<td>2</td>
<td>Open</td>
<td><img src="image" alt="Circuit Diagram" /></td>
</tr>
<tr>
<td>A127</td>
<td>1</td>
<td>Open and Closed</td>
<td><img src="image" alt="Circuit Diagram" /></td>
<td>5.00</td>
<td>6.00</td>
<td>A217</td>
<td>2</td>
<td>Closed</td>
<td><img src="image" alt="Circuit Diagram" /></td>
</tr>
<tr>
<td>A137</td>
<td>1</td>
<td>Open</td>
<td><img src="image" alt="Circuit Diagram" /></td>
<td>4.00</td>
<td>5.00</td>
<td>A227</td>
<td>2</td>
<td>Open and Closed</td>
<td><img src="image" alt="Circuit Diagram" /></td>
</tr>
<tr>
<td>A147</td>
<td>1</td>
<td>Closed</td>
<td><img src="image" alt="Circuit Diagram" /></td>
<td>5.00</td>
<td>6.00</td>
<td>A237</td>
<td>2</td>
<td>Open</td>
<td><img src="image" alt="Circuit Diagram" /></td>
</tr>
<tr>
<td>A157</td>
<td>1</td>
<td>Open and Closed</td>
<td><img src="image" alt="Circuit Diagram" /></td>
<td>5.50</td>
<td>6.50</td>
<td>A247</td>
<td>2</td>
<td>Closed</td>
<td><img src="image" alt="Circuit Diagram" /></td>
</tr>
<tr>
<td>A167</td>
<td>1</td>
<td>Open</td>
<td><img src="image" alt="Circuit Diagram" /></td>
<td>6.50</td>
<td>7.50</td>
<td></td>
<td></td>
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**Radiostat**—A stepless graphite compression rheostat for primary of 550 watt filament or plate supply transformer. Range 4 to 150 ohms. **Price $6.50**

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**ORDER BLANK—MAIL WITH REMITTANCE TO**

Enclosed find money order for $_________________________ for which please send me, shipping charges prepaid, the following items:

Name: ____________________________________________
Address: _________________________________________

Say You Saw It in QST — It Identifies You and Helps QST
Weston Model 301 Power Level Indicators are available in three types: High Speed, for the indication of modulation peaks; Low Speed, for measuring integrated average modulation over approximately a one-second period; and General Purpose, which integrates somewhat and shows heavy peaks.

These instruments normally are available adjusted to read either 0 DB or down 10 DB at 0 on the scale, based on a 6 milliwatt signal in either a 500 or 600 ohm line. The internal resistance is 5000 ohms for 0 DB or 1581 ohms for down 10 DB. These specifications are standard for the 301 line. Other instruments also are available for other levels, lines or resistances. Send for bulletin.

The Weston Hour Counter is a small, inexpensive device which indicates in hours the operating time of radio tubes in transmitters, and other electrical equipment. These hour counters are used on medium and high powered transmitters in order to keep a log of the elapsed time. Thus tubes can be replaced after some predetermined period of use, rather than wait for complete failure with consequent service interruptions. Literature on request . . . Weston Electrical Instrument Corporation, 602 Frelinghuysen Avenue, Newark, N. J.
The trite saying that to do a thing well, one must do it oneself, is nevertheless true in receiver manufacture. It is more through necessity than choice that National manufactures such a variety of parts, for in no other way can high receiver performance be maintained.

Only by painstaking design of every important detail, without compromise and without divided responsibility, can National's claim to leadership be valid. To us, this policy brings complete control of National quality. To our customers, it brings the assurance of consistent design in National receivers and of tested fitness in every National Radio Part.

NATIONAL COMPANY, INC., MALDEN, MASS.
Incorporating new features of design and construction, the RCA 865/565 finds advantageous application in amateur transmitters designed for quick band changing. Neutralization of the RCA 865/565 is seldom required when adequate shielding is employed. This feature makes this type particularly useful in buffer or doubler stages of transmitters designed for rapid QSY's.

For complete technical information on the RCA 865/565, or any other RCA type, see your RCA deForest Distributor, or write to: