In this issue: An Easy to Build Oscillator for the Beginner
COMMERCIAL GRADE COMPONENTS

A wide range of units for every application

U.T.C. Commercial Grade components employ rugged, drawn steel cases for units from 1" diameter to 300 VA rating. Vertical mounting, permanent mold, aluminum castings for power components up to 15 KVA. Units are conservatively designed. Vacuum impregnated...sealed with special sealing compound to insure dependability under continuous commercial service.

A few of the large number of standard C.G. units are described below. In addition to catalogued units, special C.G. units are supplied to customer's specifications.

CG VARIMATCH MODULATION UNITS

Will match any modulator tubes to any RF load.
Primary impedances from 500 to 20,000 ohms
Secondary impedances from 30,000 to 300 ohms

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Max. Audio Watts</th>
<th>Max. Class C Input</th>
<th>Typical Modulator Tubes</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVM-0</td>
<td>17</td>
<td>28</td>
<td>26, 49, 79, 6A6, 58, 2A3, 6H5</td>
<td>8.50</td>
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<tr>
<td>GVM-1</td>
<td>50</td>
<td>65</td>
<td>6V6, 6L6, 2A3, 42, 16, 6L6, 210</td>
<td>14.00</td>
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<tr>
<td>GVM-2</td>
<td>60</td>
<td>125</td>
<td>847, 809, 4-16, T-50, 1500</td>
<td>20.50</td>
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<tr>
<td>GVM-3</td>
<td>125</td>
<td>250</td>
<td>890, 867, 845, T-50, 1500</td>
<td>20.50</td>
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<tr>
<td>GVM-4</td>
<td>200</td>
<td>500</td>
<td>5A7, 505, 680, T-50, 1200</td>
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<tr>
<td>GVM-5</td>
<td>600</td>
<td>1200</td>
<td>845, 11F-300, 2411, 11N-341, 250V</td>
<td>115.00</td>
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</table>

INPUT, INTERSTAGE, MIXING AND LOW LEVEL OUTPUT TRANSFORMERS

(200 ohm windings are balanced and can be used for 250 ohms)

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Application</th>
<th>Primary Impedance Ohms</th>
<th>Secondary Impedance Ohms</th>
<th>List Price</th>
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<tr>
<td>131</td>
<td>1 plate to 1 grid</td>
<td>15,000</td>
<td>135,000 3:1 ratio</td>
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<tr>
<td>132</td>
<td>1 plate to 2 grids</td>
<td>15,000</td>
<td>135,000 3:1 ratio overall</td>
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<tr>
<td>133</td>
<td>2 plates to 2 grids</td>
<td>30,000 P to P</td>
<td>80,000 3:1 ratio overall</td>
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<tr>
<td>134</td>
<td>Line to 1 grid hum-bucking</td>
<td>50, 300, 500</td>
<td>80,000 overall</td>
<td>12.50</td>
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<tr>
<td>135</td>
<td>Line to 2 grids hum-bucking</td>
<td>50, 300, 500</td>
<td>120,000 overall</td>
<td>13.50</td>
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<tr>
<td>136</td>
<td>Line to 1 or 2 grids hum-bucking</td>
<td>50, 300, 500</td>
<td>80,000 overall</td>
<td>17.50</td>
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<tr>
<td>137</td>
<td>Single plate and low impedance matched to line in 1 or 2 grids hum-bucking</td>
<td>15,000, 50, 200</td>
<td>80,000 overall</td>
<td>13.50</td>
</tr>
<tr>
<td>133</td>
<td>PP 805, 56, similar to 125, 2A3, 6L6's, etc.</td>
<td>39,000 P to P</td>
<td>25,000 3:1 ratio overall</td>
<td>11.00</td>
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<td>133</td>
<td>PP 805, 56, similar to fixed bias 6L6's</td>
<td>39,000 P to P</td>
<td>7,500 3:1 ratio overall</td>
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<td>133</td>
<td>PP 15, 8A3, similar to fixed bias 2 or 4 6L6's</td>
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<td>1,500 3:1 ratio overall</td>
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<td>Mixing</td>
<td>50, 200, 500</td>
<td>50, 200, 500</td>
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<td>140</td>
<td>Triode plate to line</td>
<td>15,000</td>
<td>50, 200, 500</td>
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<tr>
<td>141</td>
<td>Triode plate to line</td>
<td>15,000</td>
<td>50, 200, 500</td>
<td>13.50</td>
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</table>

For full details on this line, write for Catalog

United Transformer Co.

150 VARICK STREET NEW YORK 13, N.Y.

EXPORT DIVISION: 13 EAST 40TH STREET, NEW YORK 16, N.Y.

CABLES: "ARLAB"
Let the flashing speed of electrons measure for you! Tubes are faster than a meter... besides, meters are damped, so won't respond readily to transient phenomena. You can use an oscilloscope for visual measurement, yes—but then cost lifts its head. Balance the price of a scope against the receiving-tube cost of any of the Ken-Rad indicator types! Your pocketbook will feel the difference.

Another advantage of Ken-Rad indicator tubes: very little auxiliary apparatus is needed. In most applications, a resistor or two sums up your list of extras.

How can you make use of this fine combination of speed, easy visibility, and real saving? By employing Ken-Rad tubes as modulator, volume-level, and resonance indicators, among other functions. There are several types from which you may choose. The 6E5 and 6U5 are Ken-Rad tubes of, respectively, sharp-cutoff and remote-cutoff designs. If you desire comparative readings, or wish to check two circuits at once, the 6AL7-GT dual-indicator tube serves ideally.

Moving far faster than a V-2 rocket, the tiny streams of electrons require careful control and deflection. Ken-Rad indicator tubes are built to exacting standards—they do their precision job well because they're made well! You'll want to see these fine tubes, inspect them, learn their low prices. Your Ken-Rad distributor or dealer has them...

so visit him today!
After owning and operating a Collins 75A-1 for several months, John Lang, W7KHU, wrote us recently as follows:

"From the standpoint of stability, selectivity and all around fine performance, the 75A-1 is the best receiver it has ever been my pleasure to work with. I have turned the receiver on, zero beat WWV, and after an hour the 75A-1 is still zero beat with WWV. The tuning system provides the most accurate calibration I have ever seen. Another important point is the performance of the crystal filter. Signals that sound as though they are zero beat with each other can be separated, and it is possible to copy either one of them without interference from the other.

"The noise limiting circuit is also extremely fine. The operation of this circuit is positive and does not distort the speech when in use. All in all, the Collins 75A-1 is the finest precision receiving equipment made for the ham, and I am mighty proud to be the owner of such a fine piece of gear."

See or write your nearest authorized Collins dealer. The net domestic price of the 75A-1 amateur receiver, complete with tubes and speaker in matching cabinet is $375.00.

Note: The price of the Collins 51J-1 communication receiver, announced last November and in the 1950 Radio Amateur's Handbook, is now $975.00 in rack panel mounting, complete with tubes. Speaker in matching cabinet is $15.00 extra. The 51J-1 mounted in table cabinet is $27.50 extra. The 51J-1 will be available to amateurs approximately April 1.
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PR Crystals

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### Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in QST. All ARRL Field Organization appointments are now available to League members. These include OBS, OES, OPS, OC and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and FAM. In addition to station and leadership appointments for Members, all amateurs are invited to join the ARRL Emergency Corps (ask for Form 7).

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<th>SCM Name and Address</th>
<th>SCM Address</th>
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<td>Walter L. Glover, 15 Heimlock St.</td>
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<td>Thomas Hunter, Jr., 69 Dublin St.</td>
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<td>A. W. Morley, 3035 West 11th Ave.</td>
<td>Edmonton, Alta.</td>
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<td>W. R. Williams, 1309 A 21st Street</td>
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<tr>
<td>Manitoba</td>
<td>W. A. Morley, 76 Legacy Ave.</td>
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"It Seems to Us..."

LEAGUE CONTROL

When the League's Board of Directors meets each year in May it does a pretty good job of going over all the angles of current amateur problems, and members' discussions and reactions, endeavoring by this or that action to chart the most desirable course. At its meeting last May the directors were unanimous in thinking we ought to have something in QST that would outline the organizational structure of the League and make it plain to every ham that there is a mechanism which really does provide for the control of the League by the membership.

It happened we had just that sort of an article in the works, and perhaps you read it when we ran it subsequently in the July 1949 issue on this editorial page. We also covered this matter in detail when we wrote up our presentation to FCC in the document that constituted the League's first comment to the Commission on Docket 9265; that was run in the September 1949 issue. And, of course, antedating these was the superb treatment of the origins of the League and the development of its form of government that Ken Warner had expected to present to the Milwaukee National Convention back in '48; we still think this is one of the finest pieces of writing you'll ever set your eyes on, if you really want to know how the League got going and the thought that has been given to this very question of membership control: If you haven't read it — or even if you have — dig out November '48 QST and turn to page 33.

All in all, then, it would seem that members have had a pretty good chance to acquaint themselves with some of the background and details of administration of their organization, the League. Yet it is a fact that when we were visiting clubs and conventions on the West Coast last autumn we persistently ran into questions from fellows who wanted to know just how the League works and, even though they admitted to being League members, apparently had missed these articles we have just been talking about. Perhaps what might help, we've thought, was a somewhat different way of telling the story. Pictures always help, and while we don't know how to photograph the League's structure we have taken a crack at a chart. So here it is, and we hope it will be responsible for a better understanding of the control of ARRL affairs on the part of some of you who haven't noticed the other articles.

First of all we want to direct attention to that block at the top. That's where you and your fellow members of the League are. The block isn't at the top out of courtesy, either; it's there because everything in the League begins at that point and because everything having to do with the League stems from the membership. You can make the League, or break it. You, and you alone, elect directors to the Board. The Board thereafter has the authority to govern League affairs as a representative of the membership — you. It appoints the three paid officers of the League — the Secretary, Treasurer and Communications Manager — and fixes their sala-
ries. The Board doesn't hire the others of the nearly sixty employees at League Headquarters — that's the responsibility of the Secretary (who, under the Constitution, is also the League's General Manager) working in conjunction with the Treasurer and Communications Manager. But you can be pretty sure that if the Headquarters staff starts falling down on performance the three paid officers hear about it in a hurry! Your Board, not the Hq., is the sole authority in determining the policy of the League in all its working phases. We sometimes hear some loose talk about a "rubber stamp" Board, meaning, so far as we can find out, that the directors simply go along automatically with whatever Headquarters wants done. What we've never understood is by what mysterious means the Board is obliged to exhibit rubber-stamp characteristics toward the paid officers whose destinies it controls absolutely. (None of the paid officers is appointed for a definite term; their appointments can be terminated at any time the Board feels like it.) In any event, however, any time the members of the division think their director is exhibiting characteristics which do not meet with general approval, all they have to do is to "unelect" him and put in his place somebody more to their liking.

Getting back to the Board, it is just as responsive to your control as the rest of the staff, in that diagram is subject to the actions of the Board. Directors don't just happen. Nor can they nominate themselves. It takes at least ten licensed amateur League members in a division to nominate somebody for director. But any ten Full Members can nominate anybody they please, provided only he meets the eligibility requirements which have been set up to ensure that directors are men of both amateur and League experience, and are free from any commercial connection with radio, etc. (All this is in the Constitution and By-Laws, a copy of which we will be glad to send you on request.) If you think you have a good man for the job of director (not excluding yourself!) and can get ten League members to go along with you, he's nominated. We run election notices soliciting just such nominations in the August and September issues of *QST* every year. That's as far as we can go — the rest is up to you.

We'd like to comment briefly on the business of voting for director. A director doesn't always get elected by a balloting of the membership; it may be that only one candidate was nominated and that happens he is simply declared elected as the new director without any voting. This happens more often than you'd think. When there are several candidates in the field, however, every licensed amateur member of the League as of September 20th of the year concerned gets a ballot and a set of envelopes to send it back in. Unfortunately, it is a fact that an awful lot of members never exercise this basic right and responsibility in the League's organization. Over the years we'd say only an average of about fifty per cent of the membership votes, although this sometimes has gone as low as thirty-five or forty per cent and as high as nearly seventy per cent. We think there is a tendency to get out more of the vote in recent years, but we still deplore the fact that a great many members pass up an opportunity to decide for themselves what kind of a League we are going to have. We have had fellows tell us that "Oh well, one vote more or less isn't important." We don't agree. Moreover, we have had at least one director election in recent years that resulted in a tie, necessitating a rerun; a dozen or so votes could have changed the results in a number of other cases.

We have said it many times before on these pages but it is just as true as it has ever been — it is your League, OMs. The Headquarters staff, including the paid officers, isn't the League; it is solely a service organization operating under and responsible to the Board of Directors. But the directors aren't the League either; they exist only for and because of the membership. You, the members, are the League.

**FEED-BACK**

W1QPG calls our attention to the fact that the power-distribution system shown on page 30 of August, 1949, *QST* does not conform with underwriters' requirements. Should a plug develop a poor neutral contact, while the "hot" contact is maintained, there would be a potential of 115 volts between chassis and ground. If one side of the primary circuit is to be connected to chassis, as shown, a permanent independent ground connection to all chassis should be made. However, the safest arrangement is to disconnect the primary circuits entirely from the chassis, running the connections directly to the No. 3 plug prongs, and then connect the chassis to an independent ground.

**IS YOURS ON FILE WITH YOUR QSL MGR?**

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10 QST for
A "Constant-Modulation" 'Phone System

Combining Efficiency and Economy in the 'Phone Transmitter

BY GEORGE R. LIPPERT,* WSYHR

• Here is a new method for obtaining a long-neglected system of modulation. It offers possibilities in lowered modulator-power requirements and high over-all efficiency, and thus merits consideration by every serious 'phone experimenter.

Interest in high-efficiency modulation systems always runs high in amateur circles, but most systems described in the past have suffered from complexity and the need for careful adjustment of the circuits. The most efficient one of the lot, single-sideband suppressed-carrier, suffers the further disadvantage that special tuning procedures are required at the receiving end. There is one system, however, that offers many advantages in amateur work, and yet it seems to have been neglected in recent years. This is the "controlled-carrier" system, first introduced to amateurs in 1935.

Controlled-carrier systems enjoyed a short vogue and then dropped out of the picture. Several methods of generating controlled-carrier signals were developed at the time, but they lost out in favor of the present high-level plate-modulation systems. It is the purpose of this article to present a simple method for generating a controlled-carrier signal and to point out the advantages that have been forgotten or were never fully exploited.

Briefly, a controlled-carrier system is one that transmits only enough carrier at any instant to provide for distortionless detection at the receiver. As the voice level is raised the carrier level is raised accordingly, so that the percentage of modulation is always maintained at a high and efficient level. With no speech input, the carrier radiation is low, and heterodyne interference is decreased. The tubes run cooler because they are working hard only during actual transmission periods. This, in turn, means that the power ratings of the tubes can be increased. The power consumption is low, since the r.f. tubes draw plate current only when modulated, and this makes the system particularly attractive in mobile work. A controlled-carrier signal can be amplified in a Class B amplifier with an efficiency approaching that of single-sideband suppressed-carrier work, because of the resting, or "cooling-off," periods, and this should be attractive to sufferers of TVI who have been looking at Class B r.f. amplifiers as a partial solution to their problem. The presence of a carrier reduces the available sideband power over that obtained with suppressed-carrier operation, but controlled-carrier signals amplified in Class B stages offer a big improvement over constant-carrier systems amplified in a similar manner.

A Simplified Circuit

Most of the earlier work with controlled-carrier transmitters used Class B modulation of the amplifiers, and required careful selection of tube types and operating conditions. However, using screen-grid modulation of a tetrode or

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* 4854 Pearl Road, Cleveland 9, Ohio.


2 The oft-discovered system of removing the plate voltage from a Class C amplifier and modulating with a Class B amplifier is not a controlled-carrier system, although it is sometimes referred to by that name. In fact it isn't much of anything; since the audio is badly distorted, the modulation transformer load is not constant and the transformer may short-circuiting in this unloaded condition, and there is no carrier for both halves of an audio cycle to work against. The fact that such modulation can be understood at all is less a recommendation for its sporadic discovery and use than a criticism of what passes for tolerable 'phone quality.—Ed.

Fig. 1 — The basic circuit for constant-modulation or controlled carrier, using screen-grid modulation. Rectified audio power developed across $C_1$ furnishes d.c. screen voltage in proportion to the audio amplitude. With no speech, the power input to the r.f. amplifier is low and the output is low or negligible.

April 1950
pentode makes the thing quite a bit simpler. The basic circuit is shown in Fig. 1. The screen grid of the r.f. amplifier is modulated through the transformer, $T_1$. Normally the secondary of the transformer would be returned to the screen power supply, and the average screen voltage would be roughly one-half the normal operating value for c.w. However, in Fig. 1 the screen grid gets its d.c. from the voltage developed across $C_1$, which is rectified audio from the modulator. With no speech, there is no signal through the modulator, no voltage developed across $C_1$ and consequently little output from the amplifier. (There is some slight leakage through a screen-grid amplifier with the screen at cathode potential, but it can be reduced to any desirable minimum by returning $C_1$ and $R_1$ to the rectifier-winding center tap, and then inserting a negative voltage between center tap and ground.) When an audio signal comes through the modulator, it is applied to the screen grid through $T_1$. At the same time, however, some of the audio power is rectified in the audio rectifier and a voltage develops across $C_1$. If $T_1$ has a ratio of 2:1, the d.c. voltage across $C_1$ is one-half the peak-to-peak voltage developed across the secondary of $T_1$, and the screen is fully modulated. As the audio signal is increased, the d.c. voltage applied to the screen is increased in proportion, and the percentage of modulation remains constant over a wide range of audio amplitude.

The value of $R_1$ is unimportant, since it only serves as a d.c. path for the screen grid, to avoid blocking during no-modulation periods, and it can be made large enough to require insignificant power from the modulator. The value of $C_1$ must be large enough to maintain the screen voltage as well as low audio frequencies, as at high ones, otherwise the percentage of modulation will be higher for the lower frequencies and speech will sound "bassy." The carrier will "hang on" slightly after a syllable, but the lag can be reduced to insignificance by proper choice of $C_1$ for the screen-grid tubes in use. A sudden decrease in audio amplitude will only cause a momentary decrease in the modulation percentage, until the d.c. drops to the level of the audio.

In a practical application, the circuit of Fig. 1 would result in audio distortion, because the condenser $C_1$ acts as a low-impedance load for the rectifier on the peaks of the audio cycles. The practical solution is to use a resistance- or inductance-input filter instead of the simple condenser, $C_1$. While this introduces a slight lag in carrier rise, the practical effect is negligible and overmodulation on the start of the first syllable is a rarity.

The plate current of the r.f. amplifier, as read on a meter, remains at a low value with no audio signal and kicks up with speech, in the same manner as the plate current of a Class B modulator stage. The screen-grid amplifier modulated as in Fig. 1 can be run at twice the input power on peaks as the same tube in plate-modulation service, by increasing the plate voltage, plate current, or both, so that the product of the peak plate voltage and current will equal the peaks in a plate-modulated stage.

The audio amplifier must supply the d.c.
power for the screens of the modulated tubes plus the audio to modulate them. In the case of two 807s the requirement is about 5 watts, compared with 40 watts necessary to plate-modulate the same tubes. In any case the audio power will be equal to about 1.5 times the d.c. power requirements of the screen grids.

In receiving a "constant-modulation" signal, the listener may or may not choose to use the receiver a.v.c. If a.v.c. is used, the receiver "S" meter will swing up sharply with modulation, and there is likely to be some distortion at times. In most cases it will be advantageous to turn off the a.v.c. and reduce the r.f. gain control, since heterodyne interference from adjacent signals will be reduced. Receivers with fast-acting a.v.c. systems will show less distortion than sluggish ones.

An Experimental Transmitter

The transmitter shown in the photograph was built (with the exception of the audio section) by William Demeter, W8GMF. It was intended to be a medium-power exciter, but the parallel 807s in the output stage made it ideal for trying the constant-modulation circuit. The circuit of the output stage and modulation equipment is shown in Fig. 2, and it was only necessary to add the audio equipment, the 6X5 rectifier and an inexpensive modulation transformer to the W8GMF exciter.

One thing became obvious immediately. It is virtually impossible to tune and load the final in its normal operating condition, so $S_1$ was added to permit using low values of plate voltage and constant values of screen voltage during tune-up. The voltages were obtained from the audio-amplifier power supply and are not critical in value. The VFO, speech amplifier and power supplies are conventional and not shown here.

In figuring the modulation-transformer turns ratio, the ratio between the rectifier winding and the modulation winding ($11-12$ in Fig. 2) is the most important because it determines the modulation percentage. Theoretically, one should have twice the turns of the other, assuming that the voltage across $C_3$ is the peak a.c. voltage and 100 per cent modulation is desired. In practice, however, the condenser may not charge to exactly the peak value, and so the ratio should be slightly higher. In the experimental transmitter, a value of 2.2:1 was used. In this transmitter, assuming the screen-grid circuit of the 807s to show an impedance of 21,000 ohms, the modulator load is 7000 ohms when connected to a winding ($7-9$ in Fig. 2) that has a 1:2 ratio to the rectifier winding. Since the transformer that was used had no center tap on this winding, the transformer $T_2$ is used as a center-tapped choke for feeding d.c. to the plates.

Tuning the Transmitter

To tune the transmitter, $S_1$ is switched to the "tune" position. This puts 400 volts on the plates of the 807s and 150 volts on the screens. The plate loading is adjusted to where the 807s draw about 60 ma. When $S_1$ is switched to the "operate" position, the plate voltage is increased to 1000, the screen voltage drops to 0 with no modulation, and the idling plate current is about 15 ma.

The r.f. section of the W8GMF transmitter that was used in the tests is also a good example of how surplus parts can be put to work.

A 60-watt lamp was used as a dummy load in the W8GMF transmitter. In the "tune" position the lamp glowed dimly, indicating an output power of about 15 watts. Upon switching to "operate" the lamp went out, although a wattmeter showed about 3 watts of carrier still present. Under full modulation the lamp would light to more than full brilliance. The plate current swings to about 150 ma. on peaks and runs around 100 ma. average under modulation.

Because the modulation percentage remains essentially constant regardless of audio amplitude, it can be seen that the audio gain control is also the power control. On local contacts the audio gain can be run at a low level, giving a low output.

Rudy Peronek, W8ZJH, has recently incorporated this system in a single 813 final with excellent results. The required audio power is about 5 watts and the maximum modulated power output is about 250 watts.

The writer wishes to express his gratitude to William Demeter, W8GMF, for his cooperation in testing this system in his transmitter.
A Two-Stage Transmitter for the Beginner

Thirty-Five Watts on 80 and 40

BY DONALD H. MIX,* WITS

Fortunately, a satisfactory transmitter for a beginner in ham radio does not have to be as complex as a superhet receiver. The greatest problem involved in the design is that of deciding where to stop. It is readily possible to obtain satisfactory results from a single tube. However, if the rig is limited to the oscillator alone, usually it will not be possible to utilize fully the capabilities of even the smaller-size power transformers. Therefore we are faced with the task of trying to strike a reasonable balance between simplicity and getting the most power in proportion to cost. A study of low-power h.c.-type transformers on the market shows that there is a roughly optimum point in the relationship between cost and power capability in transformers rated at 300 to 400 volts d.c. output at 100 to 150 ma. If we are to take full advantage of such a transformer, an amplifier will be necessary, because the power input to a crystal oscillator must be limited much below this figure to prevent damage to the crystal and assure good operating characteristics.

The usual type of amplifier is hardly to be recommended for a beginner. To cope with the well-known complications of stabilizing either triodes or screen-grid tubes is more than can reasonably be expected from one with little or no experience. The problem can be avoided by an arrangement in which the input circuit of the amplifier is not tuned to resonance. Although this system is not a highly-efficient one, it does overcome most of the handicaps imposed by a simple oscillator transmitter and the combination is considerably easier to handle, especially since the number of tuning controls is not increased.

The circuit diagram of the transmitter shown in the photographs is given in Fig. 1. The crystal-oscillator circuit is the triode Pierce which requires no tuning control. The screen of the 6AG7 serves as the customary triode plate. Through essentially electron coupling, the output is taken from an untuned plate circuit (RFC3) which is reasonably independent of the oscillator circuit proper. The amplifier is coupled capacitively through C7, and its output circuit is tuned to the desired operating frequency. Plate voltage is fed to the amplifier through the r.f. choke RFC5 (parallel feed), rather than through the tank coil, to remove the danger of high-voltage d.c. on the coil. The transmitter is keyed in the common cathode lead of both tubes and a milliammeter is provided for checking the plate current of the amplifier. It is possible to dispense with the meter if necessary, but it is very useful in making proper adjustments.

A link-coupled antenna tuner is included. Series or parallel tuning may be used by proper strapping of pins in the base of the plug-in coil at L4. The transmitter will handle a power input up to 30 or 35 watts compared with the few watts obtainable from a crystal oscillator alone.

A beginner's two-tube crystal-controlled transmitter for the 80- and 40-meter bands. The panel is a sheet of $\frac{5}{8}$-inch aluminum 7½ inches high and 14 inches long. The dials are National type HRT-0.
Construction

The general construction of the transmitter is designed to match that of the beginner's superbet receiver described in the March issue. Therefore the chassis and panel dimensions are the same and the unit will fit into a similar cabinet. As in the receiver, the exact placement of parts on top of the chassis is not critical. The two variable condensers, C₁₃ and C₁₄, are placed at either end of the chassis to balance (shafts about 3 inches in from the ends). C₁₄ must be insulated from the chassis, so it is mounted on Millen 32100 feed-through insulators which require ½-inch holes. C₁₂ need not be insulated, but metal spacers are used to bring its shaft up level with that of C₁₄. The respective coil sockets are mounted directly behind the condensers, with their axes at right angles to minimize direct inductive coupling.

The sockets for the crystal and the oscillator tube are placed in the space at the left-hand end of the chassis and the amplifier tube an inch or two to the right of C₁₃ and L₁. The Millen ceramic sockets require ½-inch holes. The oscillator socket is mounted with its key toward the front, while the key of the amplifier socket is toward the right. The amplifier-coil socket is turned so that the large Pins 1 and 6 are toward the right. The link prongs of the antenna-coil socket are to the rear. Two solder lugs should be placed under each socket-mounting nut for ground connections.

Clearance holes are drilled at the rear of the tuning condensers for the connecting wires. A hole is also required near the front of the chassis at the center for the wires running to the meter if one is to be used. A hole for the key jack is needed in the front edge of the chassis at the center. In the rear edge the power plug is mounted at the left-hand end and the two output terminals, which are a pair of ½-inch feed-through insulators similar to those mounting C₁₄, are at the opposite end.

RFC₁, RFC₃ and RFC₄ are mounted with a single screw in the locations near the tube sockets shown in the bottom-view photo. A fiber lug strip is fastened under RFC₅ to provide an insulating anchorage for the bottom end of R₄. A ¾-inch ceramic cone insulator is fastened to the right-hand mounting screw of the 6AG7 socket (in bottom view), and another similar insulator is fastened to the chassis immediately above the socket. Two soldering lugs are fastened to the top of each insulator.
Wiring

Experience has shown that even a low-power transmitter operating at 80 or 40 meters is capable of causing interference with television reception in the immediate neighborhood. Therefore, at least the most essential steps should be taken to reduce harmonics in the power-supply leads and the antenna. This consists of the use of shielded power wiring, low-inductance by-pass condensers with short leads, and the link-coupled antenna tuner. Under some circumstances it may be necessary to take further measures to suppress TVI, but those mentioned should suffice in most cases. In particular, it may be necessary to shield the transmitter by placing it in a metal cabinet. If this is done, the panel furnished with the cabinet will be used, rather than the one described, of course.

Shielded wire consists of an insulated conductor covered with copper braid. In using it, care must be exercised in keeping the ends of the copper braid away from contact with the inner conductor. In preparing the end of the wire, wrap three or four turns of No. 22 bare tinned wire (or cotton- or silk-covered magnet wire with the insulation removed will do) tightly around the shielding braid at about one inch from the end, leaving a lead of 2 or 3 inches at one end of the binding wire. Then fray the braid back to the binding and trim the braid off close with cutting pliers or shears. Flow solder around the turns of bare wire. Then remove the insulation from the end of the conductor for a distance of about 1/2 inch. This should leave about 1/2 inch of insulation between the conductor wire and the braid. Both ends of each piece of shielded wire should be prepared in the same way. The loose lead fastened to the shielding should be grounded to the chassis after the wire is installed.

Pins 1 and 2 of the amplifier-tube socket, Pins 1, 2 and 3 of the oscillator-tube socket, and Pin 2 of the amplifier-coil socket are connected directly to ground at one of the adjacent grounding lugs. Pin 5 of the power plug also is connected to the chassis. Then a short length of shielded wire is run from Pin 1 on the power plug to Pin 7 on the 6AG7 socket, and another section of shielded lead from there to Pin 7 on the amplifier-tube socket. Another section of shielded wire is run from Pin 2 on the power plug to the bottom terminal of RFC1; another piece from there to the lug on top of the cone insulator holding RFC3; another from this point to connect to R4, and the last piece goes up through the chassis to connect the latter point to the positive terminal of the milliammeter. Another section of shielded wire runs from the negative terminal of the milliammeter back down to the bottom end of RFC5. If a meter is not used, a connection is made directly from the fiber lug-strip termination of R4 to the bottom end of RFC5. The two cathode terminals of the tube sockets are connected together with shielded wire.
and another piece of shielded wire is run from Pin 8 on the amplifier-tube socket to the key jack. When the shielded wiring is completed, those wires running parallel, or crossing, should be spot-soldered together at intervals.

The various small by-pass condensers are installed next, soldering them directly between the tube socket or r.f.-choke terminals and the nearest grounding lug with the shortest possible leads. R1 is placed directly between Terminal 4 of the 6AG7 socket and ground, and R2 between the bottom end of RFC3 and ground. R3 is connected between the top end of RFC1 and Pin 6 of the 6AG7 socket. R4 is wired directly between Pin 4 of the amplifier-tube socket and the fiber lug strip. C10 is connected between Pin 8 of the amplifier-tube socket and the grounded terminal of the key jack. A section of 75-ohm Twin-Lead or parallel-conductor lamp cord connects the link terminals of the coil sockets.

The top terminal of RFC3 is wired to Pin 3 of the amplifier-tube socket and C16 is connected between the top of the same choke and Pin 5 of the amplifier-coil socket. RFC4 is connected directly between the top terminal of RFC3 and Pin 5 of the amplifier-tube socket.

The r.f. wiring, of which there is very little, should be done with stiff wire, No. 16 or larger. It should be kept well spaced from the chassis and other components. One wire connects one side of the crystal socket to Pin 4 of the 6AG7 socket. Another is run from the second crystal socket terminal to Pin 6. After the wire is soldered in place, a ½-inch section is cut out of the center and C1 is inserted.

A wire connects Pin 5 of the amplifier-coil socket to the rear stator terminal of C13. C4 is soldered between the top of RFC3 and the anchoring lug on top of the second cone insulator near the 6AG7 socket. A short piece of wire runs from these to Pin 8 of the 6AG7 socket.

The antenna-coil socket is wired according to the pin numbering in Fig. 1.

The panel is fastened to the chassis with two machine screws at each end. A hole is required to match the hole in the chassis for the key jack. The 1⅛-inch socket punch is used to make clearance holes in the panel for the shafts of the two tuning condensers. The hole for the meter can be cut with a circle cutter in a carpenter’s brace. The size of the hole will depend upon the dimensions of the meter used, of course. The meter shown is of the 2-inch variety, but panel space is available for a 3-inch meter. After the meter wires have been connected, C11 and C12 should be added. They are connected directly between each meter terminal and the shielding braid of the meter wires. The braid of each meter wire is then grounded to one of the meter-mounting screws. Since the meter terminals are exposed high-voltage points, they should be covered with sleeves of rubber tubing to remove the hazard.

**Power Supply**

The circuit diagram of a suitable power supply for the transmitter is shown in Fig. 2. It will deliver 350 volts under a full load of 110 ma. Any other power supply delivering up to a maximum of 350 to 375 volts under load will do. Naturally, if the voltage applied to the transmitter is lower, the power output will be reduced correspondingly.

The unit shown is built on a 7 × 7 × 2-inch aluminum chassis. The components may be
The simple power supply for the beginner’s transmitter.

placed in any convenient arrangement; the length of wiring leads is of no consequence. The only important point is to keep the line from the rectifier filament to the output socket (the positive high-voltage line) well insulated from the chassis. The output socket is set in one edge of the chassis so that it will line up with the plug in the transmitter, and the switch and a.c. cord are placed on the opposite side. Then the two units may be connected with a plug-in cable, or the power-supply unit can be plugged directly into the transmitter chassis.

**Antennas**

A single antenna can be made to serve for both 40 and 80 meters. It may take any one of several forms. Where space is available, the preferable antenna consists primarily of a horizontal wire one half wavelength long for 80 meters (approximately 135 feet) running in a straight line and elevated as high as possible. An antenna of this type is connected to the transmitter through a transmission line or feeder line, which is simply a pair of parallel wires spaced 2 to 6 inches. The feed line may be attached to the antenna at one end, as shown in Fig. 3C but, wherever it is at all feasible, it should be connected at the center, as shown in Fig. 3A. Where a choice in direction exists, the center-fed antenna should be run in a line at right angles to the direction in which it is most desired to work, while the end-fed antenna should be run in a direction approximately 45 degrees from the most-desired path.

If space does not permit running the antenna in a straight line, it may be bent to accommodate the length, or the ends may be dropped down, as shown in Figs. 3B and 3D. The angles at the bends should be as wide as possible. Although such bending will have some influence on the performance of the antenna, it will still work quite well. The center-fed antenna is much more tolerant as to dimensions than one which is end-fed. In restricted space, the horizontal antenna portion may be made as long as space permits and the deficiency in length added to the feed line, keeping the overall length the same. It is not advisable to do this with the end-fed antenna.

When a feed line is used, power from the transmitter can be fed more readily to the antenna if the feed line is cut to certain lengths. These lengths together with other essential dimensions of various recommended systems are shown in the accompanying table.

Another type of antenna is known as the
Marconi antenna. This consists of a wire whose total length is one quarter wavelength instead of one half wavelength. For 80 meters this means a length of about 67 feet. This antenna is shown in Fig. 3E. When such an antenna is used, the remaining output terminal of the transmitter must be connected to a ground (such as a water pipe) or to another quarter wavelength of wire which may be suspended a few feet above the ground, as shown in Fig. 3F. It is not essential that the lower wire run exactly under the antenna.

The table of antenna dimensions also shows whether series or parallel tuning should be used, that is, whether $C_{14}$ should be connected across $L_t$ or in series with it and the feed line.

The antenna may be strung between any existing supports, such as trees or buildings, or some type of mast may be used. When a feed line is used, the antenna may be of No. 12 or No. 14 antenna wire, while the feed line may be made of No. 16 wire to minimize the weight. Plastic spreaders are recommended for spacing the feeder wires because of their light weight. They can be obtained in several different lengths. When the feed line is long, the wider spacing will give less trouble from twisting. Fairly strong glass insulators should be used for the antenna, especially if the antenna is to be strung between trees.

**Adjustment**

Aside from the 6L6, a 6V6 or 6F6 may be used in the amplifier without circuit change. The smaller tubes will not handle as much power as the 6L6, of course.

The power supply should be connected to the transmitter. The 80-meter coil should be plugged into the amplifier circuit and an 80-meter crystal placed in the crystal socket. The antenna-coil socket should be empty. With the power turned on, and the key plugged in and closed, the milliammeter should show a reading (100 to 150 ma. with a 6L6 and

(Continued on page 104)
Coupling Unbalanced to Balanced Lines

Simple Circuits for Both Fixed and Adjustable Impedance Ratios

BY CARY T. ISLEY, JR.,* W3OCZ

The circuit shown in Fig. 1A has seen application in commercial equipment, but is not well known in amateur circles. The network provides for going from an unbalanced to a balanced load. The only conditions that the network constants must satisfy in order that the balanced drive exist across the output impedance are

\[ L_1 = L_2 = \frac{1}{2\pi f^2 C_1} \quad \text{(mutual inductance between } L_1 \text{ and } L_2 \text{ = zero)}\]

where \( f \) = nominal operating frequency.

If the foregoing conditions are satisfied the input impedance (assuming the \( C_2 \) of inductances and capacity are much greater than unity) is as shown in Fig. 1B. This is regardless of the type of load, bearing in mind that if the load is complex — i.e., inductive as well as resistive — \( Z_0/4 \) also will be complex. Although \( C_1 \) may be adjusted to make the input impedance resistive, this does not, in general, balance the output load. It will be observed that since each inductance must have twice the reactance of the

\[ Z_{IN} \text{(unbalanced)} \]

\[ Z_0 \text{(balanced)} \]

Fig. 1 — Network for coupling a balanced line to an unbalanced driving source (A) and the equivalent input impedance (B).

For a purely-resistive output impedance, the input impedance may be made resistive very simply by shunting the input terminals with a capacitor \( C_2 \) having the same value as \( C_1 \). This is shown in Fig. 2. The network in Fig. 2 has a constant impedance transformation ratio of 4 to 1, so the input impedance is directly determined by the value of the output load im-

\[ Z_{IN} = \frac{Z_0}{4} \]

\[ C_2 \]

\[ L_4 \]

\[ Z_0 \text{ (pure resistance)} \]

Fig. 2 — Balanced-to-unbalanced coupling circuit in which the input impedance is a pure resistance if the load is a pure resistance. This circuit gives an impedance step-down of 4 to 1 from the load to the driver. Suggested values for various bands are given in Table 1.

The capacitance at \( C_1 \) should be such as to resonate at the operating frequency with \( L_1 \) and \( L_2 \) connected in parallel. \( C_2 \) is made equal to \( C_1 \).

In my application, I wanted to feed a folded dipole via a 300-ohm line from an unbalanced link. With a 7-Mc. transmitter, it was found no rebalancing was necessary over the entire band after the network was once set to the middle of the band.

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Other Impedance Ratios

If an input impedance different from that provided by the network of Fig. 2 is desired, the addition of a very simple quarter-wave network (using lumped constants) can transform the output load impedance to almost any desired input value. The quarter-wave network may have either of the configurations shown in Fig. 3. If $R_1$ and $R_2$ are both resistive, then

$$L_3 = \frac{\sqrt{R_1 R_2}}{2\pi f}$$
$$C_3 = \frac{10^3}{2\pi f \sqrt{R_1 R_2}}$$

If $f$ is in Mc., $L_3$ will be in $\mu h.$ and $C_3$ in $\mu f.$

Since $L_3$ and $C_3$ have the same reactance at the operating frequency, $L_3$ may be wound using one of the well-known inductance formulas and $C_1$ adjusted by checking resonance with one of the inductances at the operating frequency. Incidentally, harmonic attenuation is provided by the quarter-wave network, thus making it serve as an anti-TV interference measure as well as providing the required impedance transformation.

As an example, assume it is desired to match a 300-ohm balanced line to 52-ohm coax at an operating frequency of 29 Mc. The complete network could be as shown in Fig. 4, where the component designations correspond with those of Figs. 2 and 3. Since $Z_0$ is approximately resistive, optimum values are

$$L_1 = L_2 = \frac{300}{10 \times 29} = 1.0 \mu h.$$  
$$C_1 = C_2 = 60 \mu f.$$  

For the quarter-wave part of the network the

$$L_1 = L_2 = \frac{52 \times 75 \times 0.159}{29} = 0.34 \mu h.$$  
$$C_3 = 90 \mu f.$$  

Suggested values of $L_1-L_2,$ $C_1-C_2,$ $L_3$ and $C_3$ for various bands are given in Table I. As stated above, there is a considerable range of choice in inductance and capacitance values.

![Fig. 4 — Balanced-to-unbalanced network combined with quarter-wave impedance matcher. Suggested component values are given in Table I.](image)

The values for $L_1-L_2$ and $C_1-C_2,$ the principal requirement being that $L_4$ and $L_5$ in parallel should resonate with either $C_1$ or $C_3$ at the operating frequency. The values of $L_4$ and $C_2$ are fairly critical, since they are determined by the required impedance transformation ratio. The coil dimensions can be found from the ordinary formulas for inductance or from the calculators available for the purpose, taking into account the amount of power to be carried. The capacitance can be adjusted to the correct values by checking resonance (with a grid-dip meter, for example, or by temporary coupling to the amplifier tank circuit) at the operating frequency.

**SWITCH TO SAFETY!**

April 1950
Welding Aluminum with a Blowtorch

BY H. H. WASHBURN,* W3MTE

Beam construction at W3MTE has always involved loading a quantity of aluminum tubing into the W3MTE Crosley, driving to the nearest welding shop, and then trying to find a way to get the finished beam home. Some method of home welding was obviously in order.

In the construction of a two-meter plumber's delight gamma match, I wanted to use half-inch tubing for the boom, with quarter-inch tubing for elements. The boom was to be pushed through a half-inch hole in the end of a 1 1/4-inch mast section. I wanted to tack weld the elements in place, with no mechanical claptrap.

Co-worker Les Graffs mentioned that he had used die-cast welding rod and an oxyacetylene torch in mending cracked aluminum heads on Fords, and that the weld couldn't be knocked off with a hammer. Santa Claus had brought me a nice new gasoline blowtorch, and some experimenting was done. Results were excellent.

Here is the process:
1) Wire brush thoroughly the two pieces to be joined.
2) Heat with the blowtorch the larger of the two pieces; the heat will flow into the smaller piece.
3) Rub the die-cast welding rod on the joint until both pieces are tinned. Leave a small blob on the joint. Use no flux.
4) With a piece of iron wire, push the blob around until a smooth joint is obtained.
5) Allow to cool without movement.

As usual, a good coat of aluminum paint will protect the beam and retard corrosion caused by junctures of dissimilar metals. No experimenting has been done on iron or brass parts. It may work.

This process will never put the welding shops out of business, but it has its place in my ham shack and home workshop.

A few notes are in order. Heating a heat-treated metal like 24ST draws the temper, but for light work it's satisfactory. Soon after the rod melts, the aluminum will blister, then collapse; moral: work fast and remove the torch as soon as possible. Support the work so that it is not under strain during the heating, or it will bend where you don't want a bend. Open the blowtorch fairly wide and keep the pressure up. The minimum setting may not melt the rod. Experiment with some scrap to get the hang of it before working on the middle of your new boom. Wear goggles — aluminum doesn't look hot, but it can burn you. The rod costs about $3.25 a pound, which comes to about 15 cents a stick.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1BKE, Philip P. Curtis, Lynn, Mass.
W1DZU, Conrad T. Beardley, S. Portland, Me.
W1HXM, Clyde B. Bradshaw, Wollaston, Mass.
W1RXE, Gustave A. Eckman, Richmond, Me.
Ex-W2JY, Alfred Green
W3JET, Fred C. Hill, Rehoboth Beach, Del.
W4UR, Charles N. Spang, Fort Thomas, Ky.
W5NUQ, Dr. H. P. Willoughby, Hagerman, N. M.
W6QOQ, Charles A. Huff, San Francisco, Calif.
W8NCR, Edward M. Corcoran, Artesia, Calif.
WTASY, Kleon Dale, Seattle, Wash.
Ex-W8AEB, James Liebegott, Dunaville, Penna.
W8EVM, Norville W. Cook, Kansas City, Mo.
W8FPE, Clifford P. Lawrence, Cedar Rapids, Iowa.
W8TOK, Jay A. Kerr, Adel, Iowa.
G2CMD, Eric G. Clarke, Felixstowe, Suffolk
Ex-HASC, Bela Tanea
KH6DJ, ex-K6QLG, Henry D. Kahoahawi, Wailuku, Maui

*Burton Aec., Lutherville, Md.
Filter design on a general basis requires using the appropriate formulas for calculation of the filter constants, as described a few months ago in *QST.* However, where a specific frequency range and a specific purpose are given, it is possible to present practically all the design information in the form of graphs or charts from which the required values can be read without calculation. The TVI filter meets these conditions nicely, since the only frequency range that needs much consideration is 54–88 Mc., and the type of filter considered will be of the low-pass type for coaxial line, having a cut-off frequency between 20 and 54 Mc. The amount of "figuring" necessary is reduced to a minimum that should not bother a mathematics-shy ham, because the method requires only the simplest arithmetical operations.

The process of designing from charts is facilitated by setting up the filters in half sections rather than full sections. The basic half section is shown at A in Fig. 17. The values of $L$ and $C$ are determined by the fact that at the chosen cut-off frequency their reactances are numerically equal and are also equal to the resistance of the load into which the filter is to work. (This resistance is usually designated by the letter $R.$) The cut-off frequency must of course be higher than the highest operating frequency, but should not exceed 50 Mc. for transmitters working in the 28-Mc. band and below. On the other hand, even though the 10-meter band is not used it is probably inadvisable to set the cut-off frequency lower than 20 Mc. This is because the larger coils required for low cut-off frequencies tend to show self-resonances in the v.h.f. region. Such resonances may have an adverse effect on the filter performance, principally in the 174–216 Mc. TV band but in some cases even in the 54–88 Mc. band. The factors that enter into the choice of a cut-off frequency were discussed in Part II of this article.

Since the filter is to be for coaxial line, we need consider only two values of $R,$ 52 and 75 ohms, because these are the characteristic resistances of the coax cables in common use. Figs. 18 and 19 show, respectively, the basic $L$ and $C$ values for these two $R$ values. The first step in designing a filter is to read the values from the figures; for example, if the cut-off frequency is to be 40 Mc. and 52-ohm coax is to be used, $L$ will be 0.207 $\mu$h. and $C$ will be 77 $\mu$fd.

With $L$ and $C$ determined, a constant-$k$ full T section is constructed as shown at B in Fig. 17. This is done simply by connecting two half sections back to back. Each coil therefore has the value of $L$ found from Fig. 18. The two capacitances of the half-sections are usually, in practice, combined into a single condenser having twice the value given by Fig. 19, since they are connected in parallel in forming a full section.

The same $L$ and $C$ values are the basis for forming an $m$-derived half-section, but are modified as shown at C in Fig. 17. The value of the series inductance, $L_1,$ is found by multiplying the $L$ values from Fig. 18 by $m.$ Similarly, the value of $C_1$ is found by multiplying the $C$ value from Fig.

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*Technical Editor, *QST.*

†Parts I and II of this article appeared in February and March *QST,* respectively.


18 The half-sections also can be used to construct full $\pi$ sections, but the discussion here is limited to the $T$ type because it is simpler from a constructional standpoint.
19 by \( m \). The value of \( L_2 \) is found by multiplying \( L \) by a different factor, which is shown graphically in Fig. 20 for various values of \( m \). Let us assume that \( m \) is to be 0.7, and use the values in the example above. Then from Fig. 20, \( (1 - m^2)/m \) is equal to 0.73. Therefore,

\[
L_1 = mL = 0.7 \times 0.207 = 0.145 \mu h.
\]

\[
L_2 = \frac{(1 - m^2)}{m} L = 0.73 \times 0.207 = 0.151 \mu h.
\]

\[
C_1 = mC = 0.7 \times 77 = 53.9 \mu f d.
\]

These values could be used just as they stand for terminating half-sections as described in Part II (Fig. 9 in March QST). However, if an \( m \)-derived full T section is to be formed, it is constructed by combining two half-sections back to back as shown in Fig. 17D. Each of the series coils has the same value as \( L_1 \). The two capacitances of the half-section again combine into one, with a capacitance equal to twice that of \( C_1 - 108 \mu f d \). In this example. The inductances, \( L_2 \), in the shunt arms also combine in parallel, so the resulting inductance is half the value obtained for \( L_2 \) above. The shunt-arm inductance for an \( m \)-derived full T section in the example therefore would be 0.075 \( \mu h \).

That is about all there is to determining the proper constants for filters of the type considered, since the most elaborate arrangement desired can be formed from the basic sections discussed above.

**Examples of Design**

The complete design process can be made quite clear by following through a few examples. Let us assume that the problem is to design a filter that will be usable on all bands through 30 Mc., to work in 52-ohm coax. Since the lowest-frequency picture carrier is at 55.25 Mc. (Channel 2) the filter cut-off characteristic will have to be steep enough so that the attenuation will rise from zero at some frequency above 30 Mc. to a high value at 55 Mc. For reasons discussed in Part II, the cut-off frequency preferably should not be too close to 30 Mc. There is, in fact, no reason in this case why we should not use the type of design that is optimum for good impedance characteristics in the passband — that is, use \( m \)-derived terminating half-sections with \( m = 0.6 \). Since we want high attenuation at 55 Mc., the logical thing is to make that frequency the one at which the \( m \)-derived half-sections will have theoretically infinite attenuation.

From Fig. 13 (Part II) the ratio of the rejection frequency to the cut-off frequency is 1.25 when \( m = 0.6 \). This determines the cut-off frequency, which is

\[
f_c = \frac{f_{50}}{1.25} = \frac{55}{1.25} = 44 \text{ Mc.}
\]

Then the basic \( L-C \) values for 52-ohm line are 0.19 \( \mu h \) (Fig. 18) and 70 \( \mu f d \) (Fig. 19).

For an \( m \)-derived half-section with \( m = 0.6 \), the

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*Fig. 18 — Inductance required in the half-section as a function of cut-off frequency and load resistance.*

*Fig. 19 — Capacitance required in the half-section as a function of cut-off frequency and load resistance.*

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The frequency of maximum attenuation in this section can be placed at 70 Mc., the fifth harmonic of 14 Mc., since there will be no harmonics lower than 70 Mc. in this channel. Keeping the same cutoff frequency, the ratio

\[
\frac{f_m}{f_0} = \frac{70}{44} = 1.59
\]

and from Fig. 13 (Part II) this corresponds to \(m = 0.78\). From Fig. 20, \((1 - m^2)/m\) for \(m = 0.78\) is 0.5. Consequently,

\[
L_1 = 0.78 \times 0.19 = 0.15 \mu \text{h.}
\]

\[
L_2 = 0.5 \times 0.19 = 0.095 \mu \text{h.}
\]

\[
C_1 = 0.78 \times 70 = 54.5 \mu \text{fd.}
\]

for the \(m\)-derived half-sections. The \(m\)-derived full T section is shown in Fig. 21. When this

**CONSTANTS FOR \(f_c = 44\) Mc., \(R = 52\) \(\Omega\)**

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If greater harmonic suppression is required, one way to increase the attenuation is to add a second constant-\(k\) section. This arrangement is shown in Fig. 23, together with a graph of the approximate attenuation. The minimum attenuation in Channels 2 through 6 is now about 53 db. and the average is in the neighborhood of 56 db. Theoretically, the attenuation of this filter in the high group of TV channels will be greater than 84 db.

The filter of Fig. 23 requires four condensers, and it is of interest to see what might be done with a simpler circuit, when the thing of primary interest is high attenuation in particular chann-
combined with the terminating half-sections as shown in the upper circuit of Fig. 21 the practical circuit shown in the same figure results. The attenuation in the part of Channel 4 in which harmonics fall averages better than 60 db. Comparing Fig. 21 with Fig. 22 shows that the attenuation in Channel 2 also has been increased, and is better than 50 db throughout this channel. The price of these improvements is a reduction of attenuation in the channels above 174 Mc., a condition which may not be of very great practical importance.

Fig. 25 shows how a constant-k section can be added to the filter of Fig. 24 to make a further improvement in attenuation. The harmonic suppression is well above 60 db. throughout all the TV channels. The actual filter requires one extra condenser and one extra coil, as compared with Fig. 24.

In the case of the 3-6 channel combination, Channel 6 is of more present interest than Channel 3, because only harmonics from 7 Mc. and lower fall in the latter channel, while Channel 6 gets harmonics from all amateur bands from 30 Mc. down. Maintaining the same fundamental type of filter, and choosing 85 Mc. as the frequency of infinite attenuation, the frequency ratio is

\[ \frac{f_\infty}{f_c} = \frac{85}{44} = 1.93 \]

and from Fig. 13 \( m = 0.855 \). From Fig. 20 \( (1-m^2)/m \) is 0.315. Consequently, for the basic half-section constants,

\[ L_1 = 0.855 \times 0.19 = 0.16 \mu \text{h}. \]
\[ L_2 = 0.315 \times 0.19 = 0.06 \mu \text{h}. \]
\[ C_1 = 0.855 \times 70 = 60 \mu \text{fd}. \]

The full section is shown in Fig. 21. When combined with a pair of terminating half-sections the filter shown in Fig. 26 results. The attenuation is between 45 and 50 db. in Channels 2, 3 and 4, and better than 60 db. in the part of Channel 6 where harmonics fall. For those areas where Channel 6 is of most importance this filter could be just as effective, in practice, as the more elaborate arrangement of Fig. 25, although its over-all characteristics are not as good.

Eventually we shall have a 21-Mc. band and

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**Figs. 22 to 26, inclusive — Examples of filter design, with approximate theoretical attenuation. Numbers alongside inductors give the inductance in \( \mu \text{h} \), those alongside condensers are the capacitance in \( \mu \text{fd} \). The positions of TV Channels 2 to 6 are shown along the horizontal axis in the attenuation graphs.**

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\[ QST \]
when that day comes Channel 3 will become a sore spot. Choosing 63 Mc. as the frequency of maximum rejection in Channel 3, we have

\[
\frac{f_{oc}}{f_c} = \frac{63}{44} = 1.43.
\]

From Fig. 13 \(m = 0.715\) and from Fig. 20 \((1 - m^2)/m = 0.68\). Then

\[
L_1 = 0.715 \times 0.19 = 0.14 \mu \text{h.}
\]

\[
L_2 = 0.68 \times 0.19 = 0.13 \mu \text{h.}
\]

\[
C_1 = 0.715 \times 70 = 50 \mu \text{fd.}
\]

for the half-section. The full section is shown in Fig. 21. Adding such a section to the filter of Fig. 26 gives Fig. 27. The attenuation is above 70 db. in Channels 2 through 6 — a considerable improvement over Figs. 23 and 25, both of which also use four condensers. Although probably more than adequate, it is not as good as either Fig. 23 or 25 above 174 Mc.

The process of building up filters from the basic constants has been carried through here in some detail simply to illustrate the method. It can be appreciated, after studying Figs. 22—27, inclusive, that the shape of the attenuation curve can be altered in practically any desired way by choice of cut-off frequency, frequencies of infinite attenuation, and number and types of sections. One last example illustrates good advantage the effect of the cut-off frequency. Suppose that 28-Mc. operation is not a consideration, but that high attenuation is wanted in a simple filter for use with 50-ohm coax on bands below 14 Mc. In this case we can choose a low cut-off frequency and a large value of \(m\). For reasons mentioned earlier, 20 Mc. is adopted as the cut-off frequency and \(m\) is taken as 0.85 so the rejection frequency will be near the center of the low group of TV channels. From Fig. 13 \(f_{oc}/f_s = 3.17\) for \(m = 0.95\), so

\[
f_{oc} = 3.17 \times 20 = 63.5 \text{ Mc.}
\]

From Figs. 18 and 19, \(L\) and \(C\) are respectively 0.41 \(\mu\)h. and 155 \(\mu\)fd. From Fig. 20, \((1 - m^2)/m\) is 0.1 for \(m = 0.95\). Hence,

\[
L_1 = 0.95 \times 0.41 = 0.39 \mu \text{h.}
\]

\[
L_2 = 0.1 \times 0.41 = 0.04 \mu \text{h.}
\]

\[
C_1 = 0.95 \times 155 = 147 \mu \text{fd.}
\]

Since we are using a high value of \(m\), there is no point in arranging terminating half-sections as is done in the case of \(m = 0.6\); an \(m\)-derived full T section can be used, thus eliminating one condenser. The attenuation of such a section will be
as shown in Fig. 12 (Part II). Better attenuation can be secured by adding a constant-k section as shown in Fig. 28. Although it uses only two condensers, the performance of this filter is comparable with that of the four-condenser filter of Fig. 27, which speaks eloquently for the advantages of a low cut-off frequency.

The impedance characteristics of the simple filter of Fig. 28 are of some interest, since it does not follow the customary end-section design. Calculation shows that at 14 Mc, with a resistive load of 52 ohms the input impedance is so close to being 52 ohms of pure resistance that the mismatch is entirely negligible. The same thing would be true at any frequency below 14 Mc.

Filter Construction

The important points in filter construction have been covered recently in QST\(^{17}\) and so do not need detailed attention here. They may be summarized as follows:

1. Use components having the lowest possible losses. The attenuation will be better, especially around the rejection points in m-derived sections, and the amount of fundamental power lost in the filter will be reduced.

2. Avoid any coupling between the various coils in the filter — and between the condensers, too, for that matter. Stray coupling can destroy the effectiveness of a filter. The cellular type of construction used by W2RYI and W3NJE\(^{18}\) is excellent in this respect, and is well worth the extra trouble in construction.

3. Keep the return (ground) paths of each section as independent as possible of all other sections. A small amount of coupling through the medium of ground leads or chassis is just as bad as stray inductive or capacitive coupling between filter elements. Cellular construction is an effective means for preventing return-circuit coupling.

4. Use good shielding about the filter as a whole. This is necessary to prevent transferring harmonics from the input circuit of the filter to the load by stray coupling. It also helps reduce coupling between filter elements themselves.

The inductances of filter coils fall, for the most part, in a range where there is likely to be considerable uncertainty in the calculation of coil dimensions. However, it is possible to standardize on wire size, coil diameter, and winding pitch.


because the range of frequency and characteristic impedance is not great. Fig. 29 shows measured values of inductance as a function of the number of turns, for coils of No. 12 wire, 8 turns per inch. The inductance values in each case include leads 1/8 inch in length. Since the accuracy of the curves is subject to measurement limitations, the information should be used principally as a guide. The coil inductance may be adjusted to the proper value, in the filter, by resonating the circuits as previously described.17 No. 12 wire is large enough to handle a full kilowatt with no difficulty, provided the filter is working into a resistive or near-resistive load of the proper value.

Because the voltages across the condensers in a filter of the type discussed are low — providing the load is proper — variable condensers with receiver-type spacing are adequate for amateur powers. The best way to arrive at the proper capacitance is by measurement, but in the event that this is not possible the capacitance can be estimated to a fair degree of accuracy by the rotor setting. The maximum and minimum capacitance of the condenser must be known. The capacitance change in condensers with semicircular plates is directly proportional to the

![Diagram](image-url)  
*Fig. 29 — Measured inductance of coils wound with No. 12 bare wire, 8 turns to the inch. The values include half-inch leads. Where smaller inductance values are required, they should be obtained experimentally by adjusting to the proper resonance frequency with the specified capacitance. Coils of larger inductance can be wound from the common formulas.*

angular setting of the rotor over about 90 per cent of the range; the capacitance does not change much in the first 10 or 15 degrees of rotation at the minimum-capacitance end, and also tends to slow down near the 180-degree point (full capacitance). Making allowance for these features, it should be possible to estimate the capacitance within about 10 per cent at any given condenser setting.

Fixed condensers, which preferably should be of the ceramic type, can be purchased within specified tolerances. Condensers without tolerances specified should be carefully measured, if at all possible, because in the absence of any specification it has to be assumed that the capacitance may vary from the rated value by as much as plus or minus 20 per cent. Where the desired capacitances cannot be obtained in standard values there is no alternative but to combine enough units in parallel to add up to the correct capacitance.

The type of condenser used by Pinotino is probably ideal for filter construction because of its low inductance. As a guide for those who wish to make their own, Fig. 30 shows the calculated value of capacitance as a function of plate size, for both square and circular plates, for condensers having two plates separated by 0.01 inch. For other spacings, divide the capacitance shown (for the selected plate size) by the actual spacing in hundredths of an inch. For dielectrics other than air, multiply by the dielectric constant of the material used. For example, suppose a condenser is to be made using polyethylene sheet having a thickness of 0.012 inch, the desired capacitance
being 110 µfd. The dielectric constant of polyethylene averages 2.35 (from the table in Chapter 25 of the Handbook) and so a condenser using it as a dielectric will have 2.35 times the capacitance of one having air dielectric. Since the thickness is 0.012 instead of 0.01, the capacitance will be reduced in the ratio 0.01/0.012 = 1/1.2. Hence the over-all factor to apply to Fig. 30 is 2.35/1.2 = 1.96; that is, the plate size will be given by Fig. 30 if the capacitance desired is divided by 1.96. In this case the desired capacitance is 110 µfd., so the plate size will be given by the chart for 110/1.96 = 56 µfd. Either square plates 1.6 inch on a side or circular plates having a diameter of 1.8 inch could be used.

The curves of Fig. 30 neglect “fringing,” and so the actual capacitance of the condenser can be expected to be a little higher than calculated. Also, any open areas such as are necessary for mounting screws, etc., should be deducted from the plate area.

It is of course desirable that both coils and condensers should conform as closely as possible to the design values. It is important that the resonant frequencies of the shunt arms of m-derived sections be set as accurately as possible, particularly in the simpler filters in which dependence is placed on the infinite-attenuation points for high harmonic suppression. The resonant frequencies can be measured and set to the proper values by adjusting the coil inductance, condenser capacitance, or both. In more elaborate filters this frequency adjustment is less critical, because exact placement of the rejection points is not depended on for optimum filter performance. In these cases, it will suffice to have the inductance and capacitance values within 10 per cent of the design values. This will introduce a maximum error of 5 per cent in the resonant frequencies, if both components are 10 per cent off in the same direction. If, as is readily possible, one is somewhat high and the other low, the errors tend to cancel each other.

In conclusion, a few words about measurements on filters will be pertinent. From the discussion of attenuation in Part II, it will be apparent to those who have attempted to make measurements at high radio frequencies that there is no practicable way of checking exactly the theoretical attenuation of a filter, since it requires matching the filter's image impedance at every frequency in the stop band. (Nor, as emphasized before, is there any guarantee that a filter having perfect theoretical performance will give the same attenuation in a practical installation — the probabilities are in the other direction.) In addition, there are many problems to be solved in a measurement set-up. Chief among these are the necessity for providing an input arrangement that will not introduce resonances of the type discussed in Part II, for reducing signal leakage to the point where it does not become a factor in measurements of 80 db. or more attenuation, and for providing a detector arrangement that will permit accurate measurement at extremely low signal levels.

In view of the many uncertainties, both fundamental and practical in nature, it is well to keep in mind that statements about measured filter attenuation mean something only when the full conditions and assumptions of measurement are known. And even then, there is no way to apply the figures directly to your own transmitter, transmission line and antenna. Such measurements as we have made indicate that actual filters, when built according to the constructional principles outlined, do have practical performance that is a good approximation to the theoretical. The attenuation does not become infinite, of course, at the theoretical “infinite-rejection” points, but it does run in the neighborhood of 70 db. with a single m-derived section terminated in a resistive load equal to the value of design impedance. Except for spurious resonance effects, the attenuation measurements at other frequencies usually will be found to be within a few decibels of the theoretical value under the same conditions.

The grid-dip meter may be used for this purpose as described by W2RYI in December QST. In checking the series-resonant shunt arms of m-derived sections, it is important that a really low-inductance short circuit be used. Additional inductance in the “short” easily can shift the resonance point into the next TV channel, particularly where a high value of inductance causes a very small series inductance.

Fig. 30 — Capacitance of 2-plate condensers. For other plate spacings than 0.01 inch and for dielectrics other than air, the capacitance increases in direct proportion to the dielectric constant and in inverse proportion to the spacing.
Armed Forces Day Double-Header

Features Receiving Competition and QSO Party-Message Relay—
Extra Credit for Use of Emergency Power

Circle May 20th on your calendar. . . . it's Armed Forces Day! The military is going all out this year to show its appreciation for, and its endorsement of, ham radio.

The day's double-header program will include a receiving competition patterned after the Navy Day copying contest so popular in years past, and a QSO and message-relay contest open to all radio amateurs and emphasizing the traffic-handling aspects rather than mere contact and RST, QTH reports.

The Department of Defense is vitally interested in promoting the welfare of radio amateurs everywhere. And with reason. For, from the ranks of ham radio have come the operators, the technicians, the organizers and the administrators who may become military communications specialists in time of national emergency. The closer the liaison now, in peacetime, the more readily available is a large citizens reserve, when needed, to back up the professional military communicators.

Receiving Competition

A special greeting to amateurs from the secretary of defense, the Honorable Louis A. Johnson, will be broadcast over 13 military frequencies (five MARS and eight Navy) from Navy Radio Station NSS and Army Radio Station WAR, both in Washington, D. C., and from Navy Radio Station NPG at San Francisco, Calif., as follows:

Navy Radio Washington (NSS) will broadcast at 2100 EST (0200 GCT May 21st) and again at 2300 EST (0400 GCT May 21st) on 122.4390, 9425, 12,663 and 17,000 kc.

Army Radio Washington (WAR) will broadcast at 2100 EST (0200 GCT May 21st) and again at 2300 EST (0400 GCT May 21st) on 3497.5, 6997.5, 14,405, 20,994 and 27,994 kc.

Navy Radio San Francisco (NPG) will broadcast at 2300 EST (0400 GCT) on 115, 9255 and 12,540 kc.

Transmissions are scheduled to start on the hour. If a slight delay occurs, this will not indicate that you are tuned to the wrong frequency, but rather that the operator is shifting tapes in the automatics. All transmissions will be at 25 w.p.m. A five-minute CQ will precede the actual message from Secretary Johnson.

The Armed Forces will issue a Certificate of Merit, suitable for framing and display, to anyone who copies the message without error. Send your copy to Armed Forces Day Contest, Room 5 B 519, The Pentagon, Washington 25, D. C., postmarked before midnight May 30, 1950. Be sure to include your complete name, station call, mailing address, and the time you copied the message.

QSO Party

The QSO-Relay Contest will have for its main purpose the demonstration on a national scale of the effectiveness of point-to-point or person-to-person communication by amateur radio as a back-up system for normal communications systems which might be knocked out at any time by flood, fire, storm, ice, or sabotage.

Because the great need in most disasters is for

(Continued on page 106)
Results—Ten-Meter WAS Contest

BY L. G. MCCOY,* WIICP

Ten meters reverberated from one end to the other with stations calling “CQ WAS Contest” during the Ten-Meter WAS Contest held January 7th, 8th, 14th and 15th. Even though conditions were mediocre for a good part of the contest time, competition was keen and some excellent scores were chalked up. It proved to be a swell opportunity for many amateurs to get those “hard-to-get” states on 28 Mc. Comments from the field indicated heartfelt enthusiasm and told of the enjoyment that the gang received by taking part in the contest. The typical comment was that the fellows liked the simplicity of scoring and ease of operation offered under the rules. No one station managed to work all states although some of the contestants came within a whisker of getting a perfect score. It was interesting to note that regardless of location in the country, the ten-meter gang was able to turn in some very impressive totals of states worked. It had seemed that at the beginning of the contest some districts would have a slight edge over others but the final results did not bear out these conclusions.

There were 256 logs submitted, representing 61 sections. The highest score received was that of W1ATE, Chad Knowlton. Using both phone and c.w., Chad ran up the amazing score of 17,501 points with a total of 407 contacts and 43 states worked, missing only Georgia, Delaware, West Virginia, South Carolina, and Kentucky. KH6LJ, Katsashi Nose, an old contest stand-by, was a close runner-up for top honors, scoring 16,450 points, 350 contacts and 47 states, missing Maine for a par 48. W9BVX, Ken Slane, placed third with a nice score of 12,250 points, 350 contacts and 35 states. Other high scores were W6APG 12,062, W7LEV 11,448, W1BFT 10,222, W1RIL 10,027, W8WZ 9922, W4DIH 9906, W8IPC 9480, W6VPV 9361, W6GDO 9250, and W3OCU 9048.

* Asst. Communications Manager, \’Phone.


Comments

“Enjoyed the contest very much, already have received some of those needed QSL cards.”—W7CUB. “Didn’t think my c.w. was up to contest form, but after receiving encouragement from W8CVU, I really enjoyed myself … been a bone bound for 12 years.”—VE7VL. “Best contest I’ve been in for a long time, no strings, no complications … no power limit, no time restrictions, a general free-for-all, every man for himself!”—W1BFT. “Thanks for the chance to get some of the hard states on 28 Mc. … During contest worked four that I needed, hope they QSL.”—W8AL. “Sure liked the contest, hope they have another next year.”—W3ED. “Lost one-half hour’s contest time getting FCC inspector’s car out of mud from in front of my house. Do I get a special multiplier?”—KP4JE. “It was a tough battle and I lost valuable time due to a blizzard here. I probably lost many contacts in states already worked by seeking unworked states too much … anyhow it was fun and I hope future WAS contests will follow.”—W7JDX. “This ten-meter WAS contest was one of the first that I have attempted to work in a rather serious vein, and the surprising part for me was that I had a lot of fun and thoroughly enjoyed it … much to my surprise.”—W5FI. “I broke my wrist and tore the ligaments in my foot just prior to the contest … too busy to worry about my ailments what with pulling switches, tuning receiver and keeping log with one hand.”—W9BB. “If your aim was to stir some action on 10, you succeeded. … This

Ken Slane, W9BVX, winner in the Wisconsin Section and third in the country. Ken runs 1 kw. to a 4-element quarter-wave-spaced beam. His receiver is a homebuilt 17-tube double-conversion job.

QST for
clambake gave ten c.w. a shot in the arm that it sure needed ... seems more than one such contest a year is needed ... Thanks for the invite ... it was fun ... let's do it again soon!" — K19R/vox/WG2NY.

(Scores are grouped by Divisions and Sections. ... The operator of the station first-listed in each Section is winner for that Section. ... Listings show score, number of contacts, number of states worked.)

ATLANTIC DIVISION
Eastern Pennsylvania
W8QCU 0946-829-39
W8NTD 5651-153-37

Maryland
W9JTK 7090-180-39
W8GWN 2006-118-17
W9BKK 1715-78-22
W9LZL 765-45-17
W9GVP 482-27-16
W9OSF 158-17-17

Southern New Jersey
W2QBJ 2060-100-29

Western New York
W2PFG 2254-98-23
W2ZJ 1501-79-19
W0QGF 559-49-18
W0AGP 164-20-14
W2QEG 220-20-11
W2ZZL 4-2-2

Western Pennsylvania
W3KQK 276-23-12
W3QYY 207-23-9
W3ODU 144-18-8

CENTRAL DIVISION
Illinois
W6NII 5423-152-50
W6ANO 1622-135-12
W6NZ 329-29-10
W6NC 188-24-7

Indiana
W6SRF 600-50-12
W6UEM 393-32-10

Wisconsin
W6BXY 12,250-359-35
W6BWM 6212-259-27
W6AQD 5513-149-37
W9CTD 2502-123-18

GREAT LAKES DIVISION
Michigan
W8CVU 383-97-39
W8DLB 840-70-12
W8CQA 460-41-10
W8DED 615-41-15
W8FELA 378-37-14
W8COF 279-31-9

Ohio
W8WZ 6851-205-10
W9AJW 7217-572-20
W8WFO 2590-98-30
W8EDP 1348-104-12
W8BCQ 606-52-12
W8AL 630-44-14
W9WSE 300-30-10
W8BUBM 221-17-13

HUDSON DIVISION
Eastern New York
W2ZFO 2070-99-21
W2TWU 1800-100-18

New York City and Long Island
W2GTL 3836-104-32
W2RDO 3836-111-23
W2DBR 565-45-19
W2WNB 535-22-15
W2WC 538-34-16
W2TUF 564-29-15
W2NNII 65-13-5
W2KZE 16-4-4

Northern New Jersey
W2DJT 2210-85-26

(Continued on page 109)

WASHINGTON Section winner, W7LEV, Herman J. Paas, jr., ran up a score of 11,445 for 2nd high on the West Coast. Using both phone and c.w., Herman garnered 318 contacts and 37 states.

April 1950
Key Clicks and Receiver Bandwidths

How To Adjust Your Transmitter Keying

BY BYRON GOODMAN, W1DX

If and when you sharpen your receiver, by adding a Q5-er or even by learning how to use a crystal filter, two things immediately become apparent. First off you find “holes” in the c.w. bands where you used to find signals. The better the “skirt” selectivity, the more marked is the effect. It’s no real surprise, however, because it is the end result that prompted your getting more selectivity from the receiver.

The second effect is somewhat unexpected: If there is much activity, the “holes” are filled with clicks! With mediocre selectivity you only noticed the really bad clicks, because the overlapping signals masked the others, but a sharp receiver shows up many more in a hurry. The better the selectivity, the more apparent becomes the rather poor quality of the average keying, and anything better than a Q5-er (such as the “super-selective” type of i.f. amplifier) will make you wonder about the present “state of the art.”

“So what?” you ask. “The FCC has never called me on my clicks — my transmitter is clean.” Oh, sure. Didn’t the one or two fellows you asked about your keying when you first put the rig on the air say your keying was fine? (And haven’t you overlooked clicks when you were asked about them?) The whole point is that you don’t really know about your clicks unless you yourself have listened quite critically to your own signal. Don’t worry, we’ll tell you how to do it and what to look for a little later.

Why all this fuss about clicks? If they aren’t bad enough to attract the immediate attention of the FCC monitoring stations or the OOs, why worry? Actually, of course, you don’t have to if you don’t want to. You will probably be able to work about as many stations as you could with a good signal — it’s mainly a matter of pride. Your signal, your fist, and your operating are the things that build your reputation on the air, and a good signal coming from a haywire station will do more for you than a clicky one from a picture-book job. (The fist and operating aren’t under discussion here.) If you have no pride in your signal, you can stop reading right here — we can do nothing for you.

But what’s this about receiver bandwidths and keying — how do they tie together? Simply this: The tendency in c.w. work is toward more and more selectivity in our receivers. If you don’t believe it, try to buy a Q5-er from a c.w. operator who knows how to use it. Even the receiver manufacturers, after a number of years of ignoring the thing, except for including crystal filters in their receivers, are coming around to looking closely at the possibility of including better skirt selectivity in some of their new models. What real selectivity can do has been ably demonstrated by hardy pioneers like W9AEH and a few others, although this extreme will probably find its way into the shelves of only a few for many years to come. But with this more useful selectivity comes better utilization of our bands, only if we clean up our transmitters! Those clicks outside the passband of the receiver tuned to the signal do nothing but interfere with adjacent signals — they contribute nothing to readability.

And there are your two reasons for eliminating useless key clicks: The very real one of personal pride, and the less tangible one of being a good neighbor.

We deliberately said “useless key clicks” for a very good reason. Experience has shown that a very slight click or thump is desirable on the “make” of a signal, with little or none on the “break,” for the most pleasant and accurate copy. If the keying is too soft on “make,” it becomes difficult to copy at high speeds, and the most confusing signal of all is one that is soft on “make” and clicky on “break.” But you can have all the thump on “make” that you need and still not have the effects extend beyond the passband of a selective receiver.

Checking for Key Clicks

The easiest way to find out what your signal sounds like on the air is to trade stations with a near-by ham friend some evening for a short QSO. If he is a half mile or so away, that’s fine, but any distance up to the point where the signals are still SQ 9 will be satisfactory.

After you have found out how to work his rig (yours is much more convenient, of course), make contact and then have him send slow dashes, with dash spacing. (The letter “T” at about 5 w.p.m.) With the crystal filter out, cut the r.f. gain back just enough to avoid receiver overloading (the condition where you get crisp signals instead of mushy ones) and tune slowly from out of beat-note range on one side of the signal through to zero and out the other side. Knowing the tempo of the dashes, you can readily

* Assistant Technical Editor, QST.
identify any clicks in the vicinity as yours or someone else’s. A good signal will have a thump on “make” that is perceptible only where you can also hear the beat note, and the click on “break” should be practically negligible at any point. Fig. 1A shows how it should sound. If your signal is like that, it will sound good (provided there are no chirps) and your chest expansion will go up a few inches. Then have him run off a string of 35- or 40-w.p.m. dota with the bug — if they are easy to copy, your signal has no “tails” worth worrying about and is a good one for any speed up to the limit of manual keying. If the receiver has poor selectivity with the crystal filter out, make one last check with the filter in (Fig. 1B), to see that the clicks off the signal are negligible even at high signal level.

**Checking at Home**

But suppose you don’t have any convenient friends with whom to trade stations, what then? You can still check your keying, although you have to be a little more careful. The first step is to get rid of the r.f. click at the key, because if you don’t you will never know where you stand. Locally (meaning in your own receiver) this click will coincide in time with clicks that may or may not be on your signal, so there is just no way to observe your signal without first eliminating the r.f. click. And unless you have a telepathic keying system that breaks no current, you have a click at the key! Even the current broken by the key in a vacuum-tube keyer circuit (which is sometimes only 0.1 ma. or so) will cause r.f. clicks that can be heard in your receiver and often in the b.c. set. If you key with a relay, the key opens the relay-coil circuit and clicks are generated at the key as well as at the relay contacts. Don’t make the very common mistake of thinking these clicks are the same as the on-the-air clicks discussed earlier — they are not! They are simply local clicks that you must eliminate before you can observe your signal in your receiver. These clicks are the same as the ones you get when you turn an electric light on or off — when you suddenly start or stop current flow, no matter how little, you generate r.f. and that’s the click.

Getting rid of this little click is generally no trick at all, unless you’re breaking a lot of current. All it requires is a small r.f. filter, as shown in Fig. 2. Sometimes just a small (0.001 μfd.) condenser mounted right at the key terminals will do it, and sometimes it will require the full treatment complete with r.f. chokes and second condenser. Measure the normal current through the key leads, remove the transmitter leads, and then connect a d.c. power supply and resistor to give the same current through the key. When your key will break this current with no click, as observed in your receiver and the b.c. set (tuned off any station), you have a suitable r.f. filter at the key and you can reconnect the transmitter. If you use a vacuum-tube keyer, just don’t turn on the transmitter but key the normal keyer grid current. If you use a keying relay, first eliminate the click at the key by just keying the relay and adding filter across the key, and then

![Diagram](image.png)

**Fig. 2 — A filter for eliminating the r.f. click at the key.** First try C1, then add the two r.f. chokes, and then C2. This filter does not eliminate on-the-air clicks, but it is necessary if you are trying to check keying in your own receiver. It should be mounted right at the key. C1, C2 — 0.01 to 0.001 μfd., not critical. RFC1, RFC2 — 1- to 2.5-mh. r.f. choke.
eliminate the click at the relay contacts with another r.f. filter in the relay-keyed circuit. The filter should be mounted right at the key or relay contacts. The objective is to be able to make or break normal key current without generating a local click, and the filtering is usually so simple that the junk box will yield the parts and the process takes longer to describe than to apply.

So far you haven't done a thing for your signal on the air and you still don't know what it sounds like, but you may have cleaned up some clicks in the b.c. set. Now disconnect the antenna from your receiver and short the antenna terminals with a short piece of wire. Tune in your own signal and reduce the r.f. gain to the point where your receiver doesn't overload. Detune any antenna trimmer the receiver may have. If you can't avoid overload within the r.f. gain-control range, pull out the r.f. amplifier tube and try again. If you still can't avoid overload, listen to the second harmonic as a last resort. Since an overloaded receiver can generate clicks, it is easy to realize the importance of eliminating overload during any tests or observations.

Describing the volume level at which you should set your receiver for these "jack" tests is a little difficult. The r.f. filter should be effective with the receiver running wide open and with an antenna connected. When you turn on the transmitter and take the other steps mentioned to reduce the signal in the receiver, run the audio up and the r.f. down to the point where you can just hear a little "rushing" sound with the b.f.o. off and the receiver tuned to the signal. This is with the crystal filter in. At this level, a properly-adjusted keying circuit will show no clicks off the rushing-sound range. With the b.f.o. on and the same gain setting, there should be no clicks outside the beat-note range. When observing clicks, make the slow-dash and fast-dot tests outlined previously.

Now you know how your signal sounds on the air, with one exception. If keying your transmitter makes the house lights blink or the dial light in your receiver flicker, you may not be able to tell too accurately about any chirp on your signal. However, if you are satisfied with the absence of chirp when tuning either side of zero beat, it is safe to assume that your receiver isn't chirping with the light flicker and the observed signal is a true representation. No chirp either side of zero beat is fine — some chirp can be either in your transmitter or your receiver, when the lights flicker. But don't try to make these tests without first getting rid of the r.f. click at the key — you will never be able to give yourself a clean bill of health, because clicks can mask a chirp.

In some instances, particularly if the transmitter power is several hundred watts or more, you may find that a small click still persists on all frequencies. If such a click is observed, pull out the last i.f. amplifier tube in your receiver and listen again. If the click is still there, it indicates rectification in the audio system of your receiver, the same type of BCI we cuss out cheap midget receivers for. You can cure it with the usual resistor-condenser filter used for curing such BCI cases, or you can leave it in and make mental compensation for it. Any click you hear on your signal should reduce to this minimum click immediately off the signal.

Another unavoidable click can be encountered by r.f. pick-up on the lead from a receiver i.f. amplifier to a Q5-er. Here again the click will be present at any setting of the receiver tuning control. The solution here is to make your checks with the Q5-er disconnected and the lead removed from the receiver.

**Contact Bounce**

You may find that making the slow dashes with the dash side of your bug key, or even making dots with the dash lever, gives a clean signal, but that clicks come in when the dot lever is held over. No, the rig isn't hexed. You have "bounce" or "scratch" at the dot contact on your bug — you can also have bounce in a keying relay that isn't suitable — and it is not always an easy thing to cure. It is present on a number of signals on the bands, if you know what to look for, and you can pick it out by noticing a difference in the keying characteristic between the dash side and the dot side of the key. There is no sure cure, but you can start by cleaning the dot contacts and reducing the throw of the dot lever. Another tack is to increase the damping of the spring arm that supports the movable dot contact — some operators use a cigarette stub or piece of sponge rubber jammed in the curve of the spring. If we knew a sure cure we would be happy to pass it along, but we haven't found one — you just have to experiment.
Curing Clicks

What to do about clicks—if you have them? Well, clicks are caused by the key turning your transmitter on and off too fast—and sometimes by parasitic oscillations in an amplifier—and all a key-click filter does is to slow down the turning-on and turning-off processes. Parasitic clicks occur at points 25 to 100 kc, either side of the signal, and are caused by low-frequency parasitic oscillations that are triggered by the keying. The cure consists of eliminating the oscillation, not adding key-click filters. Now let’s look at a few typical keying circuits, and how to adjust key-click filters.

One of the most popular circuits for keying is the cathode—the “center tap” with filament-type tubes—and its first cousin, the negative-supply lead. In an amplifier either type of keying responds to the same treatment, the lag circuit or keying filter shown in Fig. 3. If an oscillator is keyed, the following statements apply only to negative keying, because the grid-circuit time constant complicates the picture in cathode keying of an oscillator. If the grid is returned to ground in Fig. 3 the circuit is called “cathode keying”—if the grid is returned to the cathode it becomes “negative-supply keying.”

Adjustment of the filter in Fig. 3 is simple. If your signal has too heavy a click or thump on “make,” $L_1$ should have more inductance. If the click is too heavy on “break,” $C_1$ should have more capacity. The “break” characteristic is also influenced by the value of $L_1$, so start with a value of $C_1$ that reduces the clicks noticeably on “break,” adjust the value of $L_1$ for best “make” characteristic, and then clean up the “break” by further modification of $C_1$. Since you may have only a few stray inductances around the shack, you may not find just the value you want for $L_1$. In this case, use a value that gives too soft a “make” and then shunt the inductance with resistance to reduce its effect. Transformer windings will often serve as well as standard chokes in this application, so try everything around the shack until you find what you need. For a given voltage, high-current circuits will require more $C_1$ and less $L_1$ than will low-current ones.

Another common circuit is the tube keyer circuit and its half-brother, grid-block keying (Fig. 4). Adjustment of these is simple, too. For a given value of $C_1$, increasing the value of $R_1$ will soften the “make” characteristic, and increasing the value of $R_2$ will soften the “break.” The value of $R_2$ will be many times the value of $R_1$. With grid-block keying, the value of $R_1$ is determined already if the tube runs grid current, because this will be the normal grid leak, and so the value of $C_1$ must be adjusted for proper “make” characteristic and then the “break” made satisfactory by adjustment of $R_2$. Tubes running heavy grid current are not too suitable for grid-block keying because the value of $R_2$ generally ends up comparatively low and the negative supply must furnish too much current when the key is down.

![Fig. 4 — Vacuum-tube keying circuits (A) and grid-block keying circuits (B) are essentially the same, and they respond to the same treatment. See text for adjustment procedure.](image)

And now for a couple of parting thoughts. If you are keying in a low-level stage, don’t overlook the clipping action of subsequent stages that are fixed-biased beyond cut-off. It can reintroduce clicks. Dig out W9ADN’s article and read it again. And if you key your oscillator, don’t be too disappointed in the chirp that shows up when you have clickless keying. Amplifier keying is the answer.

And don’t get the idea that the kind of keying we have been talking about will be too “soft” for what you want. Once you get the hang of adjusting your keying to where it has no clicks off the beat-note range, even with an S9 signal, you will find that the signal is still very solid. It may even sound slightly clicky within the receiver passband, but it will be clean outside. It will be the type of signal that attracts attention because it is so rare these days.


X—Strays X

An interestingly-written 48-page booklet on the history, manufacture, types and uses of files is available without charge from the Nicholson File Co., Providence, R. I. Entitled File Philosophy, the booklet is packed with metal-working kinks that will come in handy in the ham workshop.

— W6PGH

W6MU’s laundryman is Y. C. Que ...!
WRITE YOUR DIRECTOR

“The affairs of the League shall be managed by a Board of Directors . . . (from each division a director shall be) elected by the Full Members of the League . . . the Board of Directors shall meet in annual session for the conduct of League business in the month of May of each year . . . the directors shall keep themselves informed on conditions and activities in their respective divisions, and on the needs and desires of the League members therein, that they may faithfully and intelligently represent them in the Board of Directors . . .”

These excerpts from the ARRL Constitution & By-Laws become particularly important to members as we approach the time of the annual meeting of the ARRL Board. Throughout the year directors visit clubs and conventions, send out bulletins and questionnaires, engage in correspondence and over-the-air contacts or use other means to determine amateur sentiment in their respective divisions concerning problems of the day. From now until May your director will be particularly anxious to hear from you and your club. If you have a specific position on various amateur issues, or if you have ideas for the improvement of the handling of League affairs or of amateur radio itself, sit down now and drop a line to your director, address on page 8. He wants to hear from you. You are the League, but only to the extent that you exercise the right of making your wishes known.

EXTRAORDINARY ADMINISTRATIVE CONFERENCE

The Provisional Frequency Board (in session since early 1948 in Geneva, Switzerland, to set up a new world-wide station list primarily for the fixed service) now having completed major portions of its task, has been decided to call an Extraordinary Administrative Conference in Geneva starting September 1st. It is expected that most nations of the world will send delegations; the principal purpose of the conference is to implement the new station list. Preparatory committees to establish the plans and policies for U.S. participation are currently meeting in Washington, with Secretary Budlong in attendance as often as seems desirable. More on this as it develops.

PRESIDENTIAL POLICY BOARD

On February 17th President Truman set up a “President's Communications Policy Board” to make an over-all study of the U. S. frequency uses and communications policies. What specific studies the board will make will not be known until it has begun its meetings, probably sometime in March; it is now “setting up shop” in Washington. Meanwhile, we note several good friends of amateur radio among the membership, which is: Dr. Irving L. Stewart, former FOC commissioner; Dr. Lee DuBridge, president of Cal. Tech.; James R. Killian, president of M.I.T.; Prof. William L. Everitt, dean of the E. E. department, U. of Ill.; and David H. O'Brien, former assistant administrator of the War Assets Administration.

THE "BRAILLE TECHNICAL PRESS"

A long-felt need for the blind amateur or would-be amateur appears well on its way to fulfilment with the publication of the first issue of The Braille Technical Press. Started by W2JIO, himself an instructor for the blind, the new publication sells for less than publication cost — 50 cents per issue, including postage. Aimed at the amateur, serviceman and sound technician, the publication's scope can be measured by scanning the title page of the first issue — passing the radio examinations, sound recording and reproduction, test equipment, auditory milliammeters, harmonic suppression, a simple amateur transmitter, etc. If you know of a blind amateur or blind person interested in radio, tell him about this new magazine; better still, buy him a copy, or several copies. Address Robert Gunderson, W2JJO, 980 Waring Avenue, New York 67, N. Y. The publisher also solicits articles suitable for publication.

HANDY’S 25TH

Francis Edward Handy, W1BDI, completed 25 years of service on the ARRL Hq. staff on February 20th, and 16 members of the “Ten Year Club” gathered that evening for a dinner in his honor, with President Bailey as our guest. “FEH” was presented with a leather-bound and inscribed copy of the first edition of The Radio Amateur’s Handbook, which he wrote practically single-handed in 1926. Although the annual revision of the Handbook is now a major staff job and more than two million copies have been published and sold, the book is still affectionately referred to as “Handy’s Handy Handbook.”

Ed Handy first came to the attention of Hiram Percy Maxim, then ARRL president, in 1924 as a result of the outstanding performance of 1BDI up in Augusta, Me. When in 1925 Traffic Man-
16th Sweepstakes Contest

Part I: Final Results—C.W. Section

Hitherto, both the c.w. scores and the phone scores in each Sweepstakes Contest have been reported in one issue of QST, usually a late-spring or early-summer number. Since last summer, however, our contest reporting schedule has been pushed ahead. In order to bring you the results of the 1949 DX Contest earlier, the final scores were reported in two parts, the first listing c.w. and the second the phone standings. The 1949 SS will be treated in the same manner, so that earlier reporting may be accomplished. Phone results will appear in May QST and will be accompanied by photographs of the star performers in both contest sections.

Award Winners

Competition for awards is, under the SS rules, among amateurs in each ARRL section. Entries were received from 952 c.w. individual awards are being made in each of the 72 sections. The winners are those first-listed in each section tabulation under the heading "Scores." Hearty congratulations to the SS champions!

Highlights

As a score and sections-worked record breaker, the 16th Sweepstakes was without peer. In the preceding four contests, the number of contestants scoring more than 100,000 points has been used as an index of operating performance. The number of operators reaching the six-digit mark in 1946 was a mere handful—eight. In the two Sweepstakes events following, the total soared first to 58, then to 82. Continuing this upward spiral, the 1949 SS brought scores above 100,000 from 92 contestants. Such figures are clearly indicative of the ever-increasing operating proficiency of those amateurs who have formed the SS habit!

Perhaps a more notable indicator of operator ability in this SS was the number of contestants who made a clean sweep of all sections on c.w. The final results show the calls of 34 brass-pounders who worked all of the League’s 72 sections. If anyone thinks this is an accomplishment easily attained, let him try working them all in the ’50 Sweepstakes!

So many contestants turned in praiseworthy performances that space does not permit us to give them the special mention they deserve. However, in order to give all participants an idea of how they stacked up against leaders in their geographical area, and also to give some measure of credit to the high scorers, the tabulation below shows the top score in each licensing area:

- W1JJH 117,150 KP4KA 106,776
- W2TOP 175,093 KL7SQ 25,498
- W3BES 183,600 KZ5WZ 60,401
- W4FU 185,400 VE1AR 68,325
- W5PKF 141,379 VE2NI 62,319
- W6WIP 164,430 VE3KE 112,350
- W7KEV 146,100 VE4NS 34,800
- W8CEG 118,853 VE5QZ 93,543
- W9BQM 152,600 VE6UB 51,810
- W6DYX 146,100 VE7AEC 65,462
- KX6IL 62,904 VE8AK 2,500

The determination of standings in the club competition of the 16th Sweepstakes must await completion of the phone checking detail. A tabulation showing club results will appear next month along with the phone results. — J. M.

SCORES

Sixteenth Sweepstakes Contest

Scores are grouped by Divisions and Sections. The operator of the station first-listed in each Section is award winner for that Section unless otherwise indicated. Likewise the “power factor” used in computing points in each score is indicated by the letter A or B. A indicates power up to and including 100 watts (multiplier of 1.25), B indicates over 100 watts (multiplier of 1). The total operating time to the nearest hour is given for each station and is the last figure following the score. Example of listings: W3BES 183,600—1022-72—A, 40, or, final score 183,600, number of stations 1022, number of sections 72, power factor of 1.25, total operating time 40 hours...

Stations manned by more than one operator are grouped in order of score following single-operator station listings in each section tabulation; calls of participants at multi-operator stations are listed in parentheses.

ATLANTIC DIVISION

W3JE 66,700—415-63-A-31
W3LYF 77,658—335-59-A-37
W3KEW 100,800—570-72-A-40 W2OK 32,200—302-54-B-32

April 1950 39
A 2-Meter Station for the Novice

Part III†—The Modulator, Power Supply, and Control Unit

BY EDWARD P. TILTON, W1HDQ

In the previous installments we have described a converter for 144-Mc. reception and a simple transmitter r.f. unit. This month’s equipment comprises the accessories necessary to make these two units into a complete working station—a modulator for the transmitter, and a power supply capable of handling the power requirements of all the other components. Also detailed is a control and cabling system for convenient on-the-air operation of the station.

None of the dimensions in these items is critical, and the constructor will very likely find that they are the easiest of the series to build and adjust. No layout drawings are provided, as there is no necessity for following the original designs in exact detail. Nor is it all necessary to use parts that are exact duplicates of the original, though the manufacturers’ part numbers are given in most cases.

The Modulator

As most operation on 144 Mc. is by means of voice (A2 emission) or tone-modulated telegraphy (A2), it is necessary to have a modulator as part of our 2-meter station. A suitable modulator design is shown in the first photograph, and the schematic diagram is given in Fig. 5. The modulator is nothing more than a common audio amplifier, with an output transformer of suitable design so that the power input to the final stage of the transmitter may be modulated (varied) in proportion to the variations in level of the operator’s voice. The only essential difference between the modulator and an audio system such as used in a receiver or a phonograph amplifier is in the type of output transformer used. In our modulator the output transformer (T₂) is designed to carry the current to the final stage of the transmitter through its secondary winding. The audio voltage developed in the modulator is thus added to or subtracted from the voltage impressed on the final stage—a simple explanation of the modulation process.

Only three tubes are used in the modulator. The first is a 6SN7GT dual triode, the first section of which is connected as a grounded-grid amplifier, with the microphone inserted in its cathode lead. This very simple arrangement does away with the necessity for a microphone trans-
former, and also takes care of the current necessary for the operation of a carbon microphone. These are, in fact, the reasons for the use of the stage at all, as the following triode amplifier provides more than enough gain for the 6V6GT modulators.

The potential output capability of the modulator is considerably in excess of the requirements of the transmitter. It was considered advisable to design it in this way so that, with minor changes, it could be used with a higher-powered transmitter at a later date if desired. The output transformer has a 25-watt rating, so the modulator could be used with a transmitter of 50 watts or more, if altered slightly as to operating conditions. There is no harm in having an oversized modulator, so long as the operator is careful to keep the gain control \((R_2)\) set for only as much power output as is needed to modulate the power input being used.

It is often desirable to be able to transmit in code when working on 144 Mc. Use of a keyed tone of constant pitch provides a somewhat more readable signal under adverse conditions than does voice modulation, and communication with this type of modulation (usually called m.c.w.) is an excellent way to build up one's proficiency with the code. Fortunately, inclusion of tone modulation is possible with almost no increase in complication or cost, by merely providing a means of feed-back in the modulator. The condenser \(C_5\) is used for this purpose, feeding back energy from the modulator output into the primary of the input transformer. The key is plugged into \(J_2\) (note that this jack is insulated from the panel). It may be left there permanently, if so desired, and tone modulation is thus constantly available. The pitch of the tone may be varied by changing the value of the feed-back condenser, \(C_3\).

Construction of the modulator is extremely simple, and almost no special precautions are necessary. The heater leads and the leads to the gain control were wired with shielded wire, to forestall any chance of r.f. feed-back or hum pick-up, but this is probably not absolutely necessary in such a simple circuit. Nothing about the parts arrangement is critical, and almost any convenient layout may be used with good results. Other tubes and different components may also be used. For example, if one wants to build a smaller unit, miniature tubes (12AU7 amplifier, 6AQ5 modulators) may be substituted, and a smaller output transformer may be used. The layout shown has the advantage of being converted easily to higher-power service, however.

Bottom view of the modulator. The 6SN7GT socket is at the right. Extra leads to the modulation-transformer secondary are taped together at the left.
Fig. 5 — Wiring diagram of the modulator for the 2-meter station.

C₁ — 0.01-pfd. disc-type ceramic.
C₂ — 25-pfd. 25-volt electrolytic.
C₃ — 0.003-mfd. tubular.
R₁ — 47,000 ohms, 1/₂ watt.
R₂ — 0.5-megohm potentiometer.
R₃ — 1500 ohms, 1 watt.
R₄ — 250 ohms, 10 watts.

J₁, J₂ — Open-circuit jack.
P₁ — Retaining-ring type plug, 8-pin male (Amphenol 86-CP-8).
T₁ — Small input transformer, single plate to push-pull grids (Stancor A-4713).
T₂ — Modulation transformer, push-pull 6V6s to 5000-ohm load (Stancor A-3815).

Operation of the modulator will be covered later, in the discussion of the final set-up for the complete station.

Full modulation and best quality are possible only if the modulator is "matched" to its load. The transformer used in this equipment has secondary taps for impedances of 8000, 6500, 5000, and 3000 ohms. The load impedance that the amplifier presents to the modulator is found by Ohm's Law. Simply divide the final plate voltage by the plate current. In this instance we have the plate voltage, 250, divided by the plate current, 0.05 amp., or a load impedance of approximately 5000 ohms. If a transformer other than the one specified is to be used, be sure that it is capable of working into such a load.

**Power Supply**

Power-supply equipment is something that everyone must have to run a station, regardless
of the type of operation he engages in. And we all need low-voltage supplies, too, so it pays to build a good one right at the start. There will always be uses for it later on. The power supply for our 2-meter station handles both the transmitter and the receiver, switching of the various circuits being handled by a control unit, shown in the composite photograph in Part I of this series. Details of the control unit and cabling system are shown in Fig. 7.

Looking at the schematic diagram of the power supply, Fig. 6, it may be seen that a 2-section filter system is used, but the second section supplies only the converter and the speech amplifier. These stages require better filtering than do the modulator tubes and the transmitter r.f. section, but they draw only a small amount of current, permitting a small inexpensive filter choke \( L_2 \) to be used in the second section. The first filter choke, \( L_1 \), must be of larger construction, as the

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**Fig. 6—Schematic diagram of the power supply.**

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\( C_1, C_2 \) — Dual 8-mfd. 450-volt electrolytic condenser.
\( R_1 \) — 50,000 ohms, 10 watts.
\( R_2 \) — 2500 ohms, 10 watts.
\( L_1 \) — 7-ry, 150-ma. filter choke (Stancor C-1710).
\( L_2 \) — Any small filter choke, 50-ma. or more rating.
\( J_1 \) — Retainer-ring type plug, 6-pin female (Amphenol 78-56).

\( P_1 \) — Retainer-ring type 115-volt receptacle (Amphenol 61-M).
\( S_1, S_2 \) — Single-pole single-throw toggle switch.

\( T_1 \) — Power transformer: 700 volts at 200 ma. center-tapped; 5 volts at 3 amp., center-tapped; 6.3 volts at 5 amp. (Stancor P-6314).

Bottom view of the power supply.
Fig. 7 — Diagram of the cabling system used to supply power to the various units in the 2-meter station.

J₁ — Antenna terminal — standard crystal socket (Millen 33102).
J₂ — Multiwire cable connector, 5-pin female (Amphenol 78-PF6).
J₃ — Multiwire cable connector, 6-pin female (Amphenol 78-PF6).
J₄ — Multiwire cable connector, 8-pin female (Amphenol 78-PF8).
J₁ — Multiwire cable connector, 6-pin male (Amphenol 86-PMA6).
P₀, P₃ — 300-ohm line plug (Millen 37412).
S₃₄, b, c, d — 4-circuit 2-position rotary switch (Mallory 32344).
S₂ — Single-pole single-throw toggle switch.

A glance at the diagram of the control circuits, Fig. 7, will show how this is done. The main control switch, S₁, carries two circuits for the antenna, one for the high voltage for the transmitter, and one for the regulated voltage for the converter. When the switch is in the “transmit” position, as in Fig. 7, it will be seen that all the transmitter circuits are supplied with the necessary voltages through S₃₄, and the antenna is connected through the switch to the transmitter terminals through sections a and b. If S₃ is left open there will be no plate voltage on the receiver circuits. Then, when we throw the control switch to the “receive” side the transmitter is disabled, the plate voltage is applied to the receiver through S₃₄, and the antenna is connected to the receiver input terminal. The switch S₂, seen in the composite photograph, Part I, at the lower right of the control panel, is included so that the receiver can be operated while the transmitter is on, for monitoring purposes if desired.

Just above the main control switch is the antenna terminal, into which the feeder from the antenna system is plugged. This is a standard crystal socket, as convenient plugs for these sockets, for use with 300-ohm line, are now available from several manufacturers. The ones used here are Millen type 37412.

There is an elementary safety point in laying out power cabling in radio work that is often overlooked. The “hot” terminals in the power circuits should be recessed so that no contact can be made with them by the operator, if the power supply is accidently turned on when no connection is made to it externally. This calls for the use of female-type connectors on the power side of such junctions, with the male type being used on the detachable part. At the opposite end of

The Control Panel

Arranging a satisfactory control system is one of the most difficult jobs in assembling a satisfactory station for some amateurs. Ideally, the complete operation of the station should be controlled from one switch, the functions of which include turning on the transmitter, cutting off the receiver, and switching the antenna from one unit to the other, all in a single motion. In large amateur stations these functions are usually accomplished (in an infinite variety of ways) by means of one or more relays, operating from the main control switch. In our set-up we handle the job with a single inexpensive selector switch capable of connecting four leads to either of two positions.
the cable the reverse is true, of course. Making up the cables will be simpler if several colors of wire are available, as it is difficult to keep them identified otherwise. When the cable wires have been made up and soldered in place the system can be made neat by lacing up the cables. Waxed lacing twine made especially for this purpose is available, but soft cotton package twine may be used. Lacing up the power wiring under the chassis of the two units is a refinement that adds to their neatness.

**Final Tests and Operation**

We are now about ready to go on the air with our complete station. A convenient arrangement of the component parts is shown in the composite photograph, Part I. The power supply and transmitter r.f. unit are mounted in a simple wooden rack to conserve space and make for convenience in testing and operation. The rack is made of 1 by 2-inch wood, known as furring strip in the lumber yards. Its construction should be obvious from a glance at the photograph.

The control panel is screwed to the rack at the lower right side, so that the change-over switch and the converter dial, the two most-used controls, are near together. Obviously, this layout was set up for a right-handed operator, but there is nothing critical about the arrangement, and it may be altered to suit one's own ideas and personal preference.

Before putting the unit on the air we will check out the final set-up with a dummy load. With the cables connected properly and the 300-ohm lines plugged into their terminals on the transmitter and converter we are ready to go. The 15-watt bulb that was connected to the transmitter for the initial tests may now be plugged into the antenna terminal, $J_1$, on the control panel. Throw the primary switch in the power supply on, and allow the tubes in all units to heat up. Then turn on the plate power switch, $S_2$, with the main control switch in the “transmit” position. If the rig is tuned up properly, the lamp load will light up, though a somewhat different setting of the transmitter coupling coil, $L_7$ in Fig. 3, may be required. Final adjustment of the coupling to the antenna, and also the coupling between the tripler plate and final grid coils, may be done easily by tipping the transmitter unit up and resting it on the rack shelf with the bottom toward the operator. Check the neutralization adjustments carefully at this time.

When everything is in order, plug in the microphone and check for modulation, turning the gain control up until there is an appreciable brightening of the load lamp at ordinary voice level. Hold the microphone close to the lips, and turn the gain up only as far as is necessary to develop a satisfactory modulation level. Higher gain will result in overmodulation on voice peaks, and increase the pick-up of noises remote from the microphone.

If modulation produces a dimming of the lamp brilliance you have “downward modulation” which may result from too tight antenna coupling or insufficient grid drive. Check your 616s and make sure that the best ones are in the tripler and final-stage sockets, the best ones being those that give the highest grid current. The loading on the final, by either the lamp or the antenna, should be set at a point where there is still an appreciable dip in final cathode current when the final plate condenser is tuned through resonance. Increasing the coupling beyond this point will result in no increase in output, and going too far will actually reduce the output, and cause downward modulation. The position of the coupling coil may be different when the antenna is used, so a check should be made for upward modulation when the antenna is connected. A neon bulb held near the final plate coil should show an increase in brilliance when modulation is applied.

Next, plug a key into $J_3$ in the modulator, and check the tone modulation. The quality of the note will usually be best with the gain control at a low setting, probably somewhat lower than is needed for voice modulation. The tone pitch may be raised or lowered by increasing or decreasing the value of the feed-back condenser, $C_3$.

Be sure that the oscillator and tripler controls and the coupling between the tripler and final stages are set carefully so as to give the greatest amount of grid current in the final tubes. Only when this condition is satisfied, and the coupling to the antenna is correctly adjusted, will the transmitted signal be of the best quality and strength.

**Antenna Systems**

The station is designed to operate with an antenna system fed with 300-ohm line. This can be the ribbon commonly used for television antenna installations, or the heavy-duty variety designed for high-powered transmitters. There are innumerable types of antenna systems that can be adapted to 2-meter work, and typical designs may be found in The Radio Amateur's Handbook, and the A.R.R.L. Antenna Book. New designs of special mechanical or electrical interest are published from time to time in QST.

Probably the simplest antenna, and one that is quite suitable for local work is the folded dipole, shown in Fig. 8. This may be made of any metal rod or tubing stock that can be bent into the desired shape, or it may even be made of the 300-ohm line itself. The latter arrangement is often used for indoor antennas, with the dipole fastened on a wall of the operating room. Such an antenna may be used either vertically or hori-(Continued on page 118)
50 Years of Progress—A Report on Amateur Radio
With Special Reference to the New Philosophy of Integers

BY LARSON E. RAPP,* W1O

It is customary at the midpoint in a century to take inventory on progress, and it is a real pleasure when the field is amateur radio. While it is true that QST and other amateur journals have occasionally mentioned a few of the amateur contributions to the art of communication, the author has anticipated the need for a factual report that can be added to the similar works in other fields. The present paper is the result of 23 months of steady work, sifting the inconsequential from the significant and reducing the findings to definite argot.

Early in the work it was decided to confine the investigation to those problems peculiar to amateur radio and not duplicated in other communications fields as, for example, point-to-point, mobile, entertainment (including television and broadcasting), and diathermy. It was felt that such a report would show clearly the great strides made by radio amateurs, working silently in their basement workshops and attic laboratories. The work involved in preparing this paper was made difficult by the characteristic reluctance amateurs show in talking about their achievements, while quick to acclaim the work of a colleague, despite the low power and poor antenna location of said colleague. However, free-and-easy access was obtained to thousands of well-kept logsbooks and other records, and many of the heuristic conclusions were reached only because this information was made available.

Amateur communication can best be studied by breaking it down into three parts, for simplicity, will be called Part 1, Part 2, and Part 3. Other designations might be used, of course. These three parts will be found, upon close inspection, to be (1) the quality or "tone" of the signals involved, (2) the "readability" or Q factor of the signals, and (3) the "strength" of the signals. Let us examine them in detail.

Part I—Tone

Early records clearly show that from the first days of amateur radio, at the turn of the century, there was a noticeable difference in the tones of signals emanating from different transmitters. This effect was marked enough to suggest to the early experimenters that the most logical system of amateur communication was simultaneous operation of many transmitters on the same frequency, or "wavelength" as it was known in those days, with the receiving operator skillfully utilizing the differences in tones to select aurally the desired signal. This system was found to work very well with one transmitter operating in any given area, or with one weak and one strong station, if the strong station was the desired one. This system was carried through into the middle '30s, with the accepted wavelengths, or "frequencies" as they had become known, being carefully selected to coincide with the amateur band limits, or "edges."

As interest grew in the "tone" of the signals, a scale was devised 1 to enable a receiving operator to report to the transmitting operator just what the tone of the signal was or should be. Cautiously named the "T" scale, it consisted of careful descriptions of the common types of signals in vogue at the time, numbered from 1 to 9 for easy identification. The records indicate that no amateur in the past 50 years has ever been complacent enough to stop short of perfection in the tone of his transmitter's signal, as is apparent by the sheer horror registered by an operator who receives a "T8" report, although by the accepted scale it is a legal signal and not far from perfect. It is rare indeed to hear a pedicural signal reported as "T7" or "T6," so great has been the technical progress of amateur radio. By checking back on transmitter designs, computing the transmitter waveform and modulation characteristics, and plotting these against tabulated reports recorded in logsbooks, it is possible to reconstruct the entire picture. Fig. 1 is a plot of the progress in amateur tone reports, and no further comment is required.

* Rippering-on-the-Charles, Mass.

is necessary. Study it carefully — it is a glorious record of achievement.

Part 2 — Readability

The readability or “R” factor is a direct indication of the ease with which a signal can be copied, based on a scale of 1 to 5. When the scale was first introduced, it was not unusual to hear readability reports of “R3” given to signals masked by noise or interference. However, despite increasingly-crowded bands, the accepted and taken-for-granted report is “R5,” which means “Perfectly readable.” The report of “R4,” defined as “Readable with practically no difficulty,” is reserved only for rare occasions when the signal is completely smothered by interference. It is, however, a true report, because the receiving operator will always acknowledge one of these smothered Readability 4 transmissions with “R OK, solid, FB,” and other popular expressions. To the average bystander, such operating skill is beyond all comprehension, and naturally he never bothers to ask the receiving operator what was copied so solidly. After H. RES. 2751, Sept. 9, 1935, 74th Congress, 1st Session.

all, there is nothing like respect for genius. To the uninitiated, or newcomer to amateur radio, it is sometimes difficult to arrive at an exact readability report. There is no need for this if he follows one simple rule. The following equation, arrived at empirically after months of investigation, will give the correct report in every instance. For any given band and set of conditions, the readability report is given by

\[ R = 2.5 \left( 2 - \frac{n}{f} \right) \]

where \( n \) = number of signals on the channel, and \( f \) = operating frequency in Mc.

\( R \) is always given in the nearest whole number.

Part 3 — Signal Strength

Tabulation of the signal reports received by active stations during the past 50 years shows clearly the great advances that have been made. Despite no relaxing of the legal power limit by FCC and other licensing authorities, the average report has slowly climbed to its present exalted heights. Considering only the present “S” scale, based on values from 1 to 9, it is interesting to note that in the middle ’30s it was not unusual for stations to carry on communication with “Strength 3” or “Strength 4” signals at each end of the circuit. Nowadays, however, through antenna developments and circuit refinements, the average level of signals is up around S7 or S8, with no change in the transmitter power.

As usual, the radiotelephone specialists, generally acknowledged to be more advanced than the so-called “c.w. men,” have brought the improvement in efficiency to still greater heights. Most of their reports take the form of “20 db. over S9” (“S9” means “Extremely strong signals”), and some reports run up to 40 or 50 db. over S9, with preselector. The average non-amateur, with a little mathematics and engineering knowledge at his command, is hard put to explain a signal that has 100 to 300 times the field strength of an extremely strong signal, but such profound knowledge can only be acquired after many years in the field. It even has some of the c.w. men guessing, and studying antenna theory.

Another effect observed only by amateurs, but thoroughly attested to by their records, is the “QSL” or “DXCC” effect. To the layman, this can be stated simply as being “the increased strength a signal has when it originates from a country where there are relatively few amateurs.” Odd as it may seem to the uninitiated, it can be proved definitely that a given field strength at a receiver will result in a louder signal out of the receiver when the signal originates in a rare country than when it comes from a domestic station. The effect is still under study, and no real con-

Fig. 1 — A plot of the frequency of occurrence of tone reports plotted against time. World War II and changes in reporting methods and government regulations account for the discontinuities.

The steady growth of T9 (earlier “P.D.C.”) reports is in sharp contrast to the rapid falling off and eventual disappearance of less complimentary reports.

(Continued on page 190)
IONOSPHERIC DISTURBANCE — aurora DX — 50-Mc. opening to South America. Again, in February, 1950, this sequence of events worked out as in February, 1949, and almost exactly a year later. Sparing the 'phone DX Contest by a scant 12 hours, the predicted ionospheric disturbance broke on the morning of Feb. 20th, wiping out most of the long-distance propagation on our DX bands for several days. A brilliant visible aurora appeared in the evening, and a fine c.w. session was set up for 50-Mc. enthusiasts. VE1QZ, Halifax, VE3s AET, ANY, and BBX, and WS all the way from Maine to Virginia and across the northern part of the Middle West were in there making hay.

Then, on the following morning, true to expectations, HC2OT, Guayaquil, Ecuador, made his first U. S. appearance of the year on 50 Mc. It wasn't much of an opening; your conductor had just finished telling W1AW that he guessed nothing was going to happen, when HC2OT broke through for a few minutes starting at 9:37 A.M. EST. He was weak and wobbly, but reports were exchanged, and Steve went on to work W9ZIL, Terre Haute, Ind., at 10:07. No other signals were heard at either end, so far as is known.

News of this got around fast, and the 50-Mc. band was loaded on the morning of the 22nd, a holiday in many quarters, but the cats watched the hole in vain that morning. There were mild bursts of aurora on the evening of the 21st and 22nd, and a more pronounced one early in the evening of the 23rd, setting the stage for another South American session on the morning of the 24th.

This one was it! The 10-meter band opened with a rush, signals from the South Americans building up to exceptionally high peaks at 7:30, and then dropping off quickly again, in a manner reminiscent of the behavior of 10-meter signals from Europe in the early-morning hours of October and November, 1947, when 50-Mc. openings were a daily phenomenon across the North Atlantic path. Arrangements were made with LU9EV and HC2OT to check 50 Mc. regularly, beginning at 8:15 A.M.

The early start was unnecessary, however, as the signals of HC2OT broke through at 9:36, just one minute earlier than on the 21st. After a brief exchange, with very weak c.w. signals, we tuned up the band to find LU9EV calling frantically, and the first contact on 50 Mc. between the Buenos Aires area and W1 was on.1 LU1BV was worked at 9:55 and LU8AQ at 10:12, the latter doing very nicely on about 50.6 Mc. The LU signals were peaking very strongly around 10:15, and HC2OT was booming through like a local. The South Americans found only a few U. S. stations active, however. HC2OT worked W8IPZ, Olmitz, Kansas, for state No. 26, and W6OIS and W6JOL, both of Iowa, in addition to W1HDQ. LU9EV worked W1HDQ, WS6MS, W6OIS, and W8IPZ, in that order, with W8IPZ the last station to fade out, about 11:30 EST. WS4MV, Cilo, Mich., reports reception of LU9's 9EV, 1BV, and 9MA, with signals heard until 11:50 A.M.

Some interesting things have shown up as a result of the growth in 50-Mc. interest in the various countries of South America. Below the Equator, December and January are the seasonal equivalent of our June and July, yet these two months exhibited very little in the way of 50-Mc. openings. Through most of February, however, the 6-meter band was open practically every night for the 50-Mc. enthusiasts of Argentina. LU9EV reports 50-Mc. contacts with countries in the northern part of South America or with Central America on Feb. 6th, 8th and 10th through 20th. Stations worked included YV5AC, YV5AE, YV5B, YV5BE, OA4AE, OA4BG, PY2QK, PY1LQ, and TI2AFC. HK1HQ was heard on two occasions.

This series of 2000- to 3000-mile openings was interrupted when the ionospheric disturbance broke in this hemisphere, and was not resumed until the night of the 24th. In fact, it appeared that the resumption of the evening openings coincided with the break-up of the 4-day disturbance in this hemisphere. On the night of the 24th, LU9EV worked TI2AFC, YV5AE, OA4AE, and XB1GE, and heard HC2OT. HC2OT worked TI2AFC, for country No. 13, and YV5AE. He heard YV1AU, apparently a newcomer. On the night of Feb. 25th, LU9EV worked PY2QK, YV5BE, HK1HQ (probably the first LU-HK 50-Mc. QSO), TI2AFC, YV5AE, OA4AE, and OA4BG. Contacts with these areas

1 Previous W1-LU contacts were with LU9MA, Mendosa, some 600 miles west of Buenos Aires, in Oct., 1949.
were repeated on the 26th and 27th. HK1CA and YV1AC were heard also on the 26th and 27th. HC2OT made the first HK-HC 50-Mc. contact (for country No. 14) on the 26th, and also worked T12APC, XE1GE and TV5AE.

The evening openings occur regularly, the band opening at almost the same time each evening, around 7:30 to 7:45 p.m. EST. On the better evenings the signals stay in until 10:30 or so, and they are often of good strength, though frequently exhibiting considerable flutter. Since there is no evidence of high \( F_p \)-layer m.u.f. at such hours we assume that the \( E \) layer is responsible, but the nature of these nightly openings bears little resemblance to the sporadic-\( E \) openings of our summer months. The only similarity noted was that when CEIAH was active she was able to hear and work the LUs over the 850-mile path to the Buenos Aires area, a typical sporadic-\( E \) distance. But when \( W_5 \) ever finds it possible to work distances of 2000 to 3000 miles after night for two months at a time, in two periods each year!

And what of these 5000-mile chances we, in the northern part of the United States, are getting immediately following the aurora outbreaks? The \( F_p \)-layer charts indicate an m.u.f. of about 34 to 36 Mc. for \( W_1 \) to \( H \) and \( L \), though the time that the charts say m.u.f. is highest checks closely with actual experience. For more than a year now we have demonstrated the likelihood of 50-Mc. openings following auroral peaks, during the September-November and February-April periods, the days of which always have been at 10 a.m. local time. Whether these opportunities will continue through the lower phases of the solar cycle now approaching is an enigma that 50-Mc. men should find considerable interest in solving. Can we work South America in the evening hours, too? And what of the Lima, Peru, contingent — why have they not come through along with HC2OT and the LUs? We have plenty to find out yet about the 50-Mc. DX business!

**Around the World on the V.H.F. Bands**

Wiesbaden, Germany — DL4CK (W6YXH) had to go half way around the world to get a location not surrounded by hills, but he is now set up for business on 144 Mc. in a fine spot in Wiesbaden, where DL4XS and DL4JF are also active on 144 Mc. There are also a dozen or more German hams on 144 Mc., with only one of them not crystal-control. DL4XS has assisted nearly all the Germans in getting started on 2, and relations have been greatly improved thereby. There are also about 16 stations in and around Heidelberg, and some activity is in prospect in the French Zone, when and if licensing arrangements are completed. DL4XS has been heard in England on frequent occasions, and all the gang have high hopes of doing two-way work over much of Europe this spring and summer. For sked arrangements, write WOJO John P. Drummond, Hq. 1897 AACS Wing, AFO 635, Postmaster, New York. The Wiesbaden net frequency is 144.6 Mc.

Note from WIRWS, at the DXCC desk: 6 of the cards submitted by PA8PN for DXCC are for v.h.f. contacts — ON4FG, O2ADZ, F6GL, DL3FM and PA1CB on 144 Mc., and ZB1AC on 28 Mc.

**Arington, Mass.** — Tired of the frequent necessity for beam turning in the Sunday-night sessions on 220 Mc., \( W_1 \) CTW put up a 1-section collinear vertical, replacing his 8-element double Yagi. The new fixed system is outdoors and higher than the indoor beam, and it performs as well as the latter in every direction; better in some. Lots of parasitic elements are no great help in arrays for the higher v.h.f. bands in many cases, to say nothing of their deficiencies in round-table work. Cal reminds us that here is where vertical polarization pays off, too.

**Collester, Tenn.** — The possibility of the first Tennessee-Texas 144-Mc. contact looks as a result of the first contact between \( W_4 \) HHIK and \( W_5 \) DXB, Vivian, La., on Feb. 10th. During a QSO with \( W_4 \) HHIK, W5TTI, Jackson, Miss. called \( W_5 \) DXB on the landline to arrange a try on 144 Mc., and contact was established at 10:23 p.m. Though the distance is about 200 miles, Paul believes that contact can be made under any but the most adverse conditions. Vivian is in the northwestern corner of Louisiana, only a few miles from the Texas line. Any candidates across the border?

**Old City, La.** — The local activity in the Shreveport area has shifted from 6 to 2 meters, according to W5ML. Art says that \( W_5 \) DXB, JTR, NXM, and ML are on right along, with JFP, DC, and KK1 coming on soon. On Feb. 7th W5ML worked W5FXC, Houston, and W5ONS, Victoria, Texas, and heard several more at about 200 miles.

**Halifax, Nova Scotia** — One reason you don’t hear \( W_1 \) E102QZ too much on the cold nights is the shack temperature; during the aurora openings on the 20th-23rd, the coldest nights of the winter, Oscar was doing the best he could to keep going on 50 Mc., but operating in a room temperature of about 20 degrees is no great fun. So if you hear what sounds like automatic transmission some cold night, that’s what it is, with the operator dashing out for a look over the band now and then. If you can’t raise him, at least send along a heard report!

**Lakeview, Ontario** — Want a more readable signal on aurora openings? Try tone modulation along with c.w. Peters made by VESANY in a 50-Mc. aurora (now \( W_5 \) HIND) indicate that the tone modulation really helps. It is probably no more than a comparable increase in transmitter power, with straight c.w., but a definite improvement in readability does occur when the tone is added. Gordon’s unmodulated c.w. was about the same strength as other \( W_2 \)s, but with the tone added he really stood out. But do not use tone modulation without carrier keying; it simply is no good, unless conditions are such that voice is also readable.

**Perrysville, Mo.** — For a long time the only 2-meter contact available to W6QMF has been W8PVL, at Jackson, some 30 miles to the southeast. The St. Louis 2-meter net activities have been heard regularly in Perrysville, but

One of South America’s outstanding 50-Mc. stations, CEIAH, Chuquicamata, Chile, with Ida, CEIAJ at the operating position. Off the air while its operators are on a visit in this country, CEIAH will be back in business in April.

**April 1950**
The 2-meter array shown below was built by Warren Hill, W9LJP, in an effort to come up with a low-cost job that anyone could build. He calls it “The 60-er” because that figure represents its total cost (yes, cents), the only purchased material being some aluminum clotheline. Its driven section consists of three folded dipoles, stacked a half wave apart, and fed at the bottom with 300-ohm line. It may be used with or without reflectors, though the performance is greatly improved when reflectors are added.

Each half of the folded dipoles is 38 inches total length, and the entire driven portion of the array may be made from a single piece of wire. The frame is of wood, with the wires mounted on blocks of polystyrene separated from the frame by small stand-off insulators. The dipoles are 40 inches apart. Reflectors are spaced a quarter wavelength (20 inches) in back of the driven elements.

Going to greater numbers of driven elements may make it necessary to feed the system at its center to achieve current balance and optimum performance.

**Final Results — 3rd Annual V.H.F. Sweepstakes**

Right from the start, the V.H.F. SS idea caught on. The first one, held in January, 1948, set a record for a v.h.f. activity. The 1950 edition was more than double the size of the first; the final tabulation showing just short of 400 entries estes the V.I.F. Sweepstakes as one of the most popular operating activities on the ARRL schedule, bowing only to the Field Day, the regular Sweepstakes, and the DX Contest in the number of participants.

Much of the credit for the large turnout must be given to certain club groups whose organization work resulted in many new calls appearing on our v.h.f. bands. Several clubs were mentioned by participants, and the work done by the Amateur V.H.F. Institute of New York, the York Road Radio Club, the South Jersey Amateur Radio Association, the Frankford Radio Club, and the Midwest V.H.F. Club was outstanding. Each of these spared no effort to make sure that every possible member was active in the contest, and that his report, however small, was forwarded to Headquarters.

As might be expected, individual scores topped all previous records. Once again, the V.H.F. SS demonstrated that plenty of contacts can be made on our v.h.f. bands, without appreciable help in the form of favorable conditions. No openings were reported in any part of the country, yet hundreds of contacts were made over distances in excess of 100 miles on both 50 and 144 Mc.

The largest number of QSOs ever recorded in a v.h.f. contest was turned in by W6JBI, El Porto, N. J. Using 299 rigs on both bands, W6JBI handed out 329 numbers on 50 and 144 Mc. to stations in 9 sections, for a score of 1014 points. Second in this category was his fellow-member in the Frankford Radio Club, W3BES, Glenside, Pa., who had 215 contacts in 8 sections, for 4384 points. W5KKN, Willow Grove, Pa., gave Jerry a close run for the eastern Pennsylvania Section award, finishing just two contacts behind W3BES. The Eastern Pennsylvania Section, center of some of the keenest club competition, leads all other sections in number of reports turned in: 52, Southern New Jersey was second with 49.

There were some fine one-band scores, particularly on 144 Mc. Top man in this department was W2BV, Minotaur, N. J, with 171 contacts in 10 sections for a score of 3430, an all-time one-band record, and second-highest score in the country. W2VQ, New York City, was only one QSO behind, with 170 different stations worked on 144 Mc. and top place in the highly-competitive N.Y.C.-L.I. Section.

As might be expected, since they have the heaviest population concentrations to draw from, the W2s and W3s had the highest scores but the turnout in other sections was not too well represented in previous contests, was somewhat gratifying. As she has done before, Margaret Roberts, W8BFQ, Everett, Ohio, ran up one of the best inland scores, with 49 contacts in 8 sections, for 1098 points. W9TLK, Waukegan, Ill., covered his territory thoroughly racking up 72 contacts in 4 sections (in an area where sections don’t come as easy as in the Atlantic Seaboard) for the top score in the Illinois Section.

An intensive campaign by the Midwest V.H.F. Club was the principal factor in the fine representation in W9. The Rochester V.H.F. Group stirred things up in Western New York. Activity in Southern California was sparked by the Two Meters and Down Club, by sponsoring a local competition, with prizes won by W6NGN, with 124 stations worked, W6B9G with 112, and W6WKO with 100, all on 144 Mc. At least two portable set-ups provided hard-to-get sections. W5SIP/W7P provided West Virginians for 40 lucky 144-Mc. men, and W2PQ took his mobile set-up over into Western New York to give the gang a break. Ice storms and high winds took a heavy antenna toll in the Toronto area just before the contest, but there are 15 VE8s in the box score. Several of them did some fast antenna work to get back in business.

52 QST for
We've heard reports of unsportsmanlike tactics being used in some localities, but almost everyone reported a swell time, and the best contest ever. One thing is certain: v.h.f. activity hit an all-time high over that week end. The problem now is to encourage the many scouts brought to the v.h.f. bands. To stay there, v.h.f. contests are sponsored in order to provide a week end of fun for everyone; to increase activity and develop new friendships on our v.h.f. bands. Let's keep our eyes on these objectives, and so conduct ourselves in contests and at other times that these high aims are served.

The complete tabulation of individual scores follows, arranged by ARRRL divisions and sections. The final checking of club scores had not been completed as we go to press; the gavel winner and club standings will be announced next month. The columns give the total point score, the number of contacts made, the number of ARRRL sections worked, and the bands used—in A for 50, B 144, C 220, and D 420 Mc.

ATLANTIC DIVISION

| MD.-Del.-D.C. | Western New York | W3QNA | 489-50-4-A-B | W3KZ | 384-48-4-B |
| | | W3QCV | 998-82-7-B | W3MC | 672-55-6-B |
| | Eastern Pennsylvania | W3EPJ | 590-90-7-B | W3SXM | 1722-128-7-B |
| | | W3NYY | 8-4-1-B | W3KWS | 1722-118-7-B |

DeltA DIVISION

| Minnesota | W6FKX | 6-8-1-A |
| LouisianA | W6MEK | 84-11-4-B |

GREAT LAKES DIVISION

| Oakland | W8WJUQ | 32-6-3-B |
| Kentucky | W8WKE | 14-7-1-B |
| Ohio | W8WWJ | 12-6-1-B |
| Michigan | W8WJS | 4-2-1-B |

Hudson Division

| Eastern New York | W8QCA | 61-9-1-A-B |
| | | | W8KS | 324-53-5-B |
| | | | W8KF | 432-50-4-A-B |
| | | | W8MJE | 30-8-1-B |
| | | | W8QG | 341-39-2-A-B |
| | | | W8MJ | 314-37-3-A-B |
| | | | W8XP | 292-35-4-A-B |
| | | | W8QQ | 270-33-5-A-B |

Indiana

| W8R | 328-58-5-A-B |
| W8W | 382-34-4-B |
| W8NSF | 310-30-4-B |
| W8NME | 285-37-3-A-B |
| W8NLW | 245-15-4-B |
| W8UJA | 41-9-3-A-B-D |
| W8DOA | 4-2-1-B-A |

Wisconsin

| W8DR | 321-34-2-B |
| W8LW | 315-31-3-B |
| W8UJU | 174-20-3-B |

Dakota Division

| Minnesota | W6FKX | 6-8-1-A |
| Tennessee | W4HH | 32-6-3-B |

Central Division

| Illinois | W8TCL | 767-72-4-B |
| W8QGR | 452-77-3-A-B |
| W8VX | 450-75-3-A-B-D |
| W8WJ | 430-45-3-B |
| W8MW | 365-63-3-A-B |
| W8CW | 350-50-3-B |
| W8CR | 270-45-3-B |
| W8TR | 252-42-3-B |
| W8RN | 234-32-2-B |
| W8QAP | 210-35-3-B |
| W8WBS | 182-31-3-B |
| W8BH | 180-30-2-A-B |
| W8QND | 158-27-3-A-B |
| W8QSO | 126-24-2-B |
| W8WIL | 104-26-2-B |
| W8JKU | 140-25-2-B |
| W8WNO | 27-18-2-B |
| W8WJO | 45-34-1-A-B |
| W8BYB | 42-21-1-B |
| W8WJ | 40-20-1-B |
| W8MMV | 32-10-1-A-B |
| W8WNY | 30-15-1-B |

K.Y.O.C.I.-L.

| W2LQV | 2720-170-8-B |
| W2FJH | 2848-182-7-A-B |
| W2MV | 1750-125-8-B |
| W2YK | 1449-104-7-B |
| W2NH | 1442-103-7-B |
| W2QDJ | 1400-109-7-B |
| W2QDJ | 1232-111-7-B |
| W2LH | 1152-96-6-B |
| W2PK | 1120-80-7-B |
| W2HE | 1014-98-6-B |
| W2HWE | 1023-85-6-B |
| W2WJ | 984-88-6-B |
| W2WH | 695-81-6-B |
| W2U | 880-89-5-B |
| W2WJ | 880-85-6-B |
| W2WJ | 726-92-4-B |
| W2WJ | 690-66-5-B |
| W2WJ | 690-65-5-B |

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**Progress of a Ham**

Some years ago when I was a chap

I purchased an aural, put the crystals to rest,
And it didn’t take long to prove they were beat.
It would make signals louder, as well as detect.
In fact it was better in every respect.
I still sat up late but then I could boast
That I worked a town only a few miles away.

I built a loud coupler and spent lots of jack
For plate glass condensers to make the spark crack
I then got a license that gave me a call.
My tickets were plastered all over the wall.
I sat up all night just so I could say
That I worked a town only a few miles away.
CONDUCTED BY ROD NEWKIRK,* W9BRD

How:
Sleet storms, sunspot symptoms, rare DX (with a dash of QRM) — the 16th ARRL DX Competition had just about everything going for it but the kitchen sink. And one W4 says his XYL threw even that at him.

W1RWS and colleagues have their Hq. desks reinforced for the sharp rise in DXCC aspirations all around and QSL managers are already paying a heavy price in mail as card circulation reaches its yearly peak.

One quick listen across twenty as festivities reached a climax led WSYGR to surmise that amateur radio must have last reached the age of nuclear-ission-finals, turbo-jet beam rotators, and pressurized stacks.

Quite possible. Indeed, we saw Jeeves throw down the 'phones wearing an expression of sheer horror not long after the contest began. He swears he's kept hearing the c.w. kilowatt of one W1 draw in a deep breath just before it disappeared beneath each pile-up.

Well, we trust no one else cracked under the strain but there's no question that the going did get rough. We're still worrying about the Nevada W7 who couldn't take it any longer and was later heard trying to work himself the long way round for WAS.

Yet, DX appetites are almost above satisfying; perseverance below you'll uncover a crust or crumb over which to drool.

What:
During January and February, trans-Atlantic conditions appeared intermittently good on one sixty with activity centered on week ends. Ge 2FL, 2YS, 3FAB, 5JX, 6WQ, 6G3M, 8NF, G0JUB, G8UUM and EK1AO have been well heard on our side and W1BIB lists in addition the following who are known to be on and striving: Ge 2FLK, 2UF, 2IF, 2PH, 3BOF, 3BTP, 3DOX, 3KF, 3ZP, 4OB, 6AB, 6AT, 6LB, G8UUM, G8WBJ, D12DY, E1SET, O6s 1AA, 1AE, 1AM, 1AWA, 1CA, 1HB, 20L, H21KE and P77WS. KV4AA is also quite active on the band.

Most of this activity is c.w., of course, but phone 'two ways have elicited during peak periods. W4NNN, who has his share of the LF DX collected, rigged himself a balloon-supported 1.8-Me, half-wave skywire but the band failed to open properly in this instance and just KV4AA (1955) was worked. Among the many North American participants in this department were W1s EFM, OE, PLO, Ws 1G, L1L, W4NNN and VE1EAA plus, of course, W1BB who is a student of 160-meter propagation of long standing. In fact, W1BB has gear to hit just about every band assigned to amateurs, including much of Ed Tilton's standing bands.

ZL1CI gives us some support on the eighty proceedings. Down Under and has QSOs listed with TG9RB, F4BQ, JO, VE6s BV, RF, KV4AA, VB2s BC, BM, BL, BU.

*DX Editor, QST. Please mail reports of DX activity to W9BRD's home QTH: 1117 Fargo Ave., Chicago 26, Ill.
YO3RF, ER1TY, EA6AF and UB5BK .... W5DF discovered that his vertical 5-element beams exhibit considerable gain and directivity on 40. (Because the 33-foot elements are tuned on 30 by tanks with one end directly grounded the job becomes a 3-element Marconi with very close spacing on 40 — neat trick!) Art’s report gathering fears of ZB1AX, TAZGVU, C64AD, VPEFV and nearby ZS folk. — — — Contacts dial twirling by W6ZOL netted him a nice collection in CR7BY (7022), HZ1KE (7010) and CT2AA (7030), which three were heard, as well as contacts with C64AD (7018), PT2AFW (7002), V2SM2 (7050), V56BK (now QWO), K6ZSK (7018), J43AF (7030) and J4AAI (7050). This with a mere 70 watts. Reger has a new 7-Mc. half-wave vertical ready for production, too.

That familiar snappy fast and agile break-in so often heard on 14-Mc. c.w. belongs to the gentleman shown here, busily engaged in the pilot seat of EABBC. (Photo courtesy W9UOJ)

Twenty, a little more like its old self these warmer days, has had FB8XX (14,020) as the subject of much rapt attention. QSL via F8IES for this natty number, says W7YY who also captured ZS7 3R and 9X. If you haven’t heard, FB8XX is on from the Kerguelen isles, not Madagascar. — — — GIBUR mentions OX3BR and OX3UR as being with a Danish expedition to Fuerland near the Pole (both near 14,060) and W0GEL uncorked a nice one in YS3DYN of Baghdad (14,003) — — — EASCBC (VFO), CPH1Q (14,000), CR71Z (14,003), HI1TV/Trieste (14,003), UQ5AB (14,000), UF6AC (14,003), HSB (14,002), VQ4GW (14,040), VU5LX (14,085), TA3GYN (14,090) and YO2BU (14,042) enhance the log of WBPV8 while W5FXN surrounded K58AF/KM8, Y2BC (14,060), K5XBA, VP3RF (VFO), TF5MD (14,013), CT3AB (14,015), VP8LE (14,001), H1LBJ (14,003), J2CXX and ZD8B betwixt stabs at 3.5-Mc. stuff. — — — Time was when you could get a goodly lunch of DX men together and eliciting a loud chorus of “Yes, We Have No Bananas,” but W9YCR knocked off three last ones, VP7a NU, NM (14,115) and NN. WCOK, a long-time DX chaser, was heard sipping the bug from the latter during the DX Test. Gosh, these February—March jaunts to those pleasantable isles are getting to be quite an institution — — — K25WZ is quite enthralled by evening Asians, such as PK1H, and notes that neighbor HR2H2 (14,050) sets the band a-hoppin’ whenever he opens up with his 50-watter — — — WJCGU is back at it again and is strung by the absence of the many S5’s that once inhabited 20. Ralph made off with FF6JC (14,000), F5EAB (14,000), VP2FC (14,010) and some OEs with his venerable 40-meter Heag. — — — W8AND painted UPE2BC (14,100). Number 171 but missed VK3KAA near the same QRG while W8BRA knocked off the elusive CR1FA one mor. — — — Rural antenna farms have their disadvantages says W0GJMZ in recounting the trials and tribulations of maintaining a dairy herd near Do Raleigh, Ill. Paul found time to chat with OQ5DC (14,100), ZB2I (14,070), ST2TC (14,020), ZE2KF (14,125) and F9QY in Corsica. The latter functions on flea power so you may have to turn on grand—father’s electric blanket to warm him. — — — WA3M is charter member of the “Society for Promotion of More G.W. Activity in 288” and recently managed UA6A AA, AC, V8s0 AC, JH, HS1BS and CR9AQ. — — — W5BWW reached 138 with xfer of Z64WNH to Y28RC while W4QYY identified CT1HIT as ex-CR4HT and VS1C as ex-VK5SC. JB hears that ACSSQ QSLs are beginning to dribble through to fortunate parties.

That lair of rare DX, ten, is still producing results on large scale. WR6YS has here some delicious offerings such as F6’s 3CN, 8PG, KK9s BA, BH, KG6s FZ, GA, KJ9F, KM6AO, KR8AS, VQ4s RF, NSH, ZDz 2D, 4A, OQ5A0, HB1QC (Liechtenstein), CT2AE, TAJ3VU, YK1AC and ZS6O. — — — W8NDB added VP1BOY, 7W9WB, OE7FR and VQ4ERR while W1RPC was collecting MT2BCF, MP4BAO, ZC8s JM, UNJ, KG6IE (Ivo Jima), ZE1JE, HZ1AB, VU2CQ and LX1CB. — — — A homebrew artist of the old school, W7YCU secured his WAC diploma on 30 waves. The rig is self-constructed right down to the winding of the power transformers, a detail worthy of note in an era of handy supply houses and relatively inexpensive gear. — — — PZ3RZ of French Togoland was giving 10 phone a go according to VQ4ERR, and W9AND discovered some choices c.w. activity in SP5ZPZ (ex-SP5XKA), CR4AC and GD3FOC.

Where:

The Chief Signal Officer in the U. S. zone of occupation in Germany desires that all QSLs be bound for DLI amateurs go via regular foreign mail. The German postal service is reported to be very good. This from WTR2D who has it that amateur licensing in said zone has been taken over by the Deutsch Post while DLI’s were recently required to recoup their tickets. — — — Here’s the address of the new QSL bureau for Alaska: ARR LK7 QSL Bureau, Box 73, Douglas, Alaska. — — — Now take a big drink of water and start licking stamps for the following:

CR7BY Antonio L. Figueredo, P. O. Box 276 DSTA, Laureano Marques, Mozambique

CT2AE Santa Maria Airport, Santa Maria, Azores

EA8AN J. R. S. Montero, 76 triana St., Las Palmas, Canary Islands

EA0AI Dr. A. More, Calle Ejercito Espanol, num 1, 1v, Melilla, Spanish Morocco

FVQY

FFSC

F5RLE

F5J8C

FR3AD Louis Garbe, Aerodrome- LaTentoures, Nouvelle, New Caledonia (ex-5F22F9/5F8J/5F8J8P, B5C1, Port-de- France, Martinique, F. W. I.

HP1GR Carol Glickenhaus, Box 135, Panama City, Panama

JAI2PM Senator BOQ, FEAMCOM, APO 323, 5% PM, San Francisco, Calif.

JAI2VC Civ. HSG, FEAMCOM, APO 323, 5% PM, San Francisco, Calif.

KR9CA L1KWC

MD2AC APO 321, 5% PM, New York City, N. Y.

MD2AF APO 321, 5% PM, New York City, N. Y.

MD2AM APO 321, 5% PM, New York City, N. Y.

MD2BD J. W. Bully, British Forces Broadcasting, Tripolitania

MT2BFC % BOAC, Tripolitania

MT2J MT2PW % BOAC, Tripolitania

OQ5NE % BOAC, Tripolitania

PK5Z P. O. Box 88, Leopoldville, Belgian Congo (via VR7LZ)

Y83MC A. L. Portela da Costa, Rua Rodrigues, Fernandez 197, Sao Luis, Maranhao, Brazil
VPRDG
Dean Goddard, Lower Bay Street, Bridgetown, Barbados, B. W. I.

VP7NM
Box 362, Nassau, Bahamas, B. W. I.

VW2Z
Post Office Box 7, APO 964, BM Federation, Stuttgart, Wash.

VQ1CUR
(to VQ4CUR)

V82MI
(vis V82A)

VT1RF
R. B. Fugus, Kuwait Oil Co. Ltd., Kuwait City, Kuwait, Persian Gulf

W6ABL/EZ7
APO 945, 8% FM, Seattle, Wash.

YB3DYN
(vis RSGB)

3V8AP
M. Lissner, 77 via Rue Courbet, Tunis P, O. 155, Tunisie.

With no necessity for long white beards, W5s CNU, NLM, OGD, W2s CIX, ZVS, W4PJJ; W5s AJG, FXN, GEL; W6s ZOOL; W6s CXXN, DAW, WWU, YGR; W6s CFT, GM2, UBP; MT2E -- all played Santa Claus on this deal.

Tidbits:
That Galapagos expedition is about to occupy all time now. Quoting one of the planners, HCR2FR: "We shall be leaving Guayaquil April 3rd and may operate maritime mobile on the way out if the Navy gives us permission. In any case, we expect to be on the air in Galapagos on April 7th. We shall operate around 28,450 and 14,150 kc. There is just a possibility that the expedition will divide into two groups which means that we would be on the air by 17th. We are going to operate as HCR, HCS, HCD, HCGC."
Better get your modulators functioning as John also remarks that the two 2V1 rigs may not see much e.w. operation. -- When Italy resumes administration in Somalia, WST2RJ opines, the place will be much more difficult to work, primarily, at least, by presently-active MD4GC, MD4TH, and MS4FM will be QRT. MS4A is the sole Italian national now active. MD4GC has been serving as controller of posts and telegraphs there for some time now. Those LIs mentioned previously turned out to be portable-mobile authorizations, still quite rare on the higher frequencies. -- W5LFM just became GD in the person of JA2FM and has a Stanvac ST202A 100-watt warming up portions of 10, 20 and 40 c.w. K1BYC is newly-licensed J4YV in Cal's neighborhood, preferring 10 phone. -- CE4AD has undertaken quite a project in going after his WACC; W6s in rare California counties take note. -- W6ZOOL heard from W6WD that VS6ER is QRT for reassignment, possibly VQ4. -- Instead of a return QSL from HA3PB, W8DEA found in the mailbox an SWL ver for reception of Radio Budapest. That seems to happen quite often in QSL deserts with some European countries. -- W4MR and KV4AA are among the gunners drawing beads on the Kerguelen gang. Dick hears that FB8ZZ is on Amsterdam and FB8XX on Adelle with a new station soon due to open up on Wallis Island's territory. Be the latter, FKSAB adds that the call may be FK0 or FW5. Though this isn't on the Countries List now, the chances of its addition look good. This archipelago is situated near the Date Line in the center of the Fiji-Samoa-Eille triangle. -- FKSAB desires to express his deep thanks to the W gang for services rendered and property shown, especially WSJTC and W7RT, who gave John much valuable encouragement and assistance in the line of material and instructions. FKSAB declares that the good will demonstrated from these quarters much more than made up for rough treatment on the air at the hands of some of our more avaricious brethren. -- CZ1DF dropped us a rather anonymous card to offer apologies if his call aboard ship caused any difficulties on 14-Mc. c.w. Well, most of us can spot the usual ship QRI as a rule; yet, there may have been a few false hopes raised. He's not a Yank and had no skullduggery in mind, however. We hope he and others engaging in similar operation will descendend to append "MM" to their calls to simplify the score on these stations. -- SWL John De-Meyer of Lansing has an assurance from AC4NC that all stations who send him cards will sooner or later receive QSLs in return. Chak is having the usual tough time experienced by much rare DX in scrapping up printed stock. -- Down under, VK3ZP, with an S13 and accessory gear all set to go, is a twiddlin' his thumbs -- no a.e. having as yet been run out to his QTH. ZL2AFZ drew a contract to

our winter snows in writing of excessive heat with frequent brush fires in the Naper vicinity. Recovering not long ago from a sprained ankle, George is again slipping the 14-Mc. bug in the usual fine style. -- VK3AMR is all set to go as VK9MR in Madang, New Guinea, with a 40-watt 807 and a BC-342N. Max intends to give the W/VE population a good break and expects to return a little consideration during his schedules with VK3 -- none of that "VK9MR DE so-and-so HR QRX PSE" baloney on the frequency. -- WIRWS who nabbed his No. 100 a short while ago, sees that "Phone Honor Rolls VQ53RR received QSLs from such as G9UVP, VT5PF, ZV3AP, V00GRL (Sayelles), UJ3KKA, UN1AB and Z8A, all A3 confirmations and Robbie adds the opinion that the 20th-phone FNXD is unsavory. Also, FNXAD's call has been misused on 14-Mc. A3 although there is a legid AD active. That Sayelles entry certainly is prime -- leave, dig that up 1925 QST and forget that new fangled loop modulation another try, eh? -- Our mention of the HIL card pile-up brought a few responses according to W1IHE. Now Dick would like a line on ex-DL2OU for similar purposes. -- If you mailed Z6OMJ on dates February 2nd through 8th you'll have to reapply for a QSL. A mail plane crashed and burned with outgoing pasteboards aboard, a fate to the expectant DXers worse than chronic TVI. -- That footed W2AIS (ex-ZC82P) is on the prowl once more. Guess the home-stand type of DX gets a little tame for the likes of Pat. W2E5O advises the boys to keep an ear out for W2AIS/MM on 28 Mc, while he indulges in a long voyage to Far Eastern ports. -- Heavy work schedules set up for U.S. Naval personnel keep our CN8 representatives too busy to do much about the formation of a proposed ham club in French Morocco, remarks

One of the first postwar and still one of the most consistently heard of our Trieste brethren, lINU/Trieste continues to keep himself popular on most DX bands. (Photo courtesy W8IFS)

CN5EB. Quoting further, "We all operate from the same Quonset hut with the exception of one or two of us. The receiving set-up is an SX-28 with a DB-20. On the transmitting end we have several rigs set by former amateurs and several of the homebuilt variety. The antenna is a V beam, 10 wavelengths per leg on 14 Mc, centered on Washington, D. C., same being initiated by CN5BQ. Harry's account of per-band activity there has CN5Es D/B, ED, and EW stacking pretty close to 10 meters while CNSs EL and ET sometimes give 20 and 40 a whirl. CNSs EA, EM and EQ, or at least the previous holders of these calls, have since journeyed elsewhere. Incidentally, all CNSs stations answer to the mail QTH of Navy 215, Box II, 2% FKO."

(Continued on page 180)
A High-Frequency Crystal Filter

Selectivity for a Converter/BC-455 Receiver

BY KENNETH P. LANGE,* WØBEN

* Looking for an inexpensive receiving system for 6, 10, 20 or 40 meters? If you are, here is a way to approach highefficiency performance with a converter and an inexpensive surplus receiver. The trick is in putting a crystal filter between the converter and the BC-455.

A converter ahead of a BC-455 receiver makes a good inexpensive receiving system for 10 and 20 meters, and many of these combinations are in use throughout the country. If the converter is a good one, the system leaves nothing to be desired in the way of sensitivity, and images are no problem, but the selectivity is not adequate when the bands get crowded, as they usually are. After a lot of thought about adding a Q5-er or a crystal filter to the BC-455 and finally deciding against it, we came up with a simple answer that we would like to pass along.

The reasoning went something like this. If adding a Q5-er or crystal filter means a lot of work (and it does!), and you can’t get enough selectivity with anything you can do to the converter, how about adding something between the converter and the BC-455? I knew of no articles or information on high-frequency crystal filters, but the idea seemed promising. The dope in the Handbook on crystal filters was studied, the soldering iron was heated up, and an output filter was built. The results surpassed all expectations, and the little converter/crystal filter/BC-455 receiver now gives a good account of itself in any ‘phone or c.w. QRM we run into. Where before the best we could hope for was to work the loudest ones, we can now comb out the weak ones alongside the loud signals without any trouble at all. QRM can be “phased out” just as with a low-frequency crystal filter. No special crystal is necessary — several different ones have been used — and the whole unit costs much less than a five spot.

Construction

The circuit in use is the usual one converted for the higher frequency, and is shown in Fig. 1. As in a low-frequency filter, C4 controls the “selectivity” and C3 the “phasing” or frequency of the rejection notch.

The photographs show the construction of the filter. This particular unit is built in a 3 x 4 x 5-inch metal box recruited from the junk box along with the other parts. The input and output portions of the filter are separated by a metal partition in the box. This shield can be seen in one of the photographs, and it is indicated by the dotted line in Fig. 1. Its purpose, of course, is to minimize any “straight-through” coupling between input and output, since it is imperative that the only coupling be through the crystal.

Defunct broadcast i.f. transformers were used to house the two sets of coils. The coils were wound on the original forms and the original condensers were used for paddles. If old transformers aren’t available, the coils can be wound on ½-inch diameter polystyrene rod and tuned with mica compression condensers. The phasing condenser, C6, must be insulated from the chassis, preferably without too much capacity to the chassis. The circuit LC1 and the circuit LC5C6 should be capable of resonating either side of the crystal frequency. The crystal frequency is not too important, except that it must be the same.

An output high-frequency crystal filter for adding selectivity to a converter/receiver combination. The controls are phasing control, crystal switch, and selectivity control.
as the output frequency of the converter and within the tuning range of the BC-455 (or whatever follows the converter). The unit was first tried with a home-ground 6.8-Mc. crystal, but a harmonic of the BC-455 oscillator fell in the 10-meter band, and an 8-Mc. FT-243 crystal was tried and found to work as well, after the circuits tuning only the unit itself. The four tuned circuits are: output transformer of converter, input transformer of filter, output transformer of filter, and antenna input of receiver. All four should be tuned where maximum sensitivity and output is desired or is necessary. Some receivers have a front-panel antenna tuning control and this will make it unnecessary to bother with the receiver padders or trimmers. Needless to say, if you are not familiar with the converter and receiver circuits and trimmers it is best not to attempt tuning these units. Peak the tuned circuits for maximum noise or by observing the deflection of the tuning indicator.

With C4 at maximum capacity, throw S1 to the position that will put the crystal in the circuit. If the tuned circuits are near resonance the filter

![Diagram](image)

**Fig. 1** — Wiring diagram of the high-frequency crystal filter.

- C1 — 200-μfd. mica trimmer (see text).
- C2 — 10-μfd. variable condenser.
- C3 — 30-μfd. mica condenser.
- C4 — 75-μfd. variable condenser.
- C5 — 150-μfd. mica trimmer (see text).
- L1 — 10 turns No. 20 push-back wire wound over center of L2.
- L2 — 42 turns No. 22 enameled close-wound on 5/8-inch diameter form. Center-tapped.
- L3 — 35 turns No. 22 enameled close-wound on 5/8-inch diameter form.
- L4 — 10 turns No. 20 push-back wire wound over ground end of L2.
- S1 — S.P.A.T. toggle.
- Xtal — Transmitter-type crystal. Converter output frequency.

had been retuned. Naturally if you want to retain the calibration of your converter, a crystal should be used that is as close as possible to the original output frequency of the converter. This system works only with tunable converters and not with the crystal-controlled units.

**Using the Filter**

The first step in getting the filter to operate is to connect the converter output to the input of the filter with a shielded lead. The output of the filter connects to the regular antenna connection of the receiver. Throw S1 to the position that shorts out the crystal. At this point strong signals should force their way through the filter, even though the coils have not been tuned. One must make sure that the receiver is tuned to the frequency of the crystal. This can be done by observing the point at which the crystal is tuned in on the receiver. It may be checked before the unit is built, in an oscillator circuit of some kind, or the calibration of the BC-455 can be used for a first approximation.

Begin tuning the unit by adjusting C1 and C5, with C4 meshed at full capacity. If you have access to the tuning trimmer or condenser on the output transformer of the converter it is well to touch up this circuit. Actually there are four tuned circuits to consider in tuning the unit, although the filter will work satisfactorily by should add little selectivity to the receiver, and there should be only a slight reduction in audio output of the receiver, possibly not enough to notice. The phasing condenser, C3, should be set at about half capacity for the present. If the filter seems to sharpen the signals considerably (as characterized by a great reduction in background noise, signals and noise having a "ring" or "ping" and voices sounding low and muffled) repeat the input and output transformer leaving the crystal in operation. Tune until the signals sound normal, otherwise the filter will be over-sharp when tuned for "sharp." When the signals appear to be sufficiently broad, decrease the capacity of C4 and immediately the set should take on the sharp characteristics noted before. It may be necessary to go over the tuning a number of times before arriving at a satisfactory setting.

Only practice with the filter can teach one the (Continued on page 118)
Some months ago we promised to give some figures on the relative popularity of the two methods for generating a single-sideband signal. A quick check of the tally sheet shows that users of the phasing system outnumber the filter men by almost exactly 2 to 1. One interesting point that shows up is that the first man on in the call area often sets the pattern. For example, the W3s, W6s and W8s are practically solid with phasing rigs, while the W3s, W4s and W6s concentrate on filter jobs. Thus much can be traced to the influence of W2KUJ, W2UNJ, W3MBY, W6YX, W6TQK, and W9MN. Dunno if this proves anything, but you might be able to make something out of it. And that 2-to-1 spread isn't to be construed as a final verdict on the merits of the two systems — we’re only reporting what the record shows. The single-sideband gang will be very sick indeed when it stops arguing, or at least discussing, the merits of the two systems.

Further dope on SMSQV is that he has been on since March, 1949. After several modifications the rig ended up with an output 807 as mentioned last month. The frequency-control system is the double-conversion method in use at W2NJR and mentioned in the December column. Contacts so far have been only with near-by European countries on 80 meters, with lots of time spent in instructing the fellow at the other end on how to tune in a suppressed-carrier signal.

Out in Vancouver VE7VP and VE7AFO are both on with phasing jobs. The rig at AFO uses 6SN7s in the balanced modulators and ends up with about 300 watts to a pair of 811s on 3755 kc. At VP the exciter follows the W2UNJ unit, with 6AG7s in the balanced modulators, but is band-switching for 75, 20 and 10. With 120 watts on 75 KL7LJ and JA2AZ have been worked, and on 10 with 400 watts peak the DX is VK3APX. As others have found out, lack of receiver stability on 10 makes it difficult to find stations that can hold the signal, although receivers with crystal-controlled converters do a neat job and give no trouble.

Bert Baumgardner, in Omaha, has had W6AGS on 14,220 kc. using a filter job ending up with an 807. The W9MNN filter is followed by two frequency conversions, and Bert points out that a BC-455 came in mighty handy in setting up the low-frequency channels of his rig. With the 10 watts output, nine contacts have been made with W6KAG, W3MBY and W7LWB, including a four-way one evening on what amounted to practically a dead band.

Out in Portland, Lee Campbell, W7ADE, is using a rig on 75 and 20 patterned after the W3LOE rig in the November, 1948, issue of QST. It ends up with an 807 tube, with provision for using another in parallel, and drives a pair of 757s to 250 watts peak. Plug-in coils facilitate band changing.

The newest one at the Antipodes is VK2AC in Sydney. Active only on 7 Mc. so far, he has a two-stage crystal filter on 5180 kc. and after one conversion the signal ends up in an 812 running 80 watts. 2AC holds that a rig of this type is the simplest yet and easy to get going. DX so far has been just around the corner, with lots of time spent in educating receiving operators.

Second station on in Wisconsin — W9BVU was the first — is W9OUT at Kaukauna. “Hub” uses four 6V6s as balanced modulators in a W3UNJ rig on 75 to drive an 813 to about 175 watts input. To quote his letter, “... I can’t praise [s.s.b.] enough. It is so far superior to any other method we amateurs have that it is really a shame so few are taking advantage of it. ... And, when you come right down to it, a rig for s.s.b. is actually cheaper to build than an a.m. station, for the same effective power.”

Leonard Nay, W9AMY, is on 75 from Elgin, Nebr., with a phasing rig patterned after the one described in QST last August, with the addition of the crystal-oscillator stage on the same chassis. Being on a small ranch with gas-generator power limits the maximum power, but the rig ends up with a pair of 1626s.

A nice letter from W7IKY in Seattle tells of his latest activities on 75 with the now-revamped phasing rig. Most of the effort has been toward simplification, to demonstrate to the gang around there that s.s.b. isn’t so tough. Following 6SN7 balanced modulators and a passive audio phase-shift network, IKY uses a BAG7-815-2 x 811 r.f. amplifier. A voice-operated control relay has also been incorporated, to provide rapid break-in. Copies of the circuits in use have been hectographed and sent to interested a.m. men who have been bitten by the bug. A lot of time is spent in wandering around 75 and showing the a.m. gang what s.s.b. will do, but trips to the high end have paid off with a number of East Coast QSOs. Other DX includes K3Zs, KH6s and VEs.

Almost 20 years to the day that Al Prescott, W8DLD of Lyndhurst, Ohio, started on 20 ‘phone he scrapped his a.m. gear and went whole hog on s.s.b. The result is that Al has separate phasing rigs on both 75 and 20 with all the trimmings: carrier reinsertion, sideband switching, voice-controlled break-in, low-pass audio filters in the speech amplifier, and a wealth of experience. For receiving he uses two HR6s and two YRS-1s. You can find him on 14,203 around
noon on week ends and on 3999 on Sunday nights. His early experience with linear amplifiers on a.m. phone has stood him in good stead with the present p.p. 800 amplifiers.

Incidentally, you might be interested in the voice-controlled break-in the gang uses so effectively on 75 and sometimes on 20. The usual pattern is to pick off some of the audio from the speech amplifier, build it up through another stage and then apply it to a 6H6 connected in a voltage-doubling circuit. Plate or screen voltage to the keyed oscillator or amplifiers is fed through a dropping resistor and a series VR tube. The plate of a triode control tube is connected to the junction of the resistor and VR tube, and the cathode of the control tube is grounded. The output of the audio rectifier is applied to the grid of this control tube. With no audio through the circuit, the triode conducts and draws down the voltage at the VR tube anode below the value that will allow the VR to conduct. When audio comes through the speech amplifier and is rectified, the negative voltage developed at the rectifier is applied to the control tube and allows the VR tube to pass current to the oscillator and other controlled circuits. A condenser across the audio-rectifier load resistor "holds in" the voltage between syllables, and its value determines how long it will hold. When adjusted properly, it is very difficult to tell by listening to the signal that voice operation is being used, but the speed break-in and side remarks are a sure tip-off. At W5DLQ the receiver is blanked during transmitter-on periods by rectifying a little r.f. from the oscillator and applying the developed negative voltage to the receiver through the a.v.c. line. At W3ASW audio blanking is used.

— B. G.

Members of the Santa Barbara (Calif.) Amateur Radio Club are cooperating actively with other hobby groups to establish a permanent hobby center in that city. The goal of the hobbyists is a civic building which would provide quarters, workshops, and an auditorium for use by their respective clubs. Presenting a united front as the Santa Barbara Hobby Assn., Inc., the groups have already purchased a site for the center. The officers of the association include James L. Holmes, W6REK, president, and Leon A. Bartholomew, W6ILC, corresponding secretary.

Caution to BC-610 users: A 400-volt potential to chassis exists on the grids of the 100-TH modulator tubes even though the transmitter's interlocks are operative. — Ben S. Gans, jr.

ONTARIO — Annual banquet of the North Shore Radio Club of Oshawa, Ontario, Canada will be held on Saturday, April 15, 1950. Come one, come all to the big festivities in the Genesee Hotel. Admission $2.50. Write Doug Hinton, VE3AZG, for tickets and additional information.

QST is soon to be available on microfilm. Primarily for libraries, University Microfilms will produce positive microfilm copies of each volume of QST at a cost comparable with that of binding the same material in a conventional library binding, assuming an edition of 30 or more. Sales are restricted to those subscribing to the paper edition, and the film copy is distributed only at the end of the volume year. Interested parties should write University Microfilms, 313 N. First St., Ann Arbor, Michigan.

April 1950
WELL SPOKEN!

Apt. 303, 3324 Buchanan St., Mt. Rainier, Md.

Editor, QST:

I become increasingly disturbed as I read more and more letters and articles in the several amateur radio publications claiming that amateur radio is certain to perish unless (a) through experimentation we immediately develop in our ham shacks, using only screwdriver and pliers, a new electronic device or system that will surpass anything well-equipped private industry or government labs can produce, (b) we expand our regulations to include as many volumes as the New York City building code, (c) we make it necessary to have a "Ph.D. in amateur radio" to obtain a license, or, (d) we hand together in tight-knit cliques such as DX man, traffic man, v.h.f. man, "phone men," .s.w. men or the like, and have intercourse only with those in our own little group.

Yes, I am quite disturbed. Admittedly, in these days of rapid development, we must be specialists in order to survive and succeed in our vocations. I specialize in advertising representation. Others specialize in other fields in order to bring home their share of the bacon. But why do we have to carry over this tense, nerve-wracking fear of being left behind in our hobby, which is supposed to relax us?

When I come home to relax with a hobby, I don't want to extend my business worries into worries of what I must do to keep my hobby in the public eye (a form of advertising)!. I don't want my hobby turning into the same mad rat-race as is found in the business world.

I think these cries of what we must do or perish come from those who allow the competition of their daily battle for the bacon to carry over into their hobby, and I say it isn't healthy. Let's relax and enjoy our hobby for the fun thing it is and cease these tired TV-moving melodramas about how we're going to pot. I'm having just as much fun as I did 12 years ago, when I was first licensed, and I feel neither decedent nor extinct!

-- James C. Moulton, W8ILD

STRANGER THAN FICTION

P.O. Box 360, Grimsby, Ont.

Editor, QST:

I ask you to cease using titles on QST articles that have nothing to do with the article whatsoever. For example, while looking through the index section of the December issues for an article that I vaguely remembered, it became apparent that you positively lean over backward to disguise the radio matter hidden in some of the articles. I quote from the October, 1948, issue a title "The Eyes Have It." What have they -- trachonas -- or did I accidentally pick up a medical journal? Maybe I picked up the Journal of the United Undertakers Association, issue of January, 1949, as I see the title "The Black Box." Titles such as this leave it all to the imagination and when the title "Deep Freeze" appeared in your April, 1949, issue I get the impression that I have had it.

However, taking a cue from "Relax Men, Uso Haywire" in the May, 1947, issue, I proceeded through the index further and come to the "Little Slugger" in your February, 1949, effort. This gives me new hope and sure enough a title "A Halo for Six Meters" appears and I realize that someone after all may be looking after me and the six-meter men; they need it.

"Tom Thumb" in your September, 1945, issue made me realize, after reading the article, that maybe fairy tales were the order of the day after all and that perhaps the whole thing was a "Hum Bug" as quoted in October, 1949. Oh, well. I'll take a little "Dixie Jones Owl Juice" from the February, 1948, issue and end up with your best effort to date which appeared in December, 1945, simply as "Gawp.

-- William H. Gillet, V2EAGS

HANDEL-TALKIE

4545 Augusta Blvd., Chicago 51, Ill.

Editor, QST:

The article, "A 10-Meter Handle-Talkie," in your July, 1949, issue was of considerable interest. By virtue of my employment, I am able to give you some of the history regarding the origin, in 1941, of the trade-mark Handle-Talkie by Motorola.

Don Mitchell, in 1941 our chief engineer, invented a miniature radiotelephone unit complete in itself and which could be held in one's hand, or carried by means of a strap fastened to the unit. The design was an immediate answer to the armed forces' urgent need for a small radiotelephone unit which could be carried easily by combat forces.

The trade-mark Handle-Talkie was coined for the set, and so it became known throughout the world, although in Signal Corps nomenclature it was "BC-611," for a company's trade-mark could not be applied directly to its products of this character manufactured for and used by the armed services. Handle-Talkie is being trade-marked by Motorola, Inc. The trade-mark actually applies to and should be used only in connection with that company's equipment, rather than becoming a generic term to denote any and all kinds of portable, hand-carried radio equipment.

I feel that you and your readers will be enlightened by this little story because, to my best knowledge, the information has never before been published, although many articles have been written about Motorola's Handle-Talkie unit.

-- W. E. McNatt, WA6NPK

LOW POWER

111 5th St., Garden City, N. Y.

Editor, QST:

I was interested in a letter from W2YF in December QST commenting on the plight of the low-power boys and wondering what could really be done without having a 500-watt rig and all the etcetera a well-equipped ham seems to need today. And while I can't rate as a newcomer to ham radio, I can talk about low power.

About three years ago, after a 15-year lapse in ham activities, I got back on the air with a 20-watt job modeled after the "Longfeller" published in July, 1949, QST. For quite a while I was rock-bound and then I made myself a VFO which cost, perhaps, $10, and went to town.

To date I have managed to grab off QSOs with exactly 40 countries and all the states, taking my punishment from the high-power boys like everybody else.

I left this rig at W1QQU when I came down to Long Island for the winter; but with the SS Contest coming up I threw together a jigger out of junk around the shack and got on the air with an input of just about 13 watts. With this I managed to QSO every U. S. district and all Canada except VE3 and VE7. I worked only mornings and only those who looked interesting to me. In all I made 85 contacts in about 12 hours at the desk.

So it can be done; and it is my guess that there is much (Continued on page 180)

Correspondence From Members-
CALIFORNIA — Saturday, April 29th, at the Belmont Inn, Fresno. Sponsored by the San Joaquin Valley Radio Club. An all-day affair featuring 2- and 75-meter hidden transmitter hunts, forum, ladies' afternoon tea, banquet and entertainment in the evening. Tickets are $3.75. Advance reservations and hotel-lodging information may be obtained from W6HXR, 1943 Michigan, Fresno, Calif.

OHIO — Saturday, April 5th, at Central Armory, East 6th St. and Lakeside Ave., Cleveland. Staged by the Cleveland Area Council of Amateur Radio Clubs in cooperation with the 145th Infantry, Ohio National Guard. Program starts at 3 p.m. and includes ARRL TVI film, exhibit of communications gear by 145th Infantry, etc., on a typical ham station of 1908, and address by ARRL Great Lakes Division Director John H. Brabb, WSSPF. Buffet supper at 6 p.m. Admission, $2.00 per person. For information contact your local radio club or H. R. Bloor, W8IXD, 12101 Brighton Ave., Cleveland 11, Ohio, Tel. Orchard 5727.

WASHINGTON — Saturday, April 15th, at the Elks Club, 5th-Pacific Streets, Bremerton. Staged by the Amateur Radio Assn. of Bremerton, Inc. Refreshments, entertainment, fried-chicken dinner are programmed. Tickets, $3.50, are available from E. V. Mallette, W7MIE, 1525 8th Street, Bremerton, Wash.

WISCONSIN — Saturday, April 15th, at the Zion School (back of the Elks Club), Wauaus, Auspices Wisconsin Valley Radio Association. Starts at 6 p.m. and features an excellent banquet, good speaker, hamleting galore. Please make reservations in advance to assist with meal plans. Tickets, $2.00, are available from Lawrence Lapinske, WEEWM, P. O. Box 179, Wauaus, Wis.

WISCONSIN — Saturday, April 29th, at 7 p.m., at the Elks Club, Wisconsin Rapids — Second Annual Banquet and Hamfest sponsored by the Central Wisconsin Amateur Radio Club. A well-rounded program has been arranged, including good food, entertainment and contests. For advance reservations write CWARC, c/o Gordon L. Miller, 441 West Grand Ave., Wisconsin Rapids, Wis.

WWW-WWVH SCHEDULES

The technical radio broadcast services over WWV, Beltville, Md., and WWVH, Maui, T. of H., were revised effective Jan. 1, 1950. Except in certain details, these services of the National Bureau of Standards do not differ greatly from those given in the past.

The revised services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20, 25, 30 and 35 Mc., (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time, and (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, both in the interval of 10 seconds.

The audio frequencies are interrupted at precisely one minute before the hour and are resumed precisely on the hour and each five minutes thereafter. Code announcements are in GCT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour, every 15 seconds thereafter, continuing for 4 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 4 minutes. Each carrier frequency is modulated by a second pulse which is heard as a faint tick; the pulse at the beginning of the last second of each minute is omitted.

Station WWVH operates on an experimental basis on 5, 10 and 15 Mc. The program of broadcasts on the three frequencies is essentially the same as that of WWV. Time announcements in GCT are given from WWVH every five minutes by International Morse code only.

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SOMETHING NEW IN MATCHING DEVICES

Shown in Fig. 1 is a new and different system of feeding the driven element in a beam antenna. It provides a simple means of getting power from a coaxial feed line into the antenna without elaborate and fussy matching devices. At W6GKM, it has been used with gratifying reduction in TVI even though an antenna coupler is not used. Checks made with a “twin-lamp” indicate a low standing-wave ratio over the entire 28-Mc. band, and equal loading over the same range is obtained.

The dimensions given here are for a 10-meter beam, but similar arrangements can be worked out for other bands. An 8-foot length of RG-8/U coaxial cable is used in modified form to excite the driven element of the antenna. At each end of the length of coax the inner conductor and the shield braid are soldered together. At the exact center the black Vinyl covering and the shield braid are opened, and are removed to leave a \( \frac{3}{8} \)-inch gap, as shown in the drawing. Do not cut through the polyethylene dielectric.

Another length of RG-8/U cable is used as the feed line. The inner conductor of the feed line is connected to the braid on one side of the “dipole” described above, the braid of the feed cable going to the braid on the other side of the gap. In making these joints, be careful not to apply too much heat or the dielectric of the cable will melt and permit the inner conductor to short to the shield braid. In attaching the feed line, wrap the inner conductor completely around the dipole to gain mechanical strength. The braid-to-braid connection can be wrapped with heavy wire. Tape the entire joint and the short-circuited ends to prevent contact between the exposed braid and the driven element of the antenna.

The “dipole” is then coupled to the driven element of the antenna by being held closely parallel to it by any suitable means. It may be taped to the driven element at several points if care is taken to avoid short circuits between the “dipole” and the driven element.

Note that the driven element must be split at the center as shown in the diagram. A separation of 2 inches between the two halves will allow sufficient clearance. If the driven element is cut to 16 feet, 2 inches, it will be about right for the low-frequency end of the band. Slightly shorter lengths should be used for the high-frequency end.

A coaxial link is recommended for coupling to the line at the transmitter, with a coaxial changeover relay. Care should be taken to eliminate all “sloppy” joints, and the outer conductor of the feed line, as well as the transmitter, should be well grounded. For additional aids in TVI elimination, a low-pass filter should be installed between the transmitter and the line, and high-pass filters of the type described in QST for May, 1949, should be used at the TV receiver to prevent overloading by the fundamental 28-Mc. signal.

To get the best results when the antenna is used for receiving, a simple antenna coupler such as the “T”-section unit described in the 1950 Radio Amateur’s Handbook (page 129) is suggested.

At W6GKM the beam is mounted on top of the house, and neighbors on all sides have TV antennas close by. Operating at 125 watts input in the 28-Mc. band, most of the 50 TV receivers within a 2-block radius now receive no interference from the transmitter. Some difficulty is still present in one case involving poor i.f. rejection in a receiver about a half block away, but with the feed system described here, plus suitable filters, the harmonic problem seems well in hand.

—Dale G. Frink, W6GKM
TORQUE PROTECTION FOR ROTARY BEAM ANTENNAS

Considerable torque is developed when the wind blows against a beam antenna, as evidenced by the attempts the beam makes to "head up" into the wind. If you use a fairly long shaft to couple power from the drive mechanism to the antenna itself, you've probably noticed the way the antenna swings back and forth in a gale. In time, the torque thus developed can do considerable damage to the drive shaft, or to the pins used to make joints between sections of the shaft. This was the case at W1PID, where telescoping sections of pipe locked together with self-tapping screws are used between the drive mechanism and the antenna. Investigation revealed that the shanks of the screws were slowly but surely chewing into the slots of the pipe, making a sloppy joint instead of the original snug fit.

A simple shock mount for the rotator box, as shown in Fig. 2, solved the entire problem. Now, when the wind blows, the beam swings, but the entire assembly of antenna, drive shaft, and rotating mechanism swings with it, and the torque is dissipated in a pair of screen-door springs, which also serve to return the antenna to its original heading.

The shock mounting is accomplished as follows: The rotator box is raised an inch or more off its platform, and a ball bearing is rolled into a socket in the base directly under the rotator bearing. If your platform is wood, it would be advisable to slip a piece of flat metal under the bearing to reduce friction. The entire rotator box will now swing readily. Attach the springs to the front corners of the rotator box, where they will have some slight mechanical advantage in pulling the assembly back to its original position. The springs should be stretched horizontally and away from each other in a straight line, with the far ends fastened to something solid.

Other spring-mounted arrangements can no doubt be worked out to fit individual needs. The size, type, and position of the springs will determine how much "cushioning" is obtained. A "soft" cushion will permit a greater arc of swing, and proportionate reduction of the damaging effects of torque. A hard cushion will hold the beam steadier, but with proportionate increase in the shock factor. Here is one precaution: There should be a bearing installed near the bottom of the lowest section of pipe so that when the springs are performing their function they will not pull the rotator box out of line and bend the pipe. Every support using multiple pipe sections should have at least two well-spaced bearings anyway. — Gorham Olwett, W1PID

"CLAMPER" TUBE TROUBLES

Several instances of improper transmitter operation have been reported by stations using the convenient "clamper" tube arrangement shown in Fig. 3 to eliminate the need for fixed bias in a tetrode amplifier. The operation of this circuit has been described previously on page 16 of QST for October, 1946, and in recent editions of The Radio Amateur's Handbook.

In most cases, difficulty is encountered only when the transmitter is operated in the 28-Mc. band. The symptoms vary, but in general all may be traced directly to the presence of r.f. at the grid of the 6Y6, and a parasitic choke is inserted in its plate lead. Leads designated "A," "B," and "C" should be kept as short as possible. The by-pass condenser C1 should be about 470 mauf., and the r.f. choke RFC1 suitable for the frequency of whatever parasitic is encountered in the 6Y6 stage.

A good r.f. bypass is added at the grid of the 6Y6, and a parasitic choke is inserted in its plate lead. Leads designated "A," "B," and "C" should be kept as short as possible. The by-pass condenser C1 should be about 470 mauf., and the r.f. choke RFC1 suitable for the frequency of whatever parasitic is encountered in the 6Y6 stage.

Less common troubles include parasitic oscillation in the 6Y6 circuit itself. The frequency is apt to be anywhere in the v.h.f. range, but in at

(Continued on page 110)
Operating News

F. E. HANDY, WIBDI, Communications Mgr.
JOHN E. CANN, WIRWS, Asst. Comm. Mgr., C.W.
GEORGE HART, WINJM, Natl. Emerg. Coordinator

L. G. McCoy, WICSP, Asst. Comm. Mgr., Phone
LILLIAN M. SALTER, Administrative Aide

Should You QSL? W8OOP has a most unusual double-card QSL in which he asks this question. One half of the card is devoted to a "questionnaire" that leaves the answer up to you — and if you qualify as guilty on too many self-checked counts which cover many sectors of amateur operating habits your response can be omitted. (If you don't QSL in a reasonable time he puts it down to your failure to qualify!) How would you do on some of his points to be checked, a check mark meaning "yes"?

Marriage Expert.
XYL Management Expert, Grade 1, 2 or 3.
Out-of-Band Work Expert.
Edge-of-Band Expert.
Ignoring Beginners.
Half-Hour Tuner.
VFO Slide, intent larceny.
Background Drinker.
Non-Signer on CQ calls.
Ten-Minute Whistler.
Panning ARRL. 
Panning C.W. ops. 
Panning n.f.m. ops.

"160" Successes. "This band is becoming more and more active. Numerous 'phone and c.w. sigs are there into the wee small hours. Even DX, not thought of by many in connection with the Top Band, is there! Active Gs are between 1770 and 1800 kc. usually." So writes W1BB in reporting several Gs QSOed there, one with only 10 watts input! He says that loran (only SI-2 at his shack) is cut out with the noise limiter in just part way which doesn't hurt the signal to speak of. This season's first 160-meter transocean work on Dec. 18th was reported by W4NNN who worked G3PU on c.w., and later G2PL, G6BQ and G3FAB. First 160 'phone across in the New Year seems to have been W1BB with G2PL Jan. 22nd, 2:30 a.m. EST. "How's DX?" will give you the calls of many more Gs, GDs and GMs worked; also there's FAS, KV4AA and a PY reported active on this band.

Invitation to Official Observing! Wouldn't you like to belong to that select group who assist other amateurs to avoid FCC notices and trouble? The ARRL Board of Directors, at the 1940 annual meeting, on behalf of the whole fraternity commended observers for the fine job done. FCC officials have praised the system and informally recommended its extension.

If you have good stable receiving equipment, and are an experienced member with know-how in distinguishing between images and the signals themselves, and alert to double-check against the possibility of mistakes introduced by propagation conditions or receiver overloads — and are an honest chap with some judgment and tact and live in ARRL field-organization territory (see page 6, QST) the job is practically yours! Present ARRL policy is to expand somewhat the OO system in the categories of 'phone- (III) and of c.w.-signal (IV) observing. Drop a radiogram or postcard to ARRL Hq. asking for the appropriate OO application forms. Fill these out and ship 'em off to your section manager.

All ARRL members are urged and invited to make themselves available for friendly observing work, to help in keeping brother hams out of FCC difficulties, also assisting to make and keep

The Rock Creek Amateur Radio Association of Bethesda, Md., sponsored an amateur radio exhibit and provided free message service at the Bethesda Trade Show in December. Here is a view of the installation, showing WSPRT and W3IZE taking one of the operating shifts. The station handled close to 200 messages and was well received by the public, many of whom had never heard of amateur radio. Eighty-meter c.w. was used for the bulk of the messages, with a 2-meter supplementary channel for local traffic.

QST for
our bands clean and pleasurable for amateur operating.

Did you think a frequency standard was necessary for every observer? No, that's only necessary for those classes of OQ who specialize in frequency-measurement work. We can use some of those, too, but have more nearly a full quota at the present time. Data on that which requires meeting the system standards in a practical on-the-air test will be sent on request.

... The best way to get notices of the four annual tests (FMTs) is to get in on the phone and c.w.-signal observing which brings the announcements for those who care to try. But by far the more important section of practical observing work at the present time is that concerned with sending around the good word: concerning poor notes, clicks, parasites, over-strong harmonics, splitter and modulation difficulties that can be observed and studied, etc.

The idea is to keep all our ham stations and bands at top performance — and to pass a friendly tip to amateurs whose signals aren't quite the tops so they can look into the set-up as they feel like or not. In quite a few cases this has helped avoid FCC trouble; in others notices arrived simultaneously. In any event, can you give us a hand at this observing, OM?

April CD Parties: C.W. Apr. 15th-16th, 'Phone Apr. 22nd-23rd. Something new is being tried; responsive to an opinion check conducted by the CD (four-to-one in favor) the quarterly radio get-together will have separate 'phone and c.w. periods. All SCM station and leadership appointees, also officials by election or appointment, are eligible. CD Party results in the last one are reported elsewhere in these columns. These get-togethers are tops in amateur operating and fraternization. . . . BCNU in the Party, both sections.

Speaking of appointments: All ARRL members not holding some station or other appointment for which qualified (along the lines of natural interest) are cordially invited to become an SCM appointee. If interested in traffic, 'phone work, v.h.f. experimenting or other specialties, there's a place for you — by appointment of your SCM. Our booklet Operating an Amateur Radio Station has data on all the posts and also contains an application form to be sent the SCM when filled out. Why not (today) start a radiogram to ARRL Headquarters asking for information and application blank for the particular appointment you would like to hold?

— F.E.H.

BRIEF


JANUARY CD QSO PARTY

Listed below are the highest claimed scores for the January 28th—29th CD QSO Party. Complete results, with listings by divisions and sections, will appear in the April CD Bulletin.

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A.R.R.L. ACTIVITIES CALENDAR

April 1st: CP Qualifying Run — W6WP
April 15th: CP Qualifying Run — W1AW, W9TQD
April 30th-16th: CD QSO Party (c.w.)
April 22nd-23rd: CD QSO Party (phone)
May 5th: CP Qualifying Run — W6WP
May 16th: CP Qualifying Run — W1AW, W9TQD
June 3rd: V.H.F. Contest
June 4th: CP Qualifying Run — W6WP
June 15th: CP Qualifying Run — W1AW, W9TQD
June 24th-25th: A.R.R.L Field Day
July 7th: CP Qualifying Run — W6WP
July 17th: CP Qualifying Run — W1AW, W9TQD
July 22nd-23rd: CD QSO Party
Aug. 4th: CP Qualifying Run — W6WP
Aug. 18th: CP Qualifying Run — W1AW, W9TQD
Sept. 9th: CP Qualifying Run — W6WP
Sept. 20th: CP Qualifying Run — W1AW, W9TQD
Sept. 23rd-24th: V.H.F. Contest
A.E.C. TIP-OFF-THE-MONTH

Amateur mobile units going out on emergency assignments are prone to consider only the equipment in the car and how it works. There are two other items just as essential for proper mobile operation: the car and the operator. If you do not provide for proper operation of all three of them, you may as well forget about the whole thing and go home.

The Albany County (N.Y.) AEC has devised a check list for all mobiles before going out on any emergency assignment which might be of long duration, providing all accessories for the car, the rig and the man. Not satisfied with that, they have actually gotten together a few "kites" of these accessories and stored them in the EEC's garage, ready available at any time.

Members of the Oregon Emergency Net, along with other amateurs in the vicinity, took part in the search for Ruth Aberle, a young girl who became lost in the hills near Kelsey, Washington, on December 14th. The terrain was so rugged and so thickly covered with brush that only small handle-talkies were useful in the field, and in many cases the antennas of these had to be retracted when moving around.

At the start of the search there was several inches of snow on the ground, but this changed to slush and mud as the rain came peltling down. W7KZI was called by the sheriff's office at 03:00 December 12th and asked to establish radio contact with the searching parties, but W7HGF took the first shift because of KZI's working hours. Both HGF and KZI have their panel trucks equipped with emergency gear, W7HGF moved into search headquarters early Monday morning and set up some gear in a tent and started assisting in organizing the search parties, using six handle-talkies operating on 3885 kc. for field work. Naturally, QRM was rugged. W7KZI relieved W7HGF at search headquarters the following night. The Oregon Emergency Net was alerted and the Washington SEC, W7KA, was contacted. From then until Thursday, December 15th, when the girl was found alive and well, Oregon and Washington amateurs, as well as many others near and far, took part in the search, either by maintaining contact with the search parties or by using their own office to keep 3885 cleared so that weak signals from the handle-talkies could be heard. W7GKO and W7KZI were making a tape recording from the field for one of the local broadcast stations when the news broke that the girl had been found, and were able to get the details on the tape, a copy of which was sent to ARRL Headquarters, W7HDN, Oregon PAM, who sent us this information, lists the following as having participated, although he admits it is not complete: W5JGC, W75A, AAT, DIS, F4, GM, G6XO, GYA, H9, H9WU, I6HJU, J6F, J6E, JIF, KAA, KZI, LPT, NOS, QGN, RT, W5JE. As always, a word of thanks is in order for those who also served by standing by.

Given all the parts and the necessary tools, how long would it take you to put together an emergency transmitter? The San Fernando Valley Amateur Radio Club (Calif.) decided to find out and divided its membership into several teams competing against each other. The winning team of four amateurs completed a working emergency transmitter in fourteen minutes and eleven seconds. A worthwhile activity, and a lot of fun. Maybe someone can better that record.

North Texas history repeated itself January 31st, by a severe icing condition and disrupted communications. Bonham and Denton were the largest among many North Texas cities hit hard. Fortunately, plans had previously been made to effect liaison with the Naval Base Training Unit for utilization of Navy equipment and personnel in the ARRL Emergency Corps program. Although the emergency developed before the plan had had a chance to be tested, this plan was given the "real" test we spoke about in February QST — a real emergency; and it proved to be a good plan. Naval units NDF-33, NBE-9 and NAAJ, operated by Navy personnel and local amateurs, among whom were W5BKH, W5KUC, W5DMD, W5OTH, W5ORY and W5QX, worked hand-in-hand with the North Texas Section AEC organization to effect prompt and effective relief to affected areas.

In Bonham, W5GZU carried the ball with emergency power until it was necessary to make his generator available for hospital use, after which W50YT and W56QH took over. W5CC in Denton moved plenty of traffic in a hury, using emergency power at full input. Other amateurs who came on the air with emergency power to conduct communication for isolated areas were W5KVV in Paris, W5LOY in Commerce, W5OML in Honey Grove, and W5KRV in Garland. Dallas, although ice-laden, suffered only minor interruptions of power and wire services, but several Dallas stations were active to handle emergency traffic with isolated communities, among them W5CDU, W5CJU, W5FDI, W5KUY and W56QH. During the course of the emergency, mobiles were dispatched by the Naval Reserve unit in Dallas to establish communication with isolated communities where required, working closely with amateurs as necessary.

All North Texas nets were alerted, and it is believed that the entire membership of the extensive North Texas Emergency Net system was on hand, in addition to members of the South Texas Emergency Nets and the Oklahoma Emergency Net, W5CDU and W5AAO, and North Texas SCM and SCC respectively, desiring of giving full credit to everyone who participated; the following list of calls, in addition to those mentioned above, are those who were remembered as being active: W5KZ, AWR, AW, ATW, BEM, BPA, BPI, BJ, BLU, BYV, DSH, FNY, FOY, GLW, GYW, IRZ, IT, IQW, JDZ, KPB, LEZ, MAW, MK, MVL, OPN, OIP, PCO; W5TLG. Nice going, all.

In mid-January, the Ohio River threatened to go on a rampage again, and emergency facilities were alerted all

Dignitaries of the ARRL, the Northern New Jersey Radio Association and the Northern Valley Red Cross Chapter of Englewood, N. J., got together on January 16th to dedicate station W2DAY, sponsored by and licensed to the club, in the Red Cross Chapter House. Left to right: W2NIP (alternating director), W2CCS (NJIRA Pres.), W2SOX (Dir., Hudson Division), W2DCL, W2UWK (Bergen Co. EC), W2JUC, W2NUL (Passaic Co. EC), W2ZBY, W2DIB/2, W2NIO (Chief Opr.).

QST for
along the river by Ohio River Regional Coordinator W8JPB. Upon receiving advice that an emergency was imminent at Owensboro, Ky., SECOA W4BEW and W8UPB were immediately contacted, along with several ECGs along the river. The situation was soon reported "well under control" and everybody was standing by ready to go into action as a moment's notice. W4BEW sent mobile equipment to Calhoun, Ky., to take care of a pending emergency in that area. W4JXJ, W4NXJ and W4OYT took part in this operation, using battery-powered transmitter-receiver units supplied by the Naval Reserve, and upon arrival established contact with KA4RJR at the Naval Reserve Armory in Owensboro, operating on 3880 kc., the frequency of the handle-talkies furnished by the National Guard. W4LQO and W4RZQ later also went to Calhoun to assist, while W4RUL, W4PDW and W4FPQ kept KA4RJR on the air. Early Sunday morning, January 15th, W4NXJ and W4PDW went to Calhoun with a portable transmitter and contacted W4JXJ in Owensboro.

While the emergency did not become serious, the whole operation was a magnificent demonstration of teamwork between AEC, National Guard, USNR and MARC units, and served as an excellent test of equipment, facilities and plans; thus assurance has been given that emergency communication along the Ohio River, given to frequent floods, will not be wanting if and when it is needed.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C.W. 'PHONE
7100 kc. (day) 3875 kc.
3550 kc. (night) 14,225 kc.
14,050 kc.

During periods of communications emergency these channels will be monitored by stations of the National Emergency Net for personal-inquiry traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

NORTHWEST EMERGENCY

During the period of January 10th to January 22nd, Northern California and the Pacific Northwest suffered a continuous series of winds, heavy snows and ice storms, resulting in widespread disruption of communications facilities to the extent that the Red Cross eventually declared an emergency throughout the whole area. During this period amateur emergency work was so intense that full coverage of details is impossible. We present herewith some of the high spots, as sent in by W7HDN.

Mother Nature opened hostilities with severe wind and lightning storms in the Coos Bay (Ore.) area. W7EJF, Coos Bay EC, went into operation for 11 hours handling traffic into and out of the Oregon Emergency Net. The net was then alerted on a 24-hour basis when W8BML notified that Northern California was having blizzards and communication and power outages. Ice storms occurred in the Coos Bay area on January 12th and 13th, cutting off all highways, railroads and communications. W7EJF went into action again, handling emergency traffic for the Red Cross, West Coast Airmail and FAA. Newport was served by W7GCE and W7SKK. At Tillamook W7BUC handled Associated Press traffic with W7AIZ in Portland. W7FXA served the Southern Pacific Railroad with the assistance of W7THNR. W7QVX, W7NND and W7FRE handled traffic for the sheriff's posse and the Oregon Coast Highway Association.

On January 19th a more severe recurrence of communication and power outages hit the area including Tillamook, Astoria and the Washington coast. Main from the Bonneville dam failed, leaving many communities along the lower Columbia River without power. W7KZI, using battery power much of the time, did yeoman service at Longview, assisted by W7FON and W7LPT. In Rainier W7APD and W7LHL carried the ball, and in Astoria W7s GOO, BOO, HJU, OAK and E5Q handled communications which would otherwise have gone over eighteen miles of four-crossarm poles which were out between Astoria and Portland. In Portland, W7TXV moved his BC44 into Red Cross headquarters, assisted by W7s MXT, IVN, OBN and IBS, but QRM was too heavy, so W7DZL installed a higher-powered transmitter. Other amateurs active in Portland were W7s III, GYO, PV, HDN, AJZ, ACO, WJ, AJZ, E5J, EX and ADH. W6s BPT, CJX, TT and W7GTN assisted in keeping the Oregon Emergency Net frequency of 3865 clear for emergency traffic. Because of heavy QRM and skip distance it was necessary to use relay stations in many cases. Assisting in this capacity were W6s CJO, JDN, KUP, YNM, YUH, W7s EGR, FFR, HCJ, JIN, LWX and QGQ, VEGCR, and V7s TM and UT.

At Medford, W7BLF and W7GFEU handled airline traffic from Coos Bay, and at Ashland W7QX handled traffic for the Red Cross assisted by W7s FMX, FPK, FRT, KHV and LWV, W7s LVN, HVC and KL operated mobile traffic for W7HPS doing relay work for them. W7APF did the brunt of the NOS work, although many other stations shared it. Corvallis was handled by W7s MHT and MUK, while W7MES relayed for them. W7GZD handled liaison with the 28-Mc. nets including W7s GNA, ACR, PTD, AHU and RA. Richland was represented by W7s QGN and BX, Pasco by W7BIW, Bend by W7s GNJ, BBH and S, and Klamath Falls by W7s JRJ and VW.

Also active during the emergency but not mentioned above were W7s AJV, AIO, ASG, BWA, BGY, EPI, FNJ, HCN, HDY, HHQ, HOB, HSY, JKF, JVO, KTL, LHT, LK, LMX, MLJ, MQ, NGG and WL. All in all, sounds like we have mentioned above every active amateur in the Northwest. On the contrary, W7HDN assures us that the above were only the most active stations who were needed and utilized; he is sure some have been omitted and apologizes beforehand. Both 'phone and c.w. were used extensively. All nets, both emergency and traffic, played important parts, and operation was conducted on the 80-, 75-, 40-, 10- and 2-meter bands. No less than 17 agencies and commercial organizations were served by amateur radio, and probably many more than that indirectly, to say nothing of the many messages handled on behalf of the general public directly. Newspapers in the area responded favorably to the amateurs' work. As a result, another star appears on the record of the amateur service.

And here's the station. The cabinet was built by NNRAJ and inserted in an unused fireplace opening. The lower half drops down for storage and power supplies. Banging the legs, the cover can be closed and locked, showing the framed station license mounted on the outside. W2NCY modified and standardized the many ARC-5 units available for instant interchange. The operator shown at the key is W2DCM. Many spare units are not shown.

April 1950
TRAFFIC TOPICS

W6CE, W7C7Y and W4PL staged a stirring battle for "traffic champ" honors in 1949, with W6CE finally winning out on the basis of a terrific late-season performance, while Ben, W4PL, was forced for reasons of ill health to curtail his traffic activities toward the end of the year. All three of the top performers and one other (W6DDE) made 100 per cent BPL in 1949. Tim, W6CE, amassed 317 BPL points toward his postwar record, and a traffic total for the year of 27,385! This averages out at 2295 per month. His high was in December when he racked up 6056 points, with a low the previous January when he made a measly 939. Tim headed the BPL six times in 1949.

W4PL took a commanding lead in the early part of the year, but Tim kept improving each month, passing W7C7Y in August and W4PL in September. W7C7Y then passed W4PL in November. Larry, W7C7Y, paced Tim the rest of the year, accumulating 294 BPL points and a traffic total of 23,135, also better than a 2000-per-month average.

W4PL, the dean of all traffic-handlers, knocked off 24 additional BPL points to add to his postwar total, thus keeping him far out in front in this department. Ben's 1949 traffic total was 20,053 which "ain't bad."

Runners-up for 1949 (BPL points in parentheses) were W7CTK (160), W6GZU (148), W3TYU (129), W8EBX (128), W6FDR (111), W8NH0 (94) and W6DDE (94).

Looking at the traffic-handling picture by call areas, it is again apparent that the West Coast was way out in front from the standpoint of volume of traffic handled. This year the W7s lead the way, beating out the W6s by a pretty good margin, quite the reverse of last year. No discredit to W6land, which considerably improved its 1948 record, but lots of credit to W7-land, which more than tripled its 1948 performance. All U.S. call areas bettered their last year's records, the W6s more than quadrupling their 8 BPL listings of last year. It is also noteworthy that only one of the high station areas is a "repeater" (W4PL, naturally).

<table>
<thead>
<tr>
<th>Call No.</th>
<th>High Area</th>
<th>BPLs</th>
<th>Station</th>
<th>Runners-Up</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>W7 80</td>
<td>W7C7Y</td>
<td>W7CTK</td>
<td>W7ZU</td>
<td>65,691</td>
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<tr>
<td>W6 67</td>
<td>W6CE</td>
<td>W6FDR</td>
<td>W6DDE</td>
<td>55,055</td>
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<tr>
<td>W2 42</td>
<td>W2TYU</td>
<td>W2RUF</td>
<td>W2BYF</td>
<td>22,310</td>
<td></td>
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<tr>
<td>W8 41</td>
<td>W8ZJO</td>
<td>W8HMM</td>
<td>W8XQO</td>
<td>21,724</td>
<td></td>
</tr>
<tr>
<td>W4 39</td>
<td>W4PL</td>
<td>W4QY</td>
<td>W4PYY</td>
<td>36,599</td>
<td></td>
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<tr>
<td>W5 39</td>
<td>W5GZU</td>
<td>W5I4N</td>
<td>W5DRW</td>
<td>24,814</td>
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<td>W1 39</td>
<td>W1QMJ</td>
<td>W1RWR</td>
<td>W1NJM</td>
<td>12,050</td>
<td></td>
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<td>W8 57</td>
<td>W8NOH</td>
<td>W8JSC</td>
<td>W8US</td>
<td>15,918</td>
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<td>W9 35</td>
<td>W9EBX</td>
<td>W9QIL</td>
<td>W9ESF</td>
<td>20,453</td>
<td></td>
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<tr>
<td>W3 17</td>
<td>W3CUO</td>
<td>W3CEP</td>
<td>W3REB</td>
<td>10,104</td>
<td></td>
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<tr>
<td>VE 4</td>
<td>VE1BK</td>
<td>VE3IA</td>
<td>VE3WK</td>
<td>1,107</td>
<td></td>
</tr>
</tbody>
</table>

Since the end of the war, W4PL has consistently handled more traffic than any other trafficker and maintains a stout lead in total postwar BPL points (425). W7C7Y falls into second place with 341, and another Washingtonian, W7CTK, who took top honors last year, rates third with 335. W6CE is fourth, only two points behind. The rest of the top ten include W6EBR (243), W2TYU (226), W6FDR (209), W6GZU (186), W8NH0 (181), W8EBX (129).

Review of 1949 among the traffic gang would not be complete without mention of a few organizations who devote their time to directing and managing nets in addition to handling traffic. The National Traffic System has a leveling influence in that available traffic is spread among more traffickers—many traffickers as are available and willing to handle it. Few, if any, of the above-listed amateurs were consciously and deliberately seeking honors for their 1949 performances; they simply handled the traffic that came to them in the best of their ability and in the time they had available. If they had help, they utilized it and "spread out" traffic-handling opportunities, which is as it should be and is one of the principles to which NTS is dedicated. We deft our hats to the following, who while not running up any stupendous traffic totals, are primarily responsible for the progress the National Traffic System made in its first three months of operation! W2CIL, whose Western Area Net has become a model of operating efficiency on the East Coast; W6HMM, whose battle against difficult circumstances in the Central Area has made it impossible for him to maintain his last year's traffic pace; W8IC, who was well on his way to complete organization in the Mountain Area when personal circumstances made it necessary for him to place the job in the capable hands of W6QJO; and W7FIX, whose Pacific Areas Net News is not a little responsible for the continued maintenance of a high traffic interest on the West Coast. Your efforts were not overlooked, fellows. Nor were those of regional managers W1VRB, W2PRE, W3QEG, W4ANK, W4NNJ, W8CE, W7C7Y, W8NH0, W4ABZ, W4UAL, and VE2GML.

VE2GM tells of an incident on PQN (Quebec Net) which indicates that a little humor will go a long way toward alleviating the frustrated and exasperated feeling that often follows a particularly fouled-up net drill. PQN had a lot of QRM that night, and this was made worse by the fact that signals were none too good. By the time drill was over, everybody was ready to take up stamp collecting. It was then that VE2CD, the NCS, sent the following message to VE2GM, the net manager: "HR NR 22 VE2CD SVC ST LAURENT QUE NFT FEB 7 TO VE2GM BT HAVE

70 QST for

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for January traffic:

<table>
<thead>
<tr>
<th>Call</th>
<th>Org.</th>
<th>Rel.</th>
<th>Del.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>W6CE</td>
<td>45</td>
<td>325</td>
<td>958</td>
<td>2963</td>
</tr>
<tr>
<td>W7C7Y</td>
<td>57</td>
<td>951</td>
<td>786</td>
<td>11937</td>
</tr>
<tr>
<td>W2TYU</td>
<td>18</td>
<td>301</td>
<td>445</td>
<td>974</td>
</tr>
<tr>
<td>W8ZJO</td>
<td>25</td>
<td>457</td>
<td>445</td>
<td>955</td>
</tr>
<tr>
<td>W6GZU</td>
<td>10</td>
<td>460</td>
<td>381</td>
<td>841</td>
</tr>
<tr>
<td>W5L8N</td>
<td>21</td>
<td>401</td>
<td>395</td>
<td>851</td>
</tr>
<tr>
<td>W3CUO</td>
<td>108</td>
<td>302</td>
<td>251</td>
<td>708</td>
</tr>
<tr>
<td>W8HMM</td>
<td>3</td>
<td>349</td>
<td>334</td>
<td>683</td>
</tr>
<tr>
<td>W2CDQ*</td>
<td>29</td>
<td>333</td>
<td>291</td>
<td>659</td>
</tr>
<tr>
<td>W2RUF*</td>
<td>36</td>
<td>431</td>
<td>244</td>
<td>839</td>
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<tr>
<td>W3DF</td>
<td>32</td>
<td>242</td>
<td>274</td>
<td>528</td>
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<tr>
<td>W2CDQ</td>
<td>39</td>
<td>374</td>
<td>218</td>
<td>588</td>
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<td>W2BD</td>
<td>8</td>
<td>260</td>
<td>135</td>
<td>530</td>
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<tr>
<td>W2RUF*</td>
<td>30</td>
<td>278</td>
<td>197</td>
<td>525</td>
</tr>
<tr>
<td>W1CRW</td>
<td>15</td>
<td>259</td>
<td>237</td>
<td>531</td>
</tr>
<tr>
<td>W4PTY</td>
<td>18</td>
<td>245</td>
<td>238</td>
<td>508</td>
</tr>
<tr>
<td>W8NCO</td>
<td>22</td>
<td>244</td>
<td>225</td>
<td>548</td>
</tr>
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The following made the BPL for deliveries:

<table>
<thead>
<tr>
<th>Call</th>
<th>Org.</th>
<th>Rel.</th>
<th>Del.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>W5MN</td>
<td>75</td>
<td>788</td>
<td>68</td>
<td>868</td>
</tr>
<tr>
<td>W4MC</td>
<td>71</td>
<td>848</td>
<td>64</td>
<td>864</td>
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<td>W3LYZ</td>
<td>74</td>
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<td>674</td>
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<tr>
<td>W7FIX</td>
<td>70</td>
<td>601</td>
<td>82</td>
<td>680</td>
</tr>
<tr>
<td>W8RB</td>
<td>69</td>
<td>202</td>
<td>61</td>
<td>263</td>
</tr>
</tbody>
</table>

A message total of 500 or 50 or more deliveries will put you in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

* November Traffic  ** December Traffic
FOUND A NICE QUIET SPOT FOR PQR AT 3490
KCS WAT SAY FT DON."

In the recent CD "poll" on traffic and CD Party matters, we received close to 400 return cards so far (mid-February). While the cards are still coming in, the preliminary consensus seems to be, by margins not likely to be overcome by late returns: (1) the term "Brass Pounders League" should be retained; (2) more BPL credit should be given for origination; (3) word counting for message checks should be simplified; (4a) two separate week ends for 'phone and c.w. participation in the CD Party are favored; (4b) most of the gang are against dropping the code-proficiency credit in CD Party scores; (4c) the "different stations" multiplier in CD Parties should be removed.

Many letters commenting on the poll card have been received, with several worth-while suggestions coming out as a result. Excerpts from these, and a complete tabulation of returns, are scheduled for the April CD Bulletin.

Spring is here, and summer, with its attendant QRN, poor conditions and a multitude of diversions, is just around the corner. During the past two summers it has been noted that the volume of traffic has not declined as in days of yore; the only thing that has declined is the number of traffic-handlers and the number of active nets. August and September are favorite times of the year for country fairs. This year we are going to try to operate the National Traffic System all summer. The extent to which this will succeed depends on the amount of support it gets. Managers of regional and area nets are now giving consideration to suitable frequencies for summer operation. Lining up available personnel and making plans to operate with whatever strength they can muster. It is suggested to all other nets that similar plans be made, if they are feasible, so that the amateur traffic-handling service will not be found wanting during the summer. Let us in on your plans.

PHILIPPINE INCIDENT

A far-reaching network of amateurs relayed vital information and news in the search for the two college professors who were reported missing in the Philippine jungle. The two men, Dr. R. F. Conklin of Springfield, Mass., and Dr. M. Pittman of Chicago, Ill., had gone on a hike in the mountains of northern Luzon where they were attacked by Iloca tribesmen and killed. Amateurs throughout the States and on Pacific islands relayed information about the two men to their families here in this country.

Dr. Kachnowsky, Chicago, Ill., father-in-law of Dr. Pittman, on behalf of the families of the slain men wishes to thank the following amateurs and any others that helped by sending or relaying information: W7MP, W7NQH, W7MZE, W7IOQ, W7NPK, W7ZBY, W7NLP, W9UCN, W7GDQ, W7WF, W7WMF, W7QZ, W7JSZ, W7CCL, W7E6H, W739T, W784J, W1NQB, W7CJ, W7HN, W7FX, W1G, W7EC, W7H, W7DIJ, W7AE, W1AE, W2J, W1GH, W1N, W1C, W1E, and J2BZ.

CODE-PRACTICE PROGRAM

The following list of code-practice stations should be added to the lists appearing on page 34, Nov. 1949 and page 57, Feb. 1950 QST. The $5 stations appearing below are transmitting code practice under a program sponsored by the Sandia Base Radio Club, Albuquerque, N. M.


W7QGN, Thomas C. Nelson, Jr., 1101 Cedar, Richland, Wash., 3885 kc., Mon. through Thurs., 1830-1900 PST.

W8KX, J. A. Patilave, 14, 130 M., Mon., 1900-2300.

W7KEG, P. C. Arndt, 7190 kc., Mon., 1815-1845.


W5PQW, K. L. Harris, 7290 kc., Wed., 2100-2115.


W5OML, R. Wilson, 7290 kc., Thurs., 1900-1915.


W5QZ, J. A. Riedel, 7100 kc., Fri., 1500-1600.

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April 1950 71
MEET THE SCM

Manley W. Haskell, W1VV, Maine SCM, received his first license several years after becoming interested in amateur radio in 1914, and has held the calls W1OL, WICIN, and W1VV.

In addition to his SCM office, he holds appointment as official 'phone station and emergency coordinator. He formerly held appointment as ORS. He possesses two Public Service certificates, one for his excellent work in handling emergency communications during the 1936 flood in Portland, Maine, and another for operation during the Maine Forest Fire emergency in October, 1947. He is a member of the Portland Amateur Wireless Association and a past-president of that organization.

The rig at W1VV are VFO 696/xtal-6L8-507-811-p.p. 203As, BC-654, and SCR-622. The receiver is an HQ-129X and the antennas are a half-wave 80-meter, end-fed, and a 2-meter bow rotor-fed job. Operation is confined to 144-Mc. 'phone, 3.6-Mc. c.w., and 3.85-Mc. 'phone. A BC-654 and a PE-103 dynamotor are available in case of emergency.

Writing and pistol practice are other hobbies he enjoys; his favorite sports are tennis and fishing.

CODE-PROFICIENCY AWARDS

Have you received an ARRL Code Proficiency Certificate yet? Twice each month special transmissions are made to enable you to qualify for the award. The next qualifying run from W1AW/WSTQD will be made on April 19th at 2130 EST. Identical tests will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1887, 2355, 7215, 14,100, 28,000, 82,000 and 146,000 kc. WSTQD will transmit on 3534 kc. The next qualifying run from W00WP only will be transmitted on April 1st at 2100 PST on 3690 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 15 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 2130 EST. References to texts used on several of the transmissions are given below. Make it possible to check your copy.

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<th>Subject of Practice Test from February QST</th>
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ELECTION NOTICE

(To all ARRL members residing in the Sections listed below)

You are hereby notified that an election for Section Communications Managers is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified in cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expired memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street address to facilitate checking membership.)

Communications Manager, ARRL [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the ....... ARRL Section, hereby nominate............. as candidate for Section Communications Manager for this section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

Vote early and frequently. It is your opportunity to put the man of your choice in office.

P. B. Handy, Communications Manager

Section   Closing Date   Present   Term Ends
San Francisco   Apr. 14, 1950   S. C. Van Liew   Feb. 15, 1950
New Hampshire   Apr. 14, 1950   G. E. Crowell   Reigned
New Jersey   May 15, 1950   Thomas J. Lydon   July 25, 1950
North Carolina   May 15, 1950   W. J. Wertman   July 26, 1950
Arkansas   June 1, 1950   Marshall Riggs   Aug. 14, 1950

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Quebec   Gordon A. Lynn, VE2GL   Dec. 15, 1949
West Virginia   Donald B. Morris, W8JM   Feb. 15, 1950
Georgia   James P. Born, Jr., W4ZD   Mar. 8, 1950

In the Los Angeles Section of the Southwestern Division, Mr. Virgil A. Gentry, Jr., W6VIM, and Mr. Vincent J. Haugerty, W6OK, were nominated. Mr. Gentry received 259 votes and Mr. Haugerty received 277 votes. Mr. Gentry's term of office began Jan. 25, 1950.

72 QST for
ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, L'WABES — The Schuykill ARC enjoyed the TVI films supplied by the ARRL GM in his January QST. Two members, JW1B and N7YF, were at the Berkeley Square Club CD Party. It’s hard keying the bug on the floor. LVF has a pair of S20s on 144 Mc. The Yorkville Club is on 144 Mc. FPO made the best commercial-looking low-pass filter that we have seen. The Abington Township Amateur Radio Assn. is planning to give an assembly program at one of the local high schools with ham radio as the subject. The officers of the Association are NDZ, pres.; PSH, vice-pres.; PJS, secy.; OQQ, treas. ELI is on 50 Mc., with him, and wonders where everybody is. He has his 28-Mc rig perking also. New officers of the Philadelphia Wireless Assn. are HHR, pres.; MWC, vice-pres.; Fr. Dennis O’Neill, treas.; S. Bush, secy. PST, corr. secy.; JWC, membership director. QIZ is a new member of the FWA in Philadelphia. This Club is running an educational program and is interested in training fellows of high school age. Anyone interested may contact JWC. Phone: IV 2834. W311Z is a drop of water put JW on over business. A leaky radiator let a drop of water down on the head of his 3C29 while tuning up on 28 Mc. IU is a fine job of working across the pond on 144 Mc. and seems pleased with his TVI. The West Philadelphia Radio Assn. has had a new burst of activity and reports increased attendance at the meetings. LTU did well at the W3D 1950 QST. W3CUL QST. 144 Mc. Traffic: W3CUL 705, PMG 160, NH1 56, WTS 66, PDJ 37, OML 35, ELI 12, PST 10, QE4 9, HLR 1, K34S 1. W4AID-D — 3 MILLION OF COLUMBIA — SCM, Eppa W. Darne, W3BWT — The Chesapeake Amateur Radio Club celebrated its first anniversary with a well-attended banquet at the Firehouse on 144 Mc. They are running a slow speed c.w. net on Sundays from 10:00 A.M. to 12:00 noon, using the section net frequency, 3880 kc. The Club members enjoyed a discussion on “Positive and Negative Feedback Circuits for Audio” by 10XQ/3/8 at its Jan. 17th meeting. The University of Maryland Amateur Radio Association’s present officers are NHP, pres.; OSQ, vice-pres.; OKE, treas.; Bob Buskamp, secy.; ONS, Myron Zuck, and Robert Buxbaum, skt. as tech.; JPL and LFV, traffic committee. Meetings are held Wednesdays in the Old Gym Bldg. at 7:30 P.M. The Club with the call EAX meets Swing Shift Net daily and weekly on 144 Mc. Not as A2AXA. Washington Radio Club’s Jan. 14th meeting featured a talk on “Loran” by Commander H. D. Sielstad, P3D, U.S. C. S. E., Washington, D.C. A sperry receiver indicator was demonstrated. At the second January meeting the Club held another of its famous spare gear auctions. The next meeting is the first ti mine at the Veterans Radio Club. The call OEU has been assigned, and the membership is building rigs for 7, 11, 28, and 144 Mc. WVJ is on the 28-Mc Watchtower of the Veterans Radio Club, ENR, called an unannounced emergency drill on Jan. 24th for exchange of traffic between Baltimore and Richmond, Va. The record book shows that 39 members responded and were on the air. KBE, operated by SNR, was NCS for the drill. The Rock Creek Amateur Radio Association meeting on Jan. 27th featured a talk by Phil Robinson, EUG, on TVI, and the elimination of same. The Capitol Suburban Radio Club publishes a Club Bulletin called the News Letter, editor KN5U, with list of activities and items of interest about the club and individual members. The membership recently conducted an auction of radio gear at GC’s shack. One rig which was held at Prize is the Red Cross National Headquarters radio station, the membership discussed joining up with the operations of this station which is for Joint Naval Reserve, Red Cross, and ARRL National Emergency Net operations, NXN schedules VS6GH on 22-Mc. phone, QL was in the hospital because of injury to his hand. The recently released QSL from W3AEF and contact V318 by W3AEF was being interviewed by a newspaper reporter. Karl also was interviewed “over the air” and the article appeared in W3AEF’s local Kansas newspaper. DQB now is QR, Class IV. LVJ is active in a scatter in Massachusetts and MTQ now is located in Montgomery County, Pennsylvania, making QSLs possible in this area. JID operates on 3.85- and 28-Mc. phone, KN5M, DQB, and V35 are newly-appointed ORS. EYX schedules VO5, K3XX, Q5Q, and K2AC, Q5Q is on 28-Mc. phone with air using 3.55-Mc. phone. VO5Q has a 750-watt rig on 3.5, 7, and 14 Mc., also 100 watts on 28 Mc. EYQK has his new field-station operation scheduled for March. ARRL ARS 95, EAX 82, LGF 67, BVT 31, NXQ 30, CIZ 27, EYQK 14, JH4 19, MCG 12, LVJ 5, VES 4. SOUTHERN NEW JERSEY — SCM, Dr. Luther M. Mklarane, W2ASQ — The Lakeland Amateur Radio Assn., Inc. meets the first and third Wednesdays at Kusser’s Hungarian Hall, Kusser Ave., Wharton, N.J. Kusser’s has a grill room. QSLs for 1950 are Q5Q, pres.; PBV, vice-pres.; YCSS, secy.; PFZ, treas. The Atlantic Radio Clubs meets the second Wednesdays at Red Cross Club, 312 Kusser Ave., Atlantic City. PXZ is the secretary. Visitors are always welcome; visit the Club as often as possible, HAZ is rebuilding a 144-Mc rig, and has a new NCS for TC3TQ (Trans-Continental Phone Net). K3AZ is EC for Atlantic and Cape May Counties. ZYX says that he is playing with his TV more than his rig. OWE is Morris County EC and is building an emergency rig for Red Cross Headquarters. RBF has completely recovered from his long illness and is back in circulation. STU had a problem to lick; it is HAI (hearing aid interference). Club secretaries, please let me have all the news on or before first of each month. PRef: W2OBZ, 144 Mc. W2OBZ is building a 28-Mc rig. DMB is a new call in Malone. UYG keeps schedules with Marine Corps and Coast Guard Nets. QHI has retired the 6L6, now is using an 807 and quickly adds the 150-Mc. DMB for a total of 65, and worked KY4AA on 160 meters. DBQ is now a call in Niagara Falls. FBA reports more stations in V.H.F. K3G, 3000 Mc., has returned to California. YRF received Class A ticket. ATC worked 10 counties on 28 Mc. with 10 watts. ZBO runs 7 watts on 160 meters. CCQ and ATC are thinking about 1215 Mc. WVC spends spare time working DX on 14 Mc. QHI received 150 endorsement on DXCC in spite of constant S7 noise. The Niagara Frontier 2 Meter Net held a drill and exchanged traffic with 144-Mc. Nets in Broome, Tioga, and Tompkins Counties — the relay being made on 3.6 Mc. This gang has high hopes of a state-wide 144-Mc. net in the very near future. If you are on 144 Mc., or expect to be on, and are interested, please contact SWF, USF, ex-SCM, of the section, has been working DX and has DXCC. The only time QEW is heard is when he is chug-a-lug in a stainless steel mug. W3QW is building a new CTS, and has been working all bands from 27-31. SWC, ex-VESMC, gave a talk to RDXA on his experiences in the Arctic region. The Niagara Radio Club has secured the hitherto unused USF frequency to host auto plates with amateur calls. QY has been making discreet inquiries about audio. SLZ has his sights on DXCC. CQ2-ICE last winter made 30 miles of snow and 20 miles of wind. The QRT is on 144 Mc., with a cubical quad, RARA Radio Auxiliary meetings are becoming family affairs with WYQAs, OMs, and Jr. operators sitting in. The Lawrence County Amateur Radio Club is planning a booth at New York
SOUTH DAKOTA — SCM, J. S. Foosberg, W8NGM — The Howlin' Wind Amateur Radio Club held its first anniversary banquet and membership meeting last Saturday night at the Airpark Inn. The club used its new 200-channel transceiver on the air, the OR0, in Huron. The club then used its new antenna on the air and called a few QSOs. The club plans to have its new antenna up on the air in a few weeks.

MINNESOTA — SCM, John B. Morgan, W9RA — The St. Paul Radio Club did a fine job of traffic operation and direction in the annual St. Paul Winter Carnival parade and the torchlight parade. The club used its new transmitter on 28 MHz to send a message of "Happy New Year!" to all amateurs on 28 MHz. The message was received by many amateurs on the coast and in the western states. The club also made several QSOs with amateurs on 28 MHz. The club plans to have its new antenna up on the air in a few weeks.

TENNESSEE — SCM, Ward Buhman, WATQ — Reports in Jackson were received from the town of Chenango, BSN, HB, and LCB. Another ice storm fouled up wire communication facilities in Memphis and provided work for the AEC there. A determination was made to use the new 200-channel transceiver on the air and call a few QSOs. The club plans to have its new antenna up on the air in a few weeks.

GREAT LAKES DIVISION

KENTUCKY — SCM, Dr. Ans A. Adkins, W4KWO — It will be necessary for me to mail this report on traffic and activity reports to arrive in Hazard on or before that date. KYN and BUN are in full swing and can handle much traffic. Use the KYX and KYO for traffic reports. AEC membership is growing. NIB is a new name in Henderson. JQY is in service in Kentucky. QSV and Q2S are under construction. The club plans to have its new antenna up on the air in a few weeks.

LOUISIANA — SCM, W. J. Williamson, jr., W3VT — Well, here's just about fishing time again. Not such a rough winter this year since most of the snow has melted away, so DX and traffic. However, very few of them took time out to let the rest of us know what they have been doing. The group also applied for renewal of their ORS appointment. The club plans to have its new antenna up on the air in a few weeks.

MISSISSIPPI — SCM, J. C. Wallis, W5DLA — The Keeler Air Force Base Club has established ARRL affiliation. The Pacasa Club was recently organized, QSN is operating new beam, YAA has TV, and W5FB reports that new antenna is being set up for the AEC. The club plans to have its new antenna up on the air in a few weeks.

MISSOURI — SCM, J. C. Wallis, W5DLA — The Keeler Air Force Base Club has established ARRL affiliation. The Pacasa Club was recently organized, QSN is operating new beam, YAA has TV, and W5FB reports that new antenna is being set up for the AEC. The club plans to have its new antenna up on the air in a few weeks.

OREGON — SCM, J. C. Wallis, W5DLA — The Keeler Air Force Base Club has established ARRL affiliation. The Pacasa Club was recently organized, QSN is operating new beam, YAA has TV, and W5FB reports that new antenna is being set up for the AEC. The club plans to have its new antenna up on the air in a few weeks.

NEW JERSEY — SCM, C. W. Brown, W3RC — The New Jersey ARS is operating a new beam, W3RC reports that new antenna is being set up for the AEC. The club plans to have its new antenna up on the air in a few weeks.

NEW MEXICO — SCM, John B. Morgan, W9RA — The St. Paul Radio Club did a fine job of traffic operation and direction in the annual St. Paul Winter Carnival parade and the torchlight parade. The club used its new transmitter on 28 MHz to send a message of "Happy New Year!" to all amateurs on 28 MHz. The message was received by many amateurs on the coast and in the western states. The club also made several QSOs with amateurs on 28 MHz. The club plans to have its new antenna up on the air in a few weeks.

DELAWARE — SCM, J. C. Wallis, W5DLA — The Keeler Air Force Base Club has established ARRL affiliation. The Pacasa Club was recently organized, QSN is operating new beam, YAA has TV, and W5FB reports that new antenna is being set up for the AEC. The club plans to have its new antenna up on the air in a few weeks.

APRIL 1950
IN RADIO the unconventional may be the cause of luring one from the well-beaten path of daily habit. Thus, it was that the hope of listening to a S.S.S.C. signal found us the other evening tuning across the 75-meter 'phone band far from our usual stamping grounds on the VHF bands.

It was interesting to see how the other end of the ham world lives. A couple of S.S.S.C. signals were found and tuned in by following the unique technique of receiver tuning and adjustment recommended for use in their reception. The AVC was turned off, R.F. gain retarded, A.F. gain advanced and the tuning dial turned very, very carefully. Pastafazool! It worked!

After there were no more S.S.S.C. signals to conquer, we continued tuning around with the receiver in conventional manner. Of course, the band was crowded. Two meters was never like this! The crystal filter was quickly put into action to obtain sharper selectivity; this seemed to leave something to be desired, though, as the readability suffered as side-bands were cut. Plenty of "lows," but the "highs" that contribute most to readability were down. Somehow, this didn't seem to be the right way to tune in these signals. We were keeping the carrier intact and clipping our sidebands. Now, the chief purpose of the carrier is to move the S meter while the intelligence comes from the loud-speaker. Of course, to many hams the S meter is the more important of the two anyway. Did you ever stop to think that, even at 100% modulation, we are transmitting twice as much power to swing the S meter as we are to actuate the loudspeaker?

What to do about it? The most favorable spot on the selectivity curve is the nose which is the point of least attenuation of the desired signal. Let's get the carrier off of it and put one of the sidebands there. The other sideband disappears, but so what? You don't need a mirror to see what the other fellow looks like. So we detune the receiver so that the carrier is, say, 1000 cycles off the nose. It doesn't sound good! The reason is simple: We have reduced the strength of the carrier, while those components of the sideband on the nose of the selectivity curve are now un-attenuated so we now have the equivalent of a very badly over-modulating signal. What to do now? Let's get rid of the carrier and substitute a new carrier of ample strength in its place. The carrier is easily eliminated by adjusting the phasing control to a setting that phases the carrier out. At least 80 db, of attenuation should be possible in a properly designed crystal filter. Egal! What is happening to the S meter? As the proper setting of the phasing control is approached, the S-meter reading will go to zero if the carrier is unmodulated. But if the carrier is modulated, (as practically all 75-meter 'phone carriers are!) the S meter will dance wildly up and down as it is now actuated only by side bands which are far from steady with most voices. If you can stand such desecration of ham convention and can steel yourself to the fact that from now on we are going to ignore the S meter, we are ready to proceed further. Since the S meter is now useless and there is no carrier to develop AVC, let's turn off the AVC, retard the R.F. gain control and advance the audio gain control. Notice that this preceding sentence is the technique advocated for reception of S.S.S.C. signals. Now we need to turn on the BFO to generate the carrier that is needed to replace the transmitted carrier that was previously phased out so that demodulation can be accomplished. More S.S.S.C. technique! The BFO knob must now be adjusted so that its frequency is identical to that of the extinguished carrier (and we really mean identical — to within 10 or 20 cycles). This can be accomplished by ear by turning the BFO knob very slowly until the noise emanating from the loudspeaker sounds human. Now we have the final result. All this while the tuning knob has remained untouched. We can now tune the receiver to any signal in the band adjusting nothing but the R.F. gain control to compensate for a change in signal strength. This is similar to exalted-carrier operation and can be called S.S.E.C. Or is it S.S.S.C.? As you tune into a signal, a beat note will be heard between the carrier (not yet phased out) and the BFO. Simply tune this down to zero beat at which point the carrier lands on the phasing notch and disappears and the BFO knob should be carefully adjusted for best quality. S.S.S.C. signals can be tuned in similarly except that no heterodyne will be heard as the carrier has already been suppressed at the transmitter. Perhaps you just can't get the S.S.S.C. to make sense at all. This means that the wrong side band has been suppressed and it will be necessary to reset the phasing notch and BFO on the opposite side of the selectivity curve to receive it.

The system described above seems to be far more effective than the usual "on the nose" system of tuning but it requires very careful tuning. Give it a try but don't give up too soon. It will take time to get used to the technique and it will require considerable will power to tear yourself away from old habits.

A couple of hints may help to make the initial adjustment easier. To help set the BFO to the carrier frequency, detune the phasing control slightly to let through a little carrier. The BFO knob can now be adjusted to zero beat. Now the phasing knob can be reset by off-setting the BFO knob to get the same heterodyne with the carrier. The phasing knob can now be adjusted for minimum heterodyne strength after which the BFO knob may be returned to the "zero beat" position.

The above operation will give the equivalent of single sideband exalted-carrier reception with only the necessity of acquiring the proper operating technique. It is not necessary to pay out a couple hundred bucks for additional equipment; everything necessary was provided when you bought the receiver.

How to eliminate a heterodyne now that the phasing control has to be used for carrier suppression? A Select-O-Ject will do this for you, of course.  

CAL HADLOCK, WICTW
NO OTHER MICROPHONES OFFER YOU SO MUCH FOR SO LITTLE!!!

...The New Shure Controlled Reluctance

"HERCULES"

Only $12.95 List!

A revolutionary new hand-held magnetic unit that provides clear reproduction, high speech intelligibility, high output, and ruggedness—at an amazingly low price! A tough microphone that can be used indoors or outdoors—fits snugly in the hand, sits firmly on a desk without tipping over, can be placed on a stand. Metallic Green finish. Complete with stand adapter. Die-cast case. 25/8" wide, 3 1/4" high, 1 1/4" thick.

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<tr>
<td>$10C</td>
<td>7 ft.</td>
<td>$2.95 dB below 1 volt per microbend</td>
<td>High</td>
<td>1 lb. 6 oz.</td>
<td>RUTUF</td>
<td>$12.95</td>
</tr>
<tr>
<td>$10S (with switch)</td>
<td>7 ft.</td>
<td>$2.95 dB below 1 volt per microbend</td>
<td>High</td>
<td>1 lb. 6 oz.</td>
<td>RUTUS</td>
<td>$14.95</td>
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...The New Shure Crystal

"Rex"

Only $10.00 List!

A striking-looking low-cost crystal microphone. The "Rex" is a high output, hand-held microphone that fits snugly in the hand, sits firmly on a desk without tipping over, or can be placed on a stand. The "Rex" is recommended where good quality speech reproduction is required, and low cost is an important factor. Burgundy Red metalic finish. Complete with stand adapter. 2 3/4" wide, 3 1/4" high, 1 1/4" thick.

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<td>RUDUS</td>
<td>$12.00</td>
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KANSAS — SCM, Bart E. Johnston, WBGCK — Members of the Kaw Valley Radio Club at Topeka held a simulated emergency drill recently under the direction of UPF, EC for Zone 3. 3.5- and 7-Mc. c.w. were used, as well as mobiles on 28-Mc. and 2000 kc. AHW, of Lawrence, says the Naval Reserve has installed a station on KU campus and is awaiting call. AHW's shack has been moved from the 2nd to 3rd floor of Electrical Engineering building. Midwest City, OK, has new Class A ticket. SNTN now has HABU with Class A and GOY is the proud owner of 1st-class telephone ticket. AMF has all its licensees in car. PER, of Hays, has been new keying gadget to help point out in his many traffic schedules. He and OOT have been taking Kansas traffic from Kansas City and TENA and would like help on the second trick. FDY, our new QO, is getting on 144 Mc. He has received going and will have a 522 on. UPF has new NC-183 receiver. SBB, of Topeka, is a newcomer on 3.85-Mc. phone and is reporting into Kansas 75 Phone Net. SQ, of Silver Lake, having conquered the world on 3.5- and 7-Mc. c.w. with his 490-foot dipole wire, is contemplating 3.85-Mc. phone. FLZ had hard luck with his final plate transformer shorting out.

Traffic: WBOO 250, FEW 110, FJD 54, NIV 21, IXXL 20, M0F 28, YOS 27, UI7 12, BMU 5, ICY 5, ABH 4, LUX 4, LUX 11, SCW 4.

MISSOURI — SCM, Ben H. Wendel, W5ICD — The Missouri Emergency Net is operating on 160 meters at 1900 CST Mon., Wed., and Fri. DDE is visiting clubs throughout the state, which in turn are spreading the word to the populace of Poplar Bluff on an approaching storm. The Missouri Emergency Net, the Missouri Net, and individual operators were alerted several days in advance by the Missouri Emergency Federation. The new South East Missouri Net is operating on 160 meters at 1000 EST Mon., Wed., and Fri. DDE is visiting clubs around the state, which in turn are spreading the word to the populace of Poplar Bluff Amateur Radio Club was organized with G0X, pres.; ZAO, vice-pres.; MBD, sec.-treas.; FMI and YLI are experimenting with a circuit by GZK using superimposed modulation with a pair of 81s. ATP and AQG are new nets in Marionville. Among those constructing and revamping gear, we find WRO (Chief Engineer of the Club) working on an automatic keyer, WAP operating on 75-meter rig, AXX completing a 4-watt, LSA completing a 1 kW, power supply, VHF going on 28.7Mc. mobile, and FMI completing an automatic keyer. Traffic: W8PKE 330, QXX 203, KIR 38, COF 77, WAP 65, OOF 25, SOM 17, PMT 14, QM5 9, PTO 8, NNH 7, JCP 4, ARH 1.

NEBRASKA — SCM, Scott E. Davidson, W0EOD — LiG, JAM, AZO, RCG, — CoE looking for 144-Mc. contacts. The Alk-Sac-Bee Radio Club made your SCM an honorary member. EUT is new PAM, KJP is new MC for the Johnson net. KFP, pres. for the Alpha-Crane net. PAY has new HT-9 on 28 Mc. OHK is back on with portable. OHU visited Nebraska hams recently. SAI puts out a potential signal when not on CAA duty. ERLZ, portable, worked IMX for ten miles. RQK has new 304TL final. BRW has new converter for SI, ZOG is on with p.c. 697 final. ODE has new 28-Mc. beam. GOH was testing the N-P Club recently. VQR has new final. IXL says code class going is great. The Hastings gang, PLF, NZP, ZVX, BU, and YXU are using from four-place planes to try emergency gear. The Falls City Radio Club was organized recently with WTV, pres.; ZTV, vice-pres.; HXK, sec.-treas. Licensed members operated on 10 and 160 meters with their own High Jinx Net. HZE is building a rig using super-modulation. AFZ is a new call in Omaha on 28 Mc., PZD is working with a modified version of the old modulator. DHO worked AMY operating SSB. DHO and AZH have new TBSB6s. NWQ is on 160. FJU operates portable on 28 Mc. HTVX is on 28 Mc. UHR is on a portable, emergency-equipped. MJY, WVK, KBB, YLC, and DNV are on 160. DFA has 1st-class radiotelephone license. Traffic: W8GDB 205, KIP 189, W9GZ 197, CRH 50, JDF 40, DMY 32, SAI 27, FMW 23, IXL 23, LJO 12, TIF 11, IVN 10, IDH 9.

NEW ENGLAND DIVISION

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Walter L. Glover, W1VB — While the proposed contest in the CD Contest between the Connecticut and Virginia sections did not materialize, the Connecticut gang was in there pitching and some good

(Continued on page 80)
9 REASONS why most people use VARIACs

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scores should show up. The CN Net is going strong at present with probably the largest attendance ever and with good coverage of the section. CYN also is progressing steadily. QST reports CPN is doing swell with EMF, KDK, LWW, and FOB acting as NCS Mon. to Fri. and KDK, MBK, VW, and RCV on Sundays. GC is back on the air again and is doing a big two dig in England to be more active. LKF attended the hamfest of the New London gang to give a talk on emergency matters. RWS and ICP were guest speakers at the banquet meeting of CARA in Danbury. OS has finished his new house in Easton, and is planning a new rhombe when he gets back on the air. New officers of the Stratford Club are as follows: pres.; ASO, vic-pres.; RFJ, secy.; and Mats Forland, treas. All says he is going to take a crack at the next FMT, his first try, UDW, a new QRS, reports he uses a 5000 foot long wire which works FB. He is with regret that we learned of the death of E81 and J8M. Sorry, too, to hear that QAR is going to the hospital, APU and ADW, a pair of 810s, which makes a difference in DX. NYC reports little activity on 28 Me, these evenings in his vicinity because of TV. HWG is sticking to the 7- and 14-meter bands these days. RNT and QVF were hitched on Dec. 1st. Congrats. Traffic: WJY 270, BDJ 162, AB 160, HYF 158, DAV 140, KDO 140, BVD 93, KV 57, Q8 83, LKF 70, CTP 60, BIW 47, ADW 42, T7D 37, NBP 30, VW 28, AN 20, CJM 19, NBP 18, APA 11, QVF 11, SJ 11, LIG 6, RWS 5, ODW 4, QAR 4.

MAINE — SCM, Manley W. Haskell, WIVV — Pine Tree Net: RM NXX, 3565 kc., 1900, Mon. through Fri. Sea Gull Net: PAM PB, 2961 kc., 1700, Mon. through Fri.

New OPS is GJY. GJY puts 250 watts on 'phone and goes to town with a 5x2 on 144 Me. RJQ has his modulator ready and will try it out on 28 Me. graduating to 33 Me. when he gets that "A" ticket. LGW has succeeded QUA as SEC for Maine. QUA has done a fine job of organizing the AEO throughout the State and his efforts will bear fruit for a long time. LGW did an outstanding job in the recent EC simulated test, particularly in regard to effective use of mobile units. DZU became a Silent Key in January. "H" of the Clarendon was regarded as the Grand Old Man of wireless and radio in the State of Maine. His counsel and advice will be sorely missed. The following are the following officers: QCI, pres.; ITU, vice-pres.; RSX, secy.; JRS, treas. LNI, chief op. Permanent committee: QUA, CRP, SEY, JYU. Business meetings will be followed by minor activities the next meeting and then major activities. Fluorescent lights and improved ventilation are planned for the club-house. The matter of a ham shack is under consideration.

Traffic: WING 272, YA 134, LKF 106, KLIH 105, NXX 58, E6R 61, VW 55, NXX 55, KOCM 35, KEZ 24, QUA 19, IQW 12, PTU 13, AFT 9, OME 9, JAS 8, ARM 6, FV 5, KDE 6, COV 5, QDO 5, AWN 3, GE 3, RJQ 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., WIALP — New appointments: LQQ as EC for Hamilton, LLL as OBS and OIR. The following have had appointments endorsed: As EC-ETO, ALP, URS HIL, MF, MOCN, OPL, PLO, as OPS-HIL, HXK, AR, AAL, as OBS-IHR, JCP, TP, AQX, WI, IA, PU, as LAL, as OES-HIL, CTV, as QO-IQQ, as OBS-HXK, HKE, as RTW, TCR, SGE, and HUG spent a lot of time on 15. LWEU gets on 28 Me. JFY helped SPE get his ticket. JFY is working hard on National Guard Net. RXT got his commercial telegraph license. AAL is working on remote control for his rig. MDU is working on a small rig for 3.5 Me. The Southeastern Amateur Radio Club of New Bedford bought a BC-610. The Brockton Amateur Radio Club reviewed NXX, as vice-pres.; OEG, secy.; OBL, treas. The South Shore and Eastern Massachusetts Clubs held a joint meeting in Cambridge. Q5S won the door prize, a Workday D87. QMT notes the following active in the Eastern Massachusetts Net in January: AHP, BMW, EMG, EPE, PGT, JOC, JFY, LPM, PXN, NVP, PMT, Q8, RBF, RHH, RTX, QZG, TY, UE, ZH, RNI, and AMI. HIL has a 33 Me. job on 7 Mo. 4XZB, ex-111D, Miami Beach, Fla., wants the job on 50-144 Me., to look for him. H8V is over a talk on "Audio Systems for Ham Transmitters" at the Quincy-Rubowitz Ham Assem. meeting. MBB has a three- element beam for 28 Me. The Eastern Mass. Club had a discussion on TVI. The South Shore Amateur Radio Club recently celebrated its 15th anniversary. The following charter members attended: AKN, AAY, ASI, NYP, and U7G. Martha's Vineyard Radio Club has voted to affiliate with the QRRL. The Merrimack Valley Amateur Radio Club elected QBY, pres.; NORM, gen., secy.; DICK, Q8Q, treas.; Q9R, act. mgr. Board members are QBY, NNQ, MQN, Q9R, Q8Q, NEX, and N. Givens. Meetings are (Continued on page 82)
How To
Protect Your Tubes
while tuning to resonance

For a number of years, hams have been using various methods to tune the final of their rigs to resonance. Some of these methods have proved disastrous when the resonant point could not be found before the plate structure of the final tubes developed large holes. Using an Ohmite wire-wound potentiometer to vary the output of a tetrode or pentode driver stage by varying the applied screen voltage has proved to be the most effective and economical means of tuning the final with complete safety for the tubes. The circuit is shown below. (Must use fixed bias.)

This circuit has three obvious advantages: (1) The drive to the final amplifier may be reduced to the point where the plate dissipation is not excessive when full plate voltage is applied. The final tank may then be tuned without danger to the tubes; (2) The grid drive in the final amplifier can be adjusted easily for any band of operation; (3) By reducing the screen voltage to the point where the plate current of the driver is within safe limits, the driver tank circuit can be tuned without causing excessive plate dissipation.

For the smaller screen grid tubes of the 807 type, a 10,000-ohm, 50-watt potentiometer is recommended (Ohmite Stock No. 0332). The larger screen grid tubes of the 813 size require a larger potentiometer, and the 10,000-ohm, 100-watt (Ohmite Stock No. 0463) is recommended.

Ohmite potentiometers are constructed entirely of ceramic and metal. The resistance winding is permanently locked in place by vitreous enamel. The smoothly gliding metal-graphite brush provides smooth contact with every turn. You can depend on them for long, trouble-free operation. Available at your radio parts distributor.

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held the 2nd and 4th Wed. nights at the former site of WLAW, West Andover. The call is NBN. The Club has an HT-9 and NC-101X receiver and is on all bands. Visitors are welcome. FLQ gets his Club QSL card for portable. QHP finally got his beam up in the air. MON has a six-element stacked array on 144 Mc. W1 recently QSOed 62Z, on 14V, who sends him a Club member's QSL card. KRJ rig. IH has a Collins 32V2-2, QGY is working hard in the T-9 Radio Club's 80 Meter Contest. Traffic: (Jan.) WAEMG 242, PLY 123, BXT 168, L5 100, K22 64, TY 82, ZB 60, DM 83, QJ 28, JCK 25, PT 23, JYX 16, WU 15, AAL 14, RBE 11, EWR 3, (Dec.) WJJY 94, M2U 16, ILN 2.

WESTERN MARYLAND — QRM, RY 32, on 62 from 105-108 MHz. RY is a new member of HCFM, who participated in 14-meter WAS Party. GWJ walked away with HRC's high score in III. SS, RPW was a second. EOB now is assistant manager of EAN. YOG was there in high in 68 at the CD Party. YXH had to quit at 350 in 48 because of company. RDR has 81 counties on 28Mc. phone. DXW and IDR now have Class A tickets. RYW has been favored with a trick knee after a trip to the hospital and surgery. EFC, the EC for Cambridge and vicinity, reports AEC activity on 29300 kc. with HFO, MOK, EC for Holyoke, has organized AEC drills on 7170 and 28080 kc. NY controls the Western Massachusetts. Phone Net on 29260 kc, each Thursday at 9 p.m. NY also controls the New England 'Phone Net Sunday mornings at a.m. on 3006 kc. All New England participation is invited. NLE, EC for Springfield, recently was the subject of publications with OJY and UD for the Red Cross. BVR finally ran into TVI and is now one of the I.PF boys. COJ held out for a long time but this month he walked down the aisle a marked man. RZG is chasing DX on 7 Mc. when not replacing filter components. ITI and AZW handled information on skiing conditions to W3 gang. EFO, MOK, and HIP made the February FMT measurements. BDV's new shack in the basement is a ham's dream. Jim renewed ORS and OPS appointments. GZ renewed ORS appointment. YW5A renewed OPS appointment. QQA is recuperating from a heart attack. LJD and PYR were active tuning important ski races with radio. LKO has mastered his four-element beam. AMI is using tube keyer and new VFO. Traffic: WIEOB 48R, BVR 135, AZW 45, HOG 22, AMI 20, BDV 16, MOK 8, GYJ 5.

NEW HAMPSHIRE — Acting SCM, Clifton K. Wilkinson, WICRH — RM: WICRH. Certificate Nr. 7 for WW11 goes to IBBN of Rhode Island. In February BPF marked his twenty-fifth year as an active amateur. New officers of Concord Braspounders are LDJ, pres.; QGT, vice-pres.; QYZ, secy.-treas. OMR, MKD, PFL, SBX, and RY are often found on 28Mc. phone. QCY now is 9FDD, HQE has new QTH. SKI is using new rig. G730 is a DX hunting again. The Nashua Mike and Key Club recently held its 12th annual banquet. QH was TV servicing. SBX received confirmation of contact with BFE. FFC, the club station of the Dartmouth Radio Assn., is back in business operating 3.85, 14, 27, and 28-Mc., phone 'with 150 watts and 7- and 14-Mc. c.w. with 25 watts. Two telephone towers atop the physics building support collinear arrays on 7 and 14 Mc. and a 492-element rotary beam on 27 and 28 Mc. PFR has 38 counties worked on 28 Mc. and EWF is sporting new Collins 75A-1 receiver. He lost 80- and 110-foot folded dipoles in high winds. CBW enjoyed lots of contacts in the CD Party. Traffic: WIEOB 48R, QZQ 92, MXP 36, P6U 32, JQX 29, SAL 24, RPR 6, EWFS 8. RHODE ISLAND — SCM, Roy H. Fuller, WICRH — RM: BTV, FAM: BPR. The personnel of the Rhode Island Net gathered at the QTH of yours truly to further coordinate activities of the traffic set-up. Those present were BFE, BTV, BBN, HLY, LWA, QDI, PYO, and QTR. The PRA held its annual elections Jan. 20th. New officers are NZB, pres.; QLQ, vice-pres.; RAY, secy.; KCE, treas. The Newport County Radio Club elected the following: JEB, pres.; BLS, vice-pres.; JFF, secy.-treas. SEC MIL reports activities are well planned and under control. He now has active keyers in the most important parts of the State. MIL and ORH mobile units covered the recent fire on Allen Ave., relieving and describing it to some of the boys on 28 Mc. Traffic: WBN 160, OR 134, BTV 100, CQH 95, OJD 16.

VERMONT — SCM, Rusty W. Detter, W1MVY — MMN has DXCC and WAG-15 certificate in 75Mc. phone. QM has WAG and WAS certificates for 28-Mc. phone. OKJ finally worked his 100th country on 28Mc. phone. LJJ has 2826 on 29-Mc. phone. NWW is on all bands with his new 40-Mc. VFO final. BAT is on experimental phone. BFE has H2S and is getting fired up for 50 Mc. OKE worked his first 30 states. The winners of the recent BARC Contest, CUN is on 14 and 3.5 Mc. from Newport each week end. BLC has Meissner Signal
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NORTHEASTERN DIVISION

TDHIO — SCM, Alan K. Rose, W7IWU — Sorry I missed the report last month, says a Southerner. I just had a trip to the Midwest and wasn't able to attend the Fair. I'm sure the show was a success and I look forward to attending next year.

VERMONT — SCM, Fred B. Tindinger, W7EON — The Fair in Vermont was a huge success. The state has a lot of resources to offer and I think the visitors were impressed. The next year, we plan to host an event similar to this one.

OREGON — SCM, J. B. Roden, W7MQ — Oregon has a lot to offer. From the beautiful coast to the mountains, there is something for everyone. I look forward to attending the next event here.

PHILADELPHIA — SCM, S. M. Davis, W2ZQ — The Fair in Philadelphia was a great success. The city has a lot of history and culture to offer, and I think the visitors were impressed. The next year, we plan to host an event similar to this one.

WASHINGTON — SCM, Clifford Cavanaugh, W7AF — The Fair in Washington was a huge success. The city has a lot of history and culture to offer, and I think the visitors were impressed. The next year, we plan to host an event similar to this one.
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And answers to

1. How can I find the value of this JAN
fixed condenser? The colored dots
don’t mean a thing to me. (p. 511)
2. M-derived filters — that’s all I hear
about. Where can I get the dope? (p. 542)
3. Wonder if I can put in this 40A brown
bead pilot light? The burned out light
is a 47. (p. 540)
4. Θ again! What’s the name of the ani-
mal and what does it mean, anyway? (p. 540, 549)
5. QSD. Wish I could find this in a hurry.
Maybe he meant QSB. (p. 549)

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□ I am entitled to training under the G. I. Bill

HAWAII - SCM. Dr. Robert Kaemeli, K6HIJ - RU reports a new 12.6-wave Sterba on 28 Mc. beamed NE-SW. BW (RM) reports a new 7-Mc. net with AAF acting as Net Manager. The 22-Mc. mobile club members are on every Tuesday at 1900 IST on 29.2 Mc. Remember, five confirmed contacts with mobile club members rates a certification. K6L has had our sole maintained outlet for the K2R operation. PY (00) reports activities severely curtailed since the arrival of a fifth harmonic. SJ is off to the E. of Illinois. He has an 811A job with his WU push-up on a 28-Mc. home QTH but has a 230-Mc. mobile. WU, PP, and NS maintain regular QSOs on 30 Mc. VO also appears on 60 Mc. WL and FD are teleype enthusiasts. JM reports QSO with PK3 on 28-Mc. mobile with about 50 watts. IU continues to use suppressor grid modulation on 3.85 and 28-Mc. phone. Trailer: K3EH, MN 27, BW 18, VE 13, AT 8, RU 7, PY 5, IN 4, P.L I.

NEVADA - SCM. E. Bowles, W7CX - Aest. SCM. Carroll Short, 7B7, BVZ: SEC: KU, HJ, JWV, KSR, TMY, KOA, KVZ, ZT, OBS: JLV, MIZP, BVZ is the proud holder of a W7AAT (Working Certificates) certificate marked #1. 4KMC/7 new is 70AF in Las Vegas. BU and BVZ have switched to n.f.m. and report no further 1CI difficulties. JYV reports for his area. KGE has a XYL on 3.5-Mc. c.w. at Bristol. KUE is working on aircraft but gets on now and then. Both KUR and JWV are equipped with emergency 110- and 6-volt rolls. QAI, on Pearline Mt., near Reno, suggests that the California 144-Mc. boys point their beams at Donna Pass to work him for a Nevada contact. GC has to move to Mokelumne and is back DXing. Quite a few of the boys in the Reno area are on 160 meters. KOA is in Civil Air Patrol and is helping a neighboring CAP Squadron with its radio station. GC has worked three of the Called Zolfo of the Palo Alto Amateur Radio Assn. for the 1950 season. LCN, pres.; TEP, vice-pres.; SWY, secy.; KFQ, B30, UCE, QXP, ECH, and FTT, directors. YWD, int. conferece committee; FTT, net mgr. NW again makes BPL for the third consecutive month. TBK reports the 144-Mc. emergency net has a good attendance with over forty-five stations checking in on some nights. SCCARA is planning a big time at its annual barbecue to be held some time during the summer months. The Club has arranged for a W6EDZ party in San Jose for the grand old get-together. We'll announce the exact date later. NOE e ure is putting out a fine signal with his screen grid-modulated eight watts and is very much interested in checking some of the magazines for details or better yet, contact Bill on 3.86-Mc. phone. WJM is heard briefly on 5.3-Mc. c.w. at times. BVZ writes from Saudi Arabia that he has the call MP4B4 in Bahrain. Bob says that he has worked only three stations from that QTH, running low power into an 80 and using TEF receiver. His operators on 14,000 Mc. and may be on twice that frequency. Of late he has not had much time to visit Bahrain Island. A few months ago Bob made a vacation trip to Israel and is married to a Dutch girl in Florence. JETT and LRMN, with their XYLs, attended the wedding. Trailer: WBN 308, B1061.

EAST BAY - SCM. Horace R. Greer, YWTI - Aest. SCM. Charles P. Henry, 0KJA; SEC: ECH, TMY, ZJL: ECAs: KU, EHS, KDI, JDY, QDE, MLZ, Ray Meyers, MLZ, is the new Emergency Coordinator for the NBARA. JZ lost tower and been in a race. QP is now sporting a new Collins 318B-1, YDP has another traffic and operation class going at the ORC. DQL reports that he
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has had a chance to use emergency power several times lately because of power failure. QXN has rebuilt his VFO. TY3D is QRL Mission Trail Net. WI1 has been running traffic schedule with Okinawa daily. RVAAP turns in a traffic report as new ORS. JTH now has new TV net. VDB still needs Delaware for WHS. ZM is State Coordinator for the American Legion net. The Northern California DX Club held a special get-together with the Southern California DX Club in Fresno on Jan. 28th. YQV’s new QTH is 61146th Ave., Napa, and is on the Mission Trail QST net. The Mission Trail Net had an FB birthday party over ham radio on Jan. 20th, according to B1F, BOUT writes that he would like anyone in the same section interested in trunk line traffic to call 3545 kc. at 2100 EST to drop him a line. IXH is QRL traffic. G1Z is with the Electric Supply Co. again. UXZ and W111 have found it necessary to drop ORS appointments. WUK and H9D are active in Vallejo. AYN got his old call back. WOP now has an antenna farm near Somona, DDU has a pair of 4095 kc. on 25 W. PA6 has new VFO to drive a pair of 250ITFs. WAT is the happy owner of a new Shop Smith with all the attachments. WLA is now living in an apartment house. ILOQ has new four-element beam. AJOJ was host to NIO recently. BGJ is active on 144 M. again. OP is in the area. You should see his antenna farm. RCO has new three-element beam. DUB rebuilt new final and is on the air again. ZU1 put in new relay, etc. TT is clearing up beam. SG1 was a recent visitor to these parts. ORB reports that the San Leandro Ref. Club now has an FB house for its meetings and station which was supplied by the City of San Leandro. The new QTH is at the end of Davis St., San Leandro. ORF’s beam now works FB, and he did the whole job by himself. ORF is still having key click problems with his traffic. (Jan.) W6LKB 237, W7CQ 255, FDR 138, OT 158, ZJ 133, FY4A 115, W6QNX 96, YD1 72, DQ6 62, VDR 10, TI 3, (Dec.) W6GQ 172.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone — JU 7-6407, PBL left Feb. 18th for Japan. We will all be looking forward to working you from that location. Best of luck. LWV is still in the St. Joseph Hospital. We all hope for your speedy recovery, Fred. YCG is building a station on the Peninsula and will be moving to that location soon. BYS has purchased a large relay unit to house the transmitter which is under construction. KNO is installing the Boy Scouts tower and an emergency communications set-up in Marin County, NL finished building new shack and will be on the air soon. San Francisco has a new radio club called “FMU” — Frequency Mobile Society. This is a consolidation of the Golden West High Frequency Club and the San Francisco Naval Shipyard Radio Club. Officers are W6DPA, FY4A, W6XQ, vice-pres.; ZLQ, secy.; DZ2, treas. The purpose of the Club is to promote interest in v.h.f. and mobile work as well as emergency work. Meetings are held the third Thursday of each month at the Red Cross Building, 450 Gough Street, San Francisco. The majority of the members have purchased the B.N. radar gear and are converting it to 144-Mc. They expect soon to have at least twenty-five mobile units. The regular meeting of the San Francisco Naval Radio Club was held Jan. 27th. The guest speaker of the evening was Mr. L. M. Norton, CEN, of Elinco Corp. He gave a very fine talk on single-sideband operation. The meeting closed with the usual raffle and distribution of television raffle tickets. Refreshments followed. Traffic (Jan.) W6VPC 59, (Nov.) W6IDL 52.

SACRAMENTO VALLEY — SCM, Ronald G. Martin, W6ZP — Asst. SCM: Northern Area, 26NYM; Central Area, 26GK; Southern Area, 26UP; Western Area, 26RME, ECA: Met; Sacramento, BVR: Walnut Grove, AY4D; Dunsmuir, JDN: Paradise (Chico Area); HBM: Roseville, GHP, RM; PIY, OBS: AUCK; BY: OKE; PIY and GHE, OME: ZTV, BTV, BTO, GDO, YX, OPS: JDN, Sac. Enzerfer Met (city); NOS AOU, SVS Traffic Net, 29.4 Mc., NCS ZTV, and AOU BTV, Notice PLEASE MAIL YOUR REPORTS TO REACH THE SCM BY THE 2ND OF EACH MONTHE, Northern Area: The Dunsmuir Radio Club has been organized with HPL pres.; CPU, vice-pres.; BTV, secy., treas. On the birthday of the Mission Trail, JDN and YNM had the Dunsmuir fire chief and mayor visit their station. RSB is on 7 Mc. and 100 meters. Central Area: ATQ checked in on 144 Mc. with indoor antenna; his sixteen-element beam came down in a storm. SLV reports sixteen-element beam on 7 Mc. four times. QJO and JED are operating a two-way phone on 144 Mc. The station is in a small town. VQJ is active on 144 Mc. ARO has a new VFO. (Continued on page 90)
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W6FNL — Asst. SCM, James F. Wakefield, G6Q, SEC; JPS, ECs: PHL, JAE, WBZ, G7U is the new SJVRC president, while G6Q leads the SJVRC. TYP is the new manager of K5RP, PDD has been appointed official technician for the SJVRC's station, TC. The annual Hamfest will be held Apr 9th, SHR reports a fine DX-station recently heard during January attended by about 70 well-known California DX-man's. The following are among those most often heard on 3.56 Mc, mobile in the Southeast: BLY, OXG, OXK, NGR, KPW, LTO, NJF, PDD, QON, WTY, ZTR, WJW, JPD, and IRQ. ZOJ, FSZ, JPS, and KUT are in the process of building mobile rigs. A new visitor called 1RJ, doing a fine job as Net Control on the YL Net. AIE is busy on the Legion and Teachers Nets and is laying the groundwork for a local emergency net. GRO is busy on the Legion Net and is rebuilding. H?Q is a new call in Stockton. HD is a new OHT in Merced. Tráfico: W6GRO 52, AJE 27.

**ROANOKE DIVISION**

**NORTH CAROLINA — SCM, W. J. Wortman, W4CYB**

— The Catawba Valley Amateur Radio Club, in Hickory, now publishes a monthly bulletin, Reading The Mail. The club runs a local net known as the Catawba Valley Ground Wave. New officers are ENH, pres.; OXG, vice-pres.; ENQ, secy.; EBR, treas.; PFE, act. secy. The club is working on a contract with the Catawba Valley Area Unit of the YL Club. NAQ is the proud owner of the first tube, assembled in the club, and a VHF signal generator. ENQ and LTW have new gas candles — big car men — Studebaker-Chrysler and stuff. LTW has a new ham radio for part-time use. PFE has a new beam. Down at Duke, ATH is operated by the gang. Members of the Duke Club are ZSNF, SNH, ZSOW, Z4IN, JML, ZKP, ZMN, OBR, ZFQ, PFE. Club officers are ZSNF, pres.; PZB, vice-pres.; ZSPX, secy.; ZFS, faculty advisor, and EBR, trustee. The boys are running code and theory classes and have a big group of new members prepared for examination. Thanks to ZSPX for the letter and new. We finally heard a beep from the “mountainmen” up in Asheville. They have a new set of equipment, MUV, pres.; DPF, vice-pres.; AFM, treas.; and R. J. Echard, secy. Thanks for that information. Now what about that club transmitter the same as the one on the old DXF? They are having a hard time with the equipment. Ask some life into OZK, Bob, and give us the dope.

**SOUTH CAROLINA — SCM, Wade H. Holland, W4AZT**

— The South Carolina QSO Party, held Feb. 4th and 5th, was very much of a success. There was activity on all bands from 3.5 to 144 Mc, and we hope that the winners are happy with their prizes. Suggestions for similar South Carolina activities will be given at the meeting. We are readying for the May Picnic-Hamfest in Orangeburg, and BPD and DPN expect the entire State to attend. Break-In, our section branch of the American Radio Relay League, will be in appearance in February and will be a monthly visitor. Be sure to send in your articles and information to the editors. FNC is the proud grandad of Patricia Ann Whittington, R. F. B. Randers Guignard, in Columbia, and Walter O. Cain, in Orangeburg, are busy with newly-arrived harmonics. OW is on 7, 28, and 50 Mc, EQD is strictly for 3.85 Mc, and dreams of an all-band rig with a pair of 30TXs. The Charleston Club’s new officers are OWL, pres.; NRC, secy.; and DFC, trustee. AZT was heard on 28 Mc, and TX-7, at that. ANK still is South Carolina’s top traffic man. Tráfico: W4ANK 35B, AZT 27, EQD 12.

**VIRGINIA — SCM, Victor C. Clark, W4KFC — ASST. SCM, E. Etheridge, 4K3D, SEC: IWA. PVY makes BPL again this month! PED advises that 44 students turned out for the initial code and theory class conducted by the Lynchburg Radio Club! The Wm. & Mary Radio Club (YNC) has affiliated with ARRL. BCI is now OHS; FVX is now RS; PFE is now OHS. From NN’s comes word of new members: OZH, pres.; JXH, vice-pres.; NNX, secy.; AKN, treas.; MF, act. at area. New ARC members are OHT, PFA, and PYN. PVX relays traffic between NN and the America Corp Net on 29.4 Mc. YZJ is silent while moving to new spot. ZMF is about from W8UV due to rig trouble. AIV earns VFN certificate. The lawd chased down IWO’s 75-meter antenna; now he operates 28-Mc. phone with indoor wire. PNL is polishing up. BZJ is off the air while planning mobile installation. JH forwards information on Roanoke Club’s new station. The Ocean View Club offered a prize to the high club member in the 14-20 meter WARC Party; DIH sounded like a strong contender. PAS likes new Select-O-Ject. PHJ has 25 watts and “V” beam in Jacksonville. BZJ, RHE, PFV, PFE, KPT, KYN, KXJ, LAF, MWF, NQV, PAS, PED, PYN, (Continued on page 96)
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QWM, BQR, and VE were active in the January CD Party. RJT now is QRV at Patuxent River, Md. Olds reports success with 12-watt emergency-powered rig on VFN. KVM is back on VFN. KV knocked off 54 A stations in four days on 3.5 Mc, using only 10 watts! CJS is working excellent DX on 7 Mc, including LX, YO, HA, and FAB. NN is working QX, VIF, and KV4 on 18 Mc. W4XJ and W4YF are members are haggard from the DX Tests. JLH, JHL, and RQR renewed QES appointments. Traffic: (Jan.) W4PFP 48, FT 178, LAP 153, PVY 211, FZD 24, IA 52, MLJH 20, KXD 24, IAW 20, JHL 17, DTV 16, NXXN 15, IWA 11, II 2, CJS 8, NVQ 1. (Dec.) W4PAS 44.

WEST VIRGINIA — SCM, Donald R. Morris, W3JM—ZVR’s activity allowed QNH to be the first station to work YL-WAB. KWL cleared all TWI from his neighbors and now runs his 600-watt 28-Mc. phone free of TVI. OXO was visited by DYP. YGL/ESQ handled traffic during the high water floods on the Ohio River. W3MR’s 22 Mc, 32V-2 and 75A receiver has confirmed over 75 countries on 28-Mc. phone in a short time with limited operation because of illness. H. T. E. W4N and T. L. C. G. T. O. have a large amount of traffic from the Tampa Fair. MABA is looking for a site of land suitable for a proposed club-house for W3NH. W3NE and KA3CQY, LNC, have joined the G3-WM group. W3NH has sold his 12 Mc, 1000-watt phone, to W3RA, for 7 Mc. W3NH is now in Weston, on 3.5 Mc, and AUJ worked Puerto Rico on 3.5 Mc. W3NH and W3NN are active in the daytime. Don’t forget the West Virginia QSO Party, starting January 26. Traffic: W4GBF 279, OXO 262, DFC 54, AUJ 51, BWK 38, EZR 20, FQZ 12, JM 7.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, W8KTV — SEC: GKEF, RMs: ZIO, LZY. Because of MARS and other activities, IG is resigning the o.w. QES appointment; just when he was getting a good start, too. New recruits on W8SN at 1830 MST Mondays through Fridays on 3000 kc. The Colorado Springs and Pueblo hams set up a net for emergency use due to the disastrous fire near Colorado Springs. Those taking part were SGG, KVD, GQW, HUO, and LZY. The boys had a good job organizing the net in a short time but it turned out that they were called upon. SLN set up his 28-Mc. rig at the annual Stock Show in Denver and handled several hundred messages for those attending. ZIO got his 35-Mc Mr. radio. IA is placed with bad power leaks despite repeated protests to the Power Company. PNK is finishing up his 35-Mc. mobile rig. New home at Laramie are AJT and FAT. BU6 transferred to Washington, D. C. ZK6 made BPL this month. The Denver Radio Club bought up some surplus Air Lines radio gear and auctioned it off for a neat little profit for the club treasury. Traffic: W8ZJO 956, IC 400, IA 47, LZY 39, PNK 30, OQW 2, W8XAC 299, W8XAB 262, DFC 54, AUJ 51, BWK 38, EZR 20, FQZ 12, JM 7.

UTAH — SCM, Leonard F. Zimmerman, W7SP — This is the first report from your new SCM, as Utah launches its career as a separate section. New UAR officers are now in place: CPF, vice-pres.; OOK, secy. The Meridian Club’s interesting little monthly will be continued with JVA as editor. CEN is now working with the cooperation of the CAP, NCR, State Police, SCLC Police, and the SEC. The u.h.f. gang has established 600 k. each night at a total of 320 Mc. Civilian Amateur Radio System, CARBS, is a revival of the old G.A. AARS and is going FB with many old-time AARS members. Utah’s frequency is 3700 kc. If interested, contact OOK or RFN and family and friends have moved to Las Vegas, SYD, DTD, LKM, GPN, and MFQ are members of the new Taequim net. Traffic: (Jan.) W7UTM 499, LKM 10, SP 8, JVA 4, (Dec.) W7UTM 364, LKM 91.

WYOMING — SCM, Marion R. Neary, W7KFY—DVX finds low power gives good results on 28- and 3.85 Mc. phone, MVK, with new Class A license, works mobile 3.85 Mc. phone, O2W made contact with Denver on 144 Mc. IRX 18 wearing out shoes leather in the back yard trying to find an antenna for an ART-13 to work on all bands. ILL is heard nightly on 1.9-Mc. phone. NOU is heard with a recent signal on 3.85-Mc. phone. MOO cleared 1700 QRM on 1.9 Mc. NHL finds a good antenna helps on 3.85-Mc. phone. JDB received QO appointment. Drop a card to your SCM for details on all appointments. PG6 and K7FY are designing a “superspecial” 14-Mc. rotary beam. OGG is pounding losses on all bands, but likes 3.5 Mc. best. Please send this monthly activity. SCM has a QPCH committee. SCM will collect the latest news at your meetings and forward. Traffic: W7DXV 98, HNN 81, ILL 24, IQQ 22, KFV 18, NFL 10, IRX 4, FLO 2, JAU 1.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Leon C. Smith, W4YE — ITZ, W4DAQ, OBC, ODS, OKJ, and OKF are newcomers to 4-Mc. Phone, IMK will be on 4 Mc, as soon as he gets Class A license. MAB still is collecting big bottles for his kw. HFL has new rig at home. ELX has new shack. MUH has... (Continued on page 94).

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gone 28-Ma. mobile. AXU is active on 14 Mc. OBV made over two hours contacts while traveling on a motorcycle. K4WBA is new ham in Mobile. MEM has p.p. SIs on 14 and 28 Mc. The Auburn Radio Club of practice c.w. net on 7230 ka, at 8:00 a.m. daily. BMM is rebuilding with p.p. S10 final this fall. BRY is new Dayton Radio Club call. OUI is sold on 14 Mc. K4QV, located in Tennessee, has moved to Texas. MARIS is in Colorado. Write VVX for the dope. NPF has his 4-Ma. vertical going at last. HLY has new LK4C, which should be finished by summer. New officers in the Aniston Club are LFN, 88E, and OAC, sec.-trea. FPGP moved to Semla. YEE is active as KJ4QG. MDJ has moved to SEC, is bringing our EC work up to date. Write him for EC details. DAL visits us via 4-Ma. mobile. Traffic: W4BNW 268, S10 99, SL7 62, GJW 82, YC 62, RXY 51, M4 9, YF 5, VYM 6.

EASTERN FLORIDA — SCA, John W. Hollister, WJ4WZ — Thanks to the fine schedules lined up by the new 4-Ma. traffic, much traffic has started to speed away from the Tampa flair, ALP reports. Those holding schedules include AYV, ZK3, VJQ, OAY, MNT, and YF. The informal bulletin, which was a hang-up affair, QY walked away with the first prize, a receiver, Brookville: MNT now is 16 and finally got off the air, and GBY, who is off the air, can be expected to return. RY6 and KB8A, 2-Ma. station, were on with the CAA and will be on from there. Tom reports that the Halifax Club is reorganizing with K2T as president, and that ARS is located at 2-Ma. station of the ORS. Deland: PS reports unusual conditions on Feb. 11th at noon when WS6, WS9, and 14 were rolling in on 180-Mc. phone. FJ has been noted for 2-Ma. station, Class III, Lake Harriet: NAK (EC) has the AEC going in fine shape with five new members. He reports the K5D has started a school for beginners in amateur radio. KG2D, MA, has the informal bulletin. MG2C is in Asst. EC. Lake City: IQV got ideas from the dope in the CD (ARK) Bulletin. Both the 28-Mc. and 30-Mc. c.w. WWV is V.4B, announced January 101, ITY 43, RJ 41, BMI 24, LMT 13, FZ 9, NAX 10, BT 2, YF 7.

WESTERN FLORIDA — SCA, S. M. Douglas, Jr., W44OB — Monthly reports. We haven't had any lately. You know, the only way we can find out anything is for each member of the section to take time to drop us a card, listing his activities, before the 6th of each month. The Fish Net operates nightly in Tallahassee with OCL, LDY, NQY, and K4, and GAI is on it. This month K4AI has been active, and occasionally. Frequency is 28.6 Mc. DAO is on 28 Mc. NN is heard regularly in Pensacola. NWC visited Tallahassee recently. HLA works 5500 Mc. DLO is working 7 Mc. again, and is heard throughout the section. ERR has new Class B ticket. MS has gotten his YO. Mrs. HLA has been in California. The FQZs are hitting very soon. BOL, Southwestern Division Director, visited the Pensacola Club recently. Don't forget those Westerns.

GEORGIA — SCA, Clay Griffin, W4DXY — The Georgia Tech Radio Club, AGL, is planning to handle lots of traffic during Engineers' Week this year. Report on March 25th to 30th on 8045 and 7110 kc. The Club has moved into new quarters and has separate operating positions for 2.8, 7, 14, and 144 Mc. GQR, of Cartersville, reports that he is on 50 Mc. with a 15-watt rig and a two-element beam, 1RL graduated from Georgia Tech and is back home in South Carolina with his club. K4JZ is a new CBer from Columbus; MB1 is operator at WRLB, WTY has a new mobile rig; MCB is on 28-Mc. with a 150-State, ex-HWQ, 6RL on 800, and 4RL on 600. HLY has been active from his home location and from USNR depot; C32S is operator at WRLB; WRLB is building traffic nets with a 60-watt rig. He is rebuilding for an 813 final. PZL is a new ham, and FVL is new in Columbus. KGP, Savannah, has a three-element wide-spaced beam for 28-Mc. Traffic: W4IRL 31, KGP 15, DXY 10.

WEST INDIES — SCA, C. R. Meyers, K4RD — GF and DJ set up San Juan-Arecibo circuit for possible emergency traffic on the occasion of a large fire in Arecibo. K4RD, who is now has double for 14 Mc. A new 400-watt beam and plug-in rigs for all bands. 14 Mc. is building half-gallon 3.5-Mc. rig for DV. W2QHH checks in on Puerto Rico AEC Net on 3.5 Mc. K4PD has a new 600-watt rig, K414A/BK4P is on 28 Mc. with 10 watts. HF works nice DX on 3.5 Mc. K4P4FL/K4Y and W4O1C/X4Y are on 14 Mc. c.w. and 3.5 Mc. K4Q5C, K4ESE, and K4QKD are on the CAA. In Puerto Rico and works with KD; KD added 100 resistor to his DXCC. PRAAC directors meeting and hamfest at LB's QTH was well attended by W4NEG visited (Continued on page 66).
HARMONY presents the EDILCO Line

TVI Book Now Off Press
Get your free copy of "TVI Can Be Cured". Just drop us a postcard with your call, name and address and well shoot it right to you.

Eldico Transmitter Filters
Dual low-pass, 40 Mc cut-off, over 75 db harmonic attenuation, 5.2-72 ohm input, low output. At other impedances use antenna tuning network. Good for 240 and input reactive fundamental attenuation. No effect on antenna performance.

Model TVT-62, $7.97 kit, $10.99 wired & tested.

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TVR 300 for Twinex—TV 62 for Coax
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Brute Force Line Filter
Similar to one on Page 508 ARRL Handbook. Will handle 1 kw. Completely filtered and shielded, in kit form, $5.98 wired & tested.

Copper Mesh Shielding
Heavy-duty, tightly wound, expensive but it really does the job right, the only screening we’ve found that will. 26” wide, minimum order 6 sq. ft. Per sq. ft. $0.85, plus $.50 per order packing.

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The most valuable piece of test equipment in the ham shack is the Grid Dipper. Build one with this kit and save countless hours in building, improving and de-bugging your rig. The GDA Kit builds an exact duplicate of the "Grid Dipper" and includes everything from the special handy case permitting one-hand operation down to a complete application and instruction book. With tube and internal power supply, range 3 Mc to 120 Mc in 6 steps, size 3½” x 2½” x 3”. Complete Kit ........ $21.50

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A conservative 300-Watt phone and cw rig 6V6-6H6-6L6-12AT7-C, Class B 811-A or 615-A amplifiers. All bands, 80, 40, 20, 15, 11, and 10. Exciter broad band, single control. A tuneable plate delivering 1500 v.d.c. at 350 ma, 500 v.d.c. at 200 ma, and bias supply. Punched aluminum chassis, tubes, transformers, capacitors, resistors, antenna changeover relay, meter, wire, hardware and coils included, but final tank coil for one band only. Electro-Voice 915 high level crystal microphone part of the package. Plug in the crystal and line cord and you’re on the air. Shpg. Wt. 180 lbs. ....................... Only $179.50

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NEW TR-75-TV KIT. Same as TR-75 above, but TVI proofed on all bands. Has built-in TV-62 filter, also brute force line filter with specially devised RF bypassing of osc. and 807 stage. Has new 3” square meter. Plate transformer and all a.c. lines electrostatically shielded. Shpg. Wt. 90 lbs. Complete kit .................. Only $49.95

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**$42.50 6 VOLT HT-11 POWER SUPPLY, ONLY $19.95**

NEW! COMPLETE! Compact filtered supply made by HALLE-  
CRAFTERS for the HT-11 xmtr and recr. Ideal for mobile rig in  
your car, boat or plane. Includes Mallory VP-552 Vibration  
which eliminates hum. Also has 6 volt dynamotor, fuse, line,  
connectors, relay, etc. Transmitting voltage: 6V at 1.5A; out  
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Complete with strain. Don't think metal!  

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this as first or second choice in case we are sold out of one type. Write  
phone wire TODAY!

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WEST GULF DIVISION

NORTHERN TEXAS — SCM. Joe G. Buch, W5CDU — Members of the emergency net again proved their value in rendering service to isolated cities while communications were disrupted during severe storms. A group of amateurs, assisted by Naval mobile units and manned by amateurs belonging to the Naval Reserve, lost no time in getting emergency communication to the isolated area. Our sincere thanks to all participants and to the many who were QRX, ready and willing to assist. We welcome SCM to the ranks of the Naval Mobile Force. FM station WNKR at Nacogdoches, Tex., is a newly-elected president of the Big Spring Club with F3L, vice-pres.; and NOJ, secy-treas. We extend best wishes to Mel and the other members of LTV and W5M as neighbors in Ft. Worth. JAY is fighting TVI. Thanks to DC8 for the net directory of the El Paso Emergency Corps on time of standard operating procedure. Thanks to everyone for a fine job. JGKQ has moved his BC-89 over to the QTH of Assistant SEC, KBB, Winter Garden. The rig to go back and help the emergency. IUW now is stationed at Hetton, AFB, North Dakota. Traffic: W5G0ZU 885, LSN 851, ARK 137, CDU 117, ES 10, LQY 10, LQV.

OKLAHOMA — SCM, Frank E. Fisher, W5AHT/AST — SEC: AGM, PAM; ATJ, W4J. The ACARC of Oklahoma City has a new net on details of participation in electronic countermeasures tracking in cooperation with Oklahoma A. & M. College. NMM has closed down preparatory to moving. Carl has a new station, W5ZBQ, in 12V and is working successfully. Operation is on 144 Mc., PB-85, 20 watts on 144 Mc., with sixteen-element beam. OPHE is operating fixed portable on 28 Mc., in Oklahoma City and soon will be heard on 144 Mc., KG1Q is on 28 Mc., with a 7-Mc. rig. Blackwell is to be congratulated on its new club, Pioneer Radio Amateurs, affiliated with ARRL. Activities in general seem to be dual this month judging from reports, or rather the lack of them. The OLZ slow-eyed net has added about five new members, but responses to this opportunity of operating training has not been up to expectations. How about participation in this or other useful activities? The tomato and fox seed is approaching. Are you prepared? Does your operator need help? We'll do all we can to help you. VX1 has been on the air. The newcomers are DDI, JWM, with the first phone DXCC in town; and NMA, with the first 28-Mc. phone DXCC in town. LXX needs only three rules to help. ADZ is putting his 187-RY in his new shack. NOT is building a four-element 14-Mc. beam. OPN is working 28-Mc. phone DX. LXX is back on with an 813 on 14 Mc. — it is the buffer for a pair of 304Ts to be put on later. NMV reports a 28-Mc. demonstration for the Orange Red Cross. PCO reports quite a bit of activity in El Paso emergency work. FNY is doing a nice job in a newly-organized club in San Antonio. JBZ has his big rig on 3.55 Mc. MN has now been kicked off 200THA, HAM working 30 Mc. And the Orange Red Cross, Traffic: W5M 318.

NEW MEXICO — SCM Lawrence R. Walsh, W5BMA

SEC: BYX, RY, ZU, PA, PW, PAM, LM, LIT, LAC; FAC; KYB is on 3.55 Mc. With 800 watts to 813a. AOK is on 28-Mc. phone. PLK is on 28-Mc. phone with 600 watts. QVQ is increasing power to 100 watts. QNO is converting two ARC-5s to 3.5 and 7 Mc. BYX is building another five-element beam for 144 Mc. BW is making a new antenna, RFP is using super-modulation. M5G holds code practice at the 1st and 2nd Wed. on 6770 kc. NRJ has a CF multiband antenna and SMA has a half-wave with 900-ohm ribbon. 28-Mc. DX is building an SSB adapter for his receiver, BYX, Hot Springs, worked JOT, El Paso, on 144 Mc. at 9:55 a.m. Feb. 13th. New schedule for New Mexico Tuesday, W5GQ is on 144 Mc. QFG has a twenty-four-element horizontal beam. OPN and ONP are ready to go on 144 Mc. LWA has a six-

(Continued on page 100)
New BANDMASTER transmitters pack the wallop and cost but very little!

HARVEY WELLS BANDMASTER JUNIOR — TBS-50B
30 to 50 Watts with simple switching to select any of 8 Bands, 80, 40, 20, 15, 11, 10, 6 or 2 Meters with no plug-in coils and with 100% break-in operation. Has a brand new crystal-VFO switching circuit which can readily follow a fast first, even with sluggish crystals, or you can still have break-in with your external VFO. A pi-antenna matching network built-in with integral antenna coupler is provided to load a stubborn antenna or to adjust excitation if the Bandmaster is used to drive a big final. With an AC power supply capable of delivering up to 450 Volts at 250 Ma. the Bandmaster is ready to go to work as a top-notch fixed station transmitter. With a vibrator or dynamotor power supply you’re all set to go portable or mobile. To clinch the deal, anytime the proud owner of a Bandmaster Jr. gets the urge to make with a microphone, there is available at low cost the Junior Modulation Kit to easily convert this rig into a plate-modulated phone job.
Complete with tubes, less power supply:............................................ 87.50

BANDMASTER JUNIOR MODULATION KIT

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BANDMASTER SENIOR — TBS-50C
A complete Phone-CW transmitter. The Senior is a modernized version of the popular TBS-50 with all the new and exciting features of the Bandmaster Jr. incorporated plus built-in high level modulation for phone operation with a carbon mike.
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Crystal microphone preamplifier. The unit built into the Bandmaster Deluxe which you may add to other Bandmaster models. Simple to install................................................... 22.00

BANDMASTER DELUXE — TBS-50D
The ultimate in a flexible and versatile Phone-CW transmitter. The Deluxe has all the features of the Jr. and Sr. Bandmasters plus a high-gain speech amplifier to permit phone operation with a crystal or other high-impedance microphone. A great many have been sold to foreign countries for use in commercial applications; vivid proof of the Bandmaster’s quality and adaptability. Complete with tubes, less power supply............................................. 137.50

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A sturdy power supply with good regulation for fixed station operation of any Bandmaster. Delivers 425 V. at 275 Ma. and 6.3 V. at 4 amps. May be mounted on rack panel. For 110 volts A.C. 50-60 cycles.

As developed especially for use with the Bandmasters this is also a fine power supply for use with other mobile equipment. It delivers 300 volts DC at 200 Ma. with 6 volts DC input.

DPS-50
For those who prefer a generator rather than a vibrator supply, there is available a dynamotor supply for portable operation.

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American Radio Relay League
West Hartford 7, Conn.

ten-element horizontal beam 50 feet high. SSB is moving to 28.20 Mc. QSY has a Helix beam. JX1L has an eight element beam. MJ1 has completed a tuned-line RF into a 733D receiver. Traffic: W5QJF 521, ZU 113, NKB 68, JXO 62, AS7U 48, A34Q 25, WAGRI 21, ASOCR 21, WAKIE 12, HSO 18, NEK 18, SMA 16, QCN 10, OCR 9.

Canada Maritime Division

Maritime — SCM, A. M. Crowell, VE1DQ — EC: FQ, KS sends Official Bulletin Tuesday at 6:30 p.m. and Sunday at 10:00 a.m. on 3800 kc. M1 has a 30-foot beam. FQ has a tuned-line receiver. Traffic: W5QBF 919, ZU 113, NKB 68, JXO 62, AS7U 48, A34Q 25, WAGRI 21, ASOCR 21, WAKIE 12, HSO 18, NEK 18, SMA 16, QCN 10, OCR 9.

Ontario Division

Ontario — SCM, Thomas Hunter, jr., VE2CP — Assisted, SCM c.w., M. J. McMonagle, 3AWJ. Assisted, SCM, phone, E. B. Kimble, 3FQ, SEC: RM, RHR, ATR, AWE, FPQ, BUR, DU, GO, TM, and WK, PAM: BBY, ABO, and BSA. New appointments include UY as EC, AJU as AO, IB as QSY. FN has a 155-watt and three-element beam on 21 Mc. ZO has new location on 21 Mc. BNZ on 1700 kc. Regularly, the Ontario Club has plans for another picnic. DBF, Waterloo, and DAD, Georgetown, are new to 144 Mc. Activity is above average. A large increase across Ontario with about 30 on from Toronto. BNQ is piling up counties and has now 119. B1K and AOX are using super modulation. AJU is on 50 Mc. A0ZI on Kirkland Lake. DDM reports for the Sarnia gym, bank, and DDM are only 14 years old. DBL is on 28 Mc. with 8 watts. BPE is at QHS appointments. BBR is operating mobile. The Northern Ontario Net is working daily on 3800 kc. at 9:30 p.m. VE has added double conversion to his receiver. New Kingston Club officers are BDA, pres.; AOU, vice-pres.; FPK, secy-treas.; OAQ, act. mgr. AT12 is on 7 Mc. from Kingston. AX2F is president of McMaster University Radio Club. GC has new WX-45. IB is operating YIO. A0R enjoyed his first LO-NI nets. AGC is back in Oshawa and on 28 and 29 Mc. AJF is on 14-Mc. FQ5 has 31 counties on 7 Mc. AF, GN, CDP, ANO, AOR, and BNG are on regularly with AF and 3715 kc. under GC. A0K runs 24 watts in the next room to the 5000 watts of CHO5. BTI is EC for St. Catherine. BL completed W28. Traffic: VE1S 190, VE1B 173, DU 129, WY 126, GO 113, WRD 100, ATR 89, BI 73, BMG 56, NI 54, IL 51, BEO 50, TM 43, BUL 41, BTO 40, CP 36, BSS 35, APZ 26, BSA 30, CO 24, AZZ 21, Y 19, AZV 16, W28 14, KW 12, AZH 12, AG 12, KM 12, AER 11, HK 10, RG 9, BNO 6, DCW 6, DBJ 5, Y 5, AKJ 3.

Quebec Division

Quebec — SCM, Gordon A. Lynn, VE2GL — SEC: S6A, ECQ: BB, TA, ZJ, QN, RM: BB, GM, PAM: DX, TX, ez-417, is on 14-Mc. phone from QSY in Valois. BQ is on 3800 kc. and has a lot of old-timers. Red Lumberjack, ez-217, now is QAS and sends his greetings to the gang. ATR reports that he is working Montreal radio to get QSOs and turbanicas. AB participates regularly in Frequency Measuring Tests and obtains excellent results. Call him for frequency check. QN reports Quebec City Emergency Net going fine and the gang has had lectures on map-reading and the building of mobile equipment. UNZ has installed extra battery in car-switching gear or parallel, using BC-451 receiver as converter in car. LO is maintaining daily schedule. TM finds it necessary to restrict QSOs to daytime appointments. PQN continues to operate daily at 7 and 10 p.m. on 3570 kc. but more stations are needed to give greater coverage of the Province. Look in on 3570 kc. during W3M and see what goes on, then crank the rig down and get in on the net. AKM, Canada's 11th nightly ham, is on 7000 kc. with 25 watts to 630 and PBY receiver. A0W of Lakeside, is building superbhet, as per latest Handbook. A0P is new in Montreal with a pair of 814A and 11551 converter and works on 3.5 Mc. WAGRI is working between 807 and 840 after a long silence. Traffic: (Jan.) VE2GM (Continued on page 102)
BOB HENRY, WØARA, OFFERS YOU:

LOW PRICES: I sell to you as cheap or cheaper than you can buy anywhere.

COMPLETE STOCKS: Collins, Hallicrafters, National, Hammarlund, RME, Millen, Harvey-Wells, Meissner, Gonset, Meck, Johnson, RCA, all other amateur receivers, transmitters, beams, TV, AM-FM, high fidelity amplifiers and speakers, test equipment, tubes, parts, etc. I can supply nearly any equipment shown in any catalog or advertisement and at lowest prices.

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VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VES6MJ — BN
is using parallel 507 in the new rig. JJ, ES, and TR
are reported to be well on the recovery from recent
illnesses. MJ installed n.f.m. in the rig and says most
reports are good. LQ is recovering from a nasty fall which involved a slight operation. JD has been
rested in the new rig on the operating table. JW is
operating 28-Mc. 'phone. CN has a new job with the
local transportation system. RG, BG, and MJ are oper-
tors with the 418th Auxiliary. CAARF, HJ, has
been appointed EJ for the Lethbridge area. Give him all
the support you can, gang. VJ was on the bit when an
emergency expedites in Calgary. LC is looking for the ultimate in frequency-measuring equipment. RC and RB have applied for ORS appointment. IK is new OBS. Traffic: VEGY 29, BG 48, BN 9.

BRITISH COLUMBIA — SCM, Ernest Savage, VEF7B
— Our efforts at the Blind School were rewarded when
Jimmie Nyman passed his examination; so, fellows, let’s
good go with the new class. Doctor Xu is very helpful to the
fellows in the North Country. New calls in Nanaimo are
DH, GP, and JJ. Yes, it was the SCM on 28 Mc. OJ and
AIR, of the Collingwood Club, have been seen muttering
something in the sort of Spanish. Too much of that, countryman.
PY and AMY are laid up in bed and will be there for some time.
XE, your RM, sends a nice activity report. IF made 36-w.p.m.
certificates on the first call. QC and TQ are working on rigs for 400 Mc. LP reports in with 60
w.p.m. of a.n. LK reports that the power company there just
pulled the big switch and all was well. CN has been
busy doing fine. XW and AOB are hard at it rebuilding their
new dreams. BJ is back in the BCAAF. AFO and VP are on
single sideband. QG is up in Edmonton. The N.C. No 1 is
looking for members and suggestions for a B.C. c.w.
contest. See FY. AJ transferred from Ashcroft to Abbotsford.
AOQ reports DX good on 3.8 Mc. lately. AFM is talking to
20 Mc. HE has been in Vancouer talking. BC reports 43
SW is too busy working to be heard often. AC, reflected
president of the BCAAR, is finding time to rebuild. Traffic: VEF1F 172, AOQ 161, XA 127, PB 70, UB 18, ID 6.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — Our
sincere sympathy to RO. Not many reports were
received this month. LC has new 3.5-Mc. VFO. SJW was
in the Veg, 35K now is located at The Pas as the operator for an
airline company, PA, at Dauphin, is heard on 3.8 Mc.
New members of the 'phone net are GG and GO. GV is
rebuilding. JN spent a week in Brandon. HB is new on
the list. How about more of you follows following Hall’s lead
and taking out an appointment. IA is QRT until the warmer
weather as the shack is too cold. CE has the Collins SRA
going, BS and AX are in the hospital. A speedy recovery
to you both. Eleven stations reported traffic this month:
a new high. How about some dope from DG, EA, GW, and
others? Traffic: (Jan.) VE4AM 157, PA 100, CE 57, RB
9, LF 9, PB 6, QD 5, CI 4, DJ 3, DQ 3, FS 1. (Dec.) VE4AM
16.

SASKATCHEWAN — SCM, J. H. Goodridge, VE5DW
— The Saskatoon Club have decided to hold a hamfest in
Saskatoon July 1st and 2nd. AW is building a new con-
verter. There are 40 members in the Saskatchewan 'Phone
Net. New net frequency is 3780 kc. Old Man-Walker, WAC,
OB into the house with the rig. Best wishes to RJ for a
quick recovery from his operation. On Jan. 6th the Sas-
katoon boys broke down and treated their YLs and XYLs to a turkey dinner and a social evening. HR ran up an FB
score in the January CD Party. KR is running 15 watts
on 28 Mc. and has worked all continents but Asia. WA,
PJ, and FJ are new ones in Maple Leaf. WB makes WAS
with his ZV set. KJ is working DX on 7 Mc. Some of
the gang have a coffee club on 3.8 Mc. each
morning. DG took unto himself a bride. JH reports the birth of
his third daughter. KJ has heard from Willow Bunch but
is ignored on 3.8 Mc. JV has received his DXCC award.
VB has S13 final now. DN is constructing a VFO. EK is
looking for someone with whom to swap parts. UQ’s truck
received considerable damage when hit by ice early
automobile, while Bill had a narrow escape. Traffic: VES1H
65, DW 2.
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Beginner's Transmitter
(Continued from page 10)

350-volt supply). Starting at a maximum capacitance, $C_{13}$ should be adjusted carefully until the plate current dips to a minimum. This indicates resonance at the crystal frequency. A further decrease in condenser capacitance should reveal another slight dip in plate current. This indicates resonance at the second harmonic or twice the crystal frequency. This setting should be avoided in operating the transmitter.

The 80-meter antenna-coil plug should now be connected up for either series or parallel tuning as indicated in the table. The link and coil center-tap wires should be disconnected from Pins 3 and 4. If series tuning is called for, Pin 3 should be strapped with a piece of wire to Pin 5. If parallel tuning is required, Pins 4 and 5 should be connected together and Pins 2 and 3 joined.

Now connect one of the feed-line wires to one transmitter output terminal. Connect the other feed-line wire to one terminal of a dial-lamp socket and the other dial-lamp terminal to the remaining output terminal, as indicated in Fig. 1. If series tuning is required, use a No. 41 (white bead) 2.5-volt 0.5-ampere lamp in the socket. If parallel tuning is specified, use a No. 48 (pink bead) lamp rated at 0.06 ampere.

Set $C_{14}$ at minimum capacitance, close the key and retune the amplifier to resonance at 80 meters. The dip in plate current probably will not be so pronounced as it was before the antenna coil was plugged in. Then adjust $C_{14}$ and watch the plate current. At some point in the range of $C_{14}$, the plate current should rise to a maximum. Adjust $C_{14}$ to this maximum. At this point the lamp in the feed line should show an indication of output. If it doesn't show at least a glow when series tuning is used, try a lamp with a lower current rating, such as the No. 46 (blue bead) which has a rating of 0.25 ampere. If, on the other hand, the lamp burns out with parallel tuning, use a lamp with a higher current rating, such as the No. 40 (brown bead) rated at 0.15 ampere.

Now readjust $C_{13}$ for maximum lamp brilliancy. A slight further readjustment of $C_{14}$ and then $C_{13}$ may improve the output. At this point, detuning $C_{13}$ in either direction should show at least a slight rise in plate current. If it doesn't, the coupling should be reduced by bending the adjustable link away from the antenna coil. Use the tightest coupling that will permit a discernible dip in plate current when $C_{13}$ is tuned through resonance. When tuning is completed, the dial lamp may be shortened out with a clip lead.

Forty-meter output can also be obtained with an 80-meter crystal, simply by plugging in the 40-meter coils and following the above procedure. However, the output in this band will be greater if a 40-meter crystal is used. Be sure to note from the table if there is a change between series and parallel tuning in going from 80 to 40 meters and wire up the 40-meter antenna-coil plug and change the dial lamp accordingly, if required. 
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= 394 405
- 395 406
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Armed Forces Day
(Continued from page 81)
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The contest will last 12 hours. It will begin at 1700 GCT May 20th and will end at 0500 GCT May 21st. Check the box on page 31 which shows the starting time in your local standard time. Don’t forget to add an hour if your locality is on Daylight Saving Time.

The QSO form will be left to individual stations. However, contest officials urge that in the interests of promoting new and renewing old friendships, each QSO include RST, QTH and name.

Any amateur radio station licensed by the FCC or by the Armed Forces of the United States is eligible to compete in the Armed Forces Day Contest.

Rules
a) General calls will be used as follows: (1) G.11, “CD AD”; (2) ‘phone — “CQ Armed Forces Day.”
b) All amateur bands, either ‘phone or c.w., can be used.
c) Single- and multi-operator stations will be considered separately for purposes of scoring the contest.
d) Operating and message procedures will conform to standard amateur practices.

e) All contest logs will be sent to Room 5 B 519, The Pentagon, Washington 25, D. C., postmarked before midnight May 30, 1950.

Scoring

Points

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Contest log forms are available upon request. Write Armed Forces Day Contest, Room 5 B 519, The Pentagon, Washington 25, D. C.

Capt. E. L Nielsen W4ODI, chief of MARS-Army, Comdr. E. L. Battey, WA1A, Naval Reserve liaison officer, Naval Communications, and Major A. H. Ralls, W4RB, chief of MARS-Air Force have been named to a committee to supervise and judge the contest.

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<th>State</th>
<th>Call Sign</th>
<th>Frequency</th>
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<td>WSFWA</td>
<td>320- 37-17</td>
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<tr>
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<td>W9JMR</td>
<td>4047-913-19</td>
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<td>W6KCR</td>
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Southern California

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Arizona

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San Diego

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Homeland

W6AWT

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Canada

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<tr>
<th>State</th>
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<tr>
<td>Ontario</td>
<td>VE2GA</td>
<td>144- 12-12</td>
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<tr>
<td>Quebec</td>
<td>450- 38-12</td>
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WESUR

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<th>State</th>
<th>Call Sign</th>
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<tr>
<td>British Columbia</td>
<td>VE3EH</td>
<td>3192-114-28</td>
</tr>
<tr>
<td>VE3W</td>
<td>336- 21-14</td>
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Saskatchewan

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<th>Call Sign</th>
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</thead>
<tbody>
<tr>
<td>VE3QZ</td>
<td>3250-130-25</td>
</tr>
</tbody>
</table>

Happenings

(Continued from page 88)

sger Fred Schnell, IMO, left on a world-wide cruise with the Navy to demonstrate the value of the short waves, OM Handy was called to Hartford to take over the administration of the Communications Department and its field organization, a post he has held ever since. The amateur body, and particularly those primarily interested in organized operating activities, will certainly join in extending warm 73 to "FEII" and good wishes for the next 25 years.

Sweepstakes Results

(Continued from page 41)

Maine

<table>
<thead>
<tr>
<th>Call Sign</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>W9JMR</td>
<td>17,500- 200-35- A-21</td>
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<tr>
<td>W9KJK</td>
<td>18,300- 163-30- B-20</td>
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<tr>
<td>W9WBU</td>
<td>11,625- 158-30- B-25</td>
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<tr>
<td>W9XGJ</td>
<td>9914- 192-30- B-8</td>
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<tr>
<td>W9HC</td>
<td>9825- 178-35- A-20</td>
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<tr>
<td>W9AW</td>
<td>8650- 127-96</td>
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<tr>
<td>W9ID</td>
<td>6505- 100-16- A-15</td>
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<tr>
<td>W9XGJ</td>
<td>450- 60-29- A-7</td>
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<tr>
<td>W9LJ</td>
<td>410- 70-29- A-28</td>
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<td>W9GF</td>
<td>3640- 56-25- A-9</td>
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<td>2088- 40-17- A-10</td>
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<tr>
<td>W9WBU</td>
<td>2080- 40-20- B-7</td>
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<td>W9AAB</td>
<td>1300- 40-16- A-3</td>
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<td>W9UNA</td>
<td>1268- 40-14- A-4</td>
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<td>W9MM</td>
<td>1160- 90-65- B-9</td>
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<tr>
<td>W9WBU</td>
<td>1180- 80-75- A-3</td>
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H. Massachusetts

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<tr>
<td>W9T</td>
<td>117,100- 697-71- A-35</td>
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<tr>
<td>W9MB</td>
<td>58,300- 557-71- A-32</td>
</tr>
<tr>
<td>W9NW</td>
<td>46,831- 320-59- A-32</td>
</tr>
</tbody>
</table>

(Continued on page 118)
CABINET RACKS
Made of 1/16" electrically welded steel, louvers on sides, ventilation in back. Flap panel mounting for 10" rack panels. Door on top with snaplock and piano hinges. Finished in Black Wrinkle.

**MODEL**
- **108 Panel Size 3 1/2" x 11 1/2"**, Size of Cabinet 18" x 21 1/4" x 15", Single Unit. .......... **$ 6.67**
- **1116 Panel Size 15 1/4", Size of Cabinet 14" x 21 1/2" x 15", Single Unit. .......... **$10.13**
- **1917 Panel Size 13 1/4" x 11 1/2", Size of Cabinet 14 1/2" x 21 1/4" x 15", 24 Double Unl-Door Top and Back .......... **$13.87**
- **2263 Panel Size 26 1/2" x 16", Size of Cabinet 26 1/2" x 16" x 16", Double Triple Unl-Door Top and Back .......... **$15.66**

We carry a complete line of Steel Bottom Plates.

AMPLIFIER FOUNDATIONS
Deluxe models louvers on sides and elongated holes on top for maximum ventilation. Round corners Black Wrinkle Chassis. Grey Wrinkle covers.

**MODEL**
- **5103**
- **6143**
- **7173**
- **10173**
- **10173**

**PRICE**
- **$1.78**
- **$1.98**
- **$2.43**
- **$2.52**
- **$2.93**

**TRANSFORMER SPECIAL**
870 volt CT @ 450mA with 80V bias top 5 volts @ 3 amps 2 1/2 volts CT @ 10 amps 2 1/2 volts @ 3 amps 6.3 volts @ 1.5 amps 115V, 60 cycle primary .......... **$3.95**

FLYBACKS
HVO-1 for RCA 211T1. Provides up to 100M anode volts for 7 or 10BP4. .......... **$4.15**

HVO-3 for RCA 211T3. Provides approximately 90M anode volts for 10" & 12" tubes. .......... **$4.15**

HVO-5 for RCA 211T5. Provides approximately 14M anode volts for #16AP4 or similar tubes. .......... **$5.35**

HVO-6 for G.E. T71J. Provides up to 14M anode volts for any tube to 19". .......... **$5.92**

TUBES
3C24 Triode 100 Watts output. 8.3 Volts 3 amp. Filaments 500 Volts plate @ 75 Ma. Each $3.50

2 x 2870 Rectifier 2.5 amp. .......... **$1.90**

VERTICAL OUTPUT
2 Hys @ 250 Ma D.C. type C-2997 .......... **$1.92**
2 Hys @ 200 Ma D.C. type C-2997 .......... **$1.62**

HORIZONTAL OUTPUT
2 Hys @ 250 Ma D.C. type C-2997 .......... **$1.76**
2 Hys @ 200 Ma D.C. type C-2997 .......... **$1.62**

ISOLATION TRANSFORMERS
All 117 Volts to 177 Volts 60 Cy. 1800 watts 3.50 P-98, 100 watts 9.30 P-98, 50 watts P-171, 2.00 P-98, 60 watts P-98. We ship to any part of the globe.

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Continuous Tuning Final Tank
Front Panel Controls
Unique Pierce Oscillator
VFO Input Receptacle

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W1RCHA 30,713 - 275-45-A-23
W1KJO/Y 25,685 - 234-44-A-18
W1BVR 17,345 - 190-14-A-11
W1AVC 13,005 - 135-32-B-33
W1BEF 12,490 - 142-44-B-17
W1RZG 12,045 - 178-31-A-16
W1AZW 11,390 - 142-32-A-12
W1JFL 7,900 - 84-47-B-11
W1DST 7,400 - 90-37-A-12
W1RIA 5,035 - 74-29-A-19
W1OPJ 3,535 - 63-23-A-7
W1CQY 1,740 - 19-18-A-4
W1BVI 1,520 - 34-18-A-4
W1BHT 535 - 22-11-A-17

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WH5AAD 53,065 - 284-60-A-38
WH5VP 16,800 - 77-40-A-10

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W1QYX 41,725 - 315-53-A-33
W1CVK 3,135 - 61-30-A-8
W1QYX 455 - 19-13-B--
W1HKG 30 - 5-5-B-

RHODE ISLAND

W1CHU 102,940 - 574-72-A-38
W1BBN 27,475 - 175-70-A-35
W1HFK 28,265 - 247-45-A-35
W1CQK 18,035 - 185-30-A-14
W1AWE 10,685 - 123-42-A-31
W1MLJ 7,600 - 95-32-A-

VERMONT

W1KRV 52,035 - 414-63-B-30

NORTHEASTERN DIVISION

ALASKA

KL7EQ 25,495 - 170-92-A-30
KL7PS 12,065 - 128-18-B-13

IDAHO

W7FBF 46,245 - 203-63-A-22
W7MOU 42,240 - 340-64-B-32
W7HUG 27,620 - 209-53-A-21
W7MHR 14,635 - 171-94-A-20
W7T 12,495 - 190-48-A-40

MONTANA

W7FLB 31,585 - 250-62-B-25
W7BRJ 31,005 - 254-59-A-39
W7C 25,355 - 201-69-A-17
W7MHQ 25,531 - 210-43-A-26
W7MKJ 15,950 - 145-57-A-13
W7LER 8290 - 92-36-A-24
W7DHR 7,490 - 74-41-A-18
W7NRJ 5,465 - 81-27-A-17
W7GOH 792 - 22-18-B-

SAN FRANCISCO

W6BIP 8,608 - 474-72-B-10
W6WQ 6,574 - 328-60-A-30
W6BH 4,855 - 394-60-A-20

SACRAMENTO VALLEY

W6BIP 33,330 - 253-66-B-19
W6WQ 19,475 - 147-53-A-50
W6WT 198 - 11-9-B-2

SANTA ROSA VALLEY

W6SRO 100,500 - 577-72-A-10
W6BMY 51,191 - 351-71-B-22
W6QX 13,260 - 100-33-A--
W6QX 13,260 - 100-33-A--
W6BMR 1240 - 73-32-A-14
W6QX 2,304 - 58-25-A-33
W6GHH 1010 - 25-28-A-2

ROANOKE DIVISION

Virginia
W4AEO 89,300 - 551-64-A-40
W4OGG 38,240 - 418-70-B-90

(Continued on page 114)
SEE LEO FIRST . . . QUIT WORRYING ABOUT TVI—GET A WRL TRANSMITTER . . .

Tests with amateurs living in congested and fringe areas using WRL transmitters have proven to us that we have a XMTR with minimum television interference. Write today for detailed information!

NEW WRL ‘400’

GLOBE KING
“More Watts Per Dollar”
A versatile, advance design transmitter that gives efficient performance on all bands—10 to 160 on phone and CW, 350 watt phone—400 watt CW. Provisions for ECO. Complete—with one set of coils.

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$379.45
WIRED-TESTED
$399.45
Low Down Payment

WRL 175 WATT GLOBE CHAMPION

R.F. Section a complete 175 watt XMTR. Provisions for ECO. Automatic fixed bias on Final and Buffer. Class B Speech Modulator 175 watt input—10 thru 160 meter bands. Complete with tubes, meters, and 1 set of coils.

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KIT FORM
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  □ Radio Map
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Address:
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Just right for your control room walls. Approximately 28” X 36”.
Contains time zones, amateur zones, monitoring stations. Mail coupon today and 25¢

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ELDICO ADDS 2 NEW KITS
TO THEIR FAST GROWING SENSATIONAL LINE OF HAM KITS

No. 1—TR-75-TV
A 75-WATT TVI'd RIG

TR-75TV * Basically this is the same top-value kit as the sturdy dependable TR-75. TVI's have been added all of Eldico's working tools to eliminate television interference. In addition to all of the components, the TR-75TV includes integral low-pass filters; picture work output tuner for additional harmonic attenuation; fully shielded 807 grid circuit; 8" square meter; fully shielded cabinet. $45.95 complete.

THE STANDARD TR-75, less TVI components...$34.95

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A REALLY FINE ELECTRONIC BUG

Now Eldico electronic bug Eldico introduces an electronic bug incorporating every improvement known to the art. Proven designs...worked over by Eldico engineers...analyzed in the light of O'Malley's January 1959 article "By Changing the Electronic Bug," Eldico offers two basic models, one with a built-in monitor.

Each key comes complete with all components, including a deluxe key assembly and a modern housing for the entire unit. Among the electrical features are self-forming dashes that automatically insure perfectly formed dashes; separate controls for speed and weight of characters; over-all components riveted for a lifetime of continuous service.

EE1, Electronic Bug in kit form...$21.95
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EE3, Model EE1 completely assembled and tested...$27.95
EE4, Model EE2 completely assembled and tested...$39.95

The complete Eldico line of TVI FILTERS, TRANSMITTERS, and POWER SUPPLIES is available from top National Distributors throughout the United States. If your distributor cannot supply you with Eldico kits write Eldico directly. WRITE NOW FOR YOUR FREE TVI BOOK, "TVI CAN BE CURED."

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100 WATTS - 40 WATTS

Eldico makes two Modulators for the Ham, in kit form, the MD-100 and the MD-40 (which also comes with a power supply MD-40P). In keeping with the fine high quality design of all Eldico kits, these Modulators come complete ready to assemble and put to work. Both units are designed to accommodate the Electro-Voice Speech Clipper and the MD-40 series includes the Electro-Voice 915 high level crystal Mike.

MD-100 * Complete Kit...$45.95
MD-40 * Complete Kit and mike...$29.95
MD-40P * Complete Kit with power supply and mike...$39.95
SPEECH CLIPPER...$14.70

ELDICO GRID DIP OSCILLATOR

The "Grid-Dipper" is a really hot test unit in the shack. Save countless hours of building time, know your circuits are right. Complete with all parts and internal power supply, Range 5 Mci to 250 Mc in six steps. 7¼ x 5½ x 3"...$12.50

Modification Kit, including instruction to convert to regeneration type...$3.00

NOTE: All prices F.O.B., New York City and are subject to change without notice.

TR-1 TRANSMITTER KIT

A conservative 100-Watt phono and c.w. rig 645-616-616-616. Class B 811 modulators. All bands, 20, 40, 20, 15, 11, and 10. Exciter broad band, single control PA tuning. Three power supplies delivering 1500 vdc at 50 ma, 500 vdc at 200 ma, and bias supply. Aluminum chassis, tubes, transformers, capacitors, resistors, antenna changeover relay, meter, wire, hardware and coils included. Electro-Voice 915 high level crystal microphone part of the package. Plug in the crystal and line cord and you're on the air. Only $195.00 cash or $89.50 down payment plus six monthly payments of $15.75.

ELDICO OF NEW YORK INCORPORATED
44-31 DOUGLASTON PARKWAY
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115
Center Loaded Whip Antennas
For Your Mobile or Marine Installation

On 2 to 8 Mc.

A "must" for efficient operation on all frequencies between 2 and 8 Mc. The basic 75-meter Center-Loaded Antenna covers the entire mobile phone band. Other coils available for the marine 2000 to 3000 Kc., airport 3105 Kc., CAP 2374 Kc. and PS frequencies. Send for special Bulletin.

W6AAT 3475-59-54-B-7 VE3A9D 20,231-176-59-B
W5QID 3-1-1-A-1 VE3MW 20,029-164-49-A

Oklahoma
W5LIW 86,400-900-78-2-B-37 VE3SR 13,197-128-53-B-11
W5NR 35,400-300-64-B-23 VE3QT 11,228-119-38-A-17
W5OWG 27,000-235-54-B-19 VE3TO 10,440-105-40-A-25

Southern Texas
W5QEL 102,612-781-69-B-36 VEZIN 62,310-384-65-B-40
WS5Q 70,263-400-70-J-40 VE3PO 32,000-225-56-A-21
WS5QLP 52,000-407-65-B-26 VE3OLS 26,810-225-65-J-17
WS5QG 35,613-321-61-B-33 VE3QG 19,500-74-A-9
WS5CX 23,500-222-60-A-— VE3GT 9,650-42-42-A-7

New Mexico
WS5CA 29,205-191-69-A-11 VE3EY 9,400-95-16-B-21
WS5PN 29,016-208-65-A-30 VE3EY 7,400-95-16-B-21
WS5NR 19,105-135-53-A-21 VE3EY 6,000-95-16-B-21
WS5A 10,034-104-59-A-12 VE3EY 6,000-95-16-B-21
WS5OE 10-2-2-A-1 VE3EY 6,000-95-16-B-21

CANADA
Maritime
VE1TR 59,800-370-65-A-35 VE1ABC 65,482-461-71-B-40
VE1ICU 59,585-289-66-B-34 VE1ER 46,950-389-66-B-31
VE1EJ 359-9-11-B-1 VE1EJ 2950-50-20-A-7

British Columbia
BTH OS NV WY 3645-69-19-A-21
VE1GA 645-47-9-B-6
VE1ACR (VE3A AHW AOB) 3645-69-19-A-21

Yukon
VE3AK 2600-59-20-A-7

Manitoba
VE3AIL 2600-59-20-A-7

Saskatchewan
VE3EIK 3645-393-71-A-37
VE3MQ 49,078-302-65-A-30
VE3EAM 52,706-267-61-A-38

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440 Main St.
Free Employment Service • GI Approved

Hints & Kinks
(Continued from page 65)

least one case it was right in the middle of TV Channel 6, resulting in a weird case of TVI where interference was present only when the key was open! These parasites yield to the usual treatment of inserting an r.f. choke such as the Ohmite Z-144 or Z-50 (depending on the frequency of the parasitic) right at the plate connection of the 6Y6. It may be significant that in cases where parasites were encountered, the clamping tube was installed in the power-supply chassis instead of close to the amplifier tube. Thus, short leads seem to pay off again. — W1FTX
I GUARANTEE YOU THE BEST TRADE-IN DEAL!

YES SIR! I DON'T CARE HOW AMAZING OR SURPRISING ANY OTHER OFFERS MAY BE -- IT WILL PAY YOU TO GET YOUR NEW RECEIVER OR TRANSMITTER FROM ME!

DON'T WAIT ANOTHER DAY -- BRING IN YOUR OLD EQUIPMENT NOW! YOU WILL BE MORE THAN SATISFIED WITH MY SQUARE DEAL!! IF YOU LIVE OUT OF TOWN, WRITE AND TELL ME WHAT YOU HAVE TO TRADE AND WHAT YOU WOULD LIKE TO GET FOR IT.

START ENSURING THAT NEW GEAR RIGHT AWAY!

73, Bill Harrison, W2AVA

LYSCO'S TVI-LESS BAND SWITCHING VFO TRANSMITTER

Send for illustrated descriptive bulletin.

- TVI SUPPRESSED! Xmt designed with 3-section, low-pass filter incorporated in output - all leads bypassed for RF - most effective shielding - etc., etc.
- 35 WATTS - 6AQ7 Crystal Oscillator, 6AQ7 Buffer Doubler, and 6SL7 Final Amplifier with 55 watts input on all bands.
- VFO CONTROL - Calibrated output on 10, 11, 15, 20, 40, 80, and 160 meters. Provision for crystal control, too.
- CW BREAK-IN - Oscillator keying for clean, chipless, full break-in operation. Built-in key click filter.
- MODULATION PREV OSION - Terminals provided for external modulator. Add 15-watt amplifier and enjoy phone operation. (Special 15-Watt Modulator - $92.50 complete!)
- FINGER TIP CONTROL - Completely band switching! All controls, switch, switch, VFO and select switch, etc., on front panel. Large illuminated vernier dial.
- REGULATED SUPPLY! - Built-in supply uses VR-150 voltage regulator and 555Y, high output rectifier!

Excellent as a compact portable or home station transmitter. Coaxial connector output to 50 to 75 ohm cable to feed antenna or high power amplifier. Attractive metal cabinet finished in black crackle with chromium trim - 15" x 9" x 3" deep. Weighs 25 lbs. Supplied complete with all tubes. Nothing more to buy! Simply plug into 115V AC line! Complete installation and operation instructions including owner's data furnished. Operate all bands - QSY at will - eliminates TVI!

Lyso Transmitter $99.50
Model 600
EXCLUSIVE -- Available Only At Harrison Radio!!!

NEW DOUBLE CONVERSION COMMUNICATIONS RECEIVER

Hallicrafters SX-71
Now in stock for immediate delivery

Only $179.50

Here's the new SX-71, a receiver designed expressly to meet superior ham band performance, incorporating features found only in the highest priced receivers - and the home! Prices are lower now than ever before! Continuous coverage from 530 KC to 35 MC, and 48 MC to 156 KC - and look at that big directly calibrated analog meter! Built-in limiter and balanced detector stages for noise-free, NBFM reception. Double conversion gives better than 300 to 1 image rejection.

HARRISON HAM-A-LOG

HAR A-M-A-LOG! Features HARRISON'S all models - laboratory calibrated parts including special condensers and copper-plated utility boxes! Check your HAM-A-LOG carefully for converters, antenna rotators, new type police whips, and HARRISON'S BIGGEST BARGAINS in power transformers and beam antennas! Don't miss these super-values! Send for your copy today! A postcard will do.

HARRISON HAM-A-LOG

20-FOOT MAGNESIUM LADDER BOOMS

Yours 20-foot straight ladders make excellent boom for optimum spaced four-element ten or three-element twenty meter beam. Use our ladder for HUV or any other installation. Requires no painting or maintenance after installation.

20' Magnesium Ladder
PREMAX CORULITE BEAM ANTENNA ELEMENTS

Only $35.95

Elements for four-element ten meter beam $32.00
Elements for three-element twenty meter beam $25.50

HARRISON

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225 GREENWICH STREET
(10 West Broadway, at Barclay St.)
Barclay 7-7777

ATTENTION ALL BC-221 OWNERS!
It will pay you to send for our special bulletin No. 221.
ATTENTION

MOBILE HAMS

Complete mobile package — nothing else to buy. Outstanding mobile signals use motorola equipment — backed by years of communication equipment experience — World’s largest producer of 2-way mobile equipment.

A mobile transmitter with a double feature FM or AM at flip of the switch, the MOTOROLA FMT-30-DMS (27-30 MHz)...

$130.00

MOTOROLA P-69-13-ARS receiver with special noise limiter for use with any converter having 1500-3000 KC.

$60.00

P-7253 spring base rear antenna

$22.50

3-50 famous Gon-set converter complete to connect to the P-69-13-ARS receiver...

$39.95

P-327-E Fire wall loudspeaker...

$5.00

The above comes complete with all necessary accessories and mounting hardware. Order direct or through the Motorola National Service Organization member in your area.

For further information write to:

MOTOROLA INC.

Amateur Sales Dept. QST-April

1327 W. Washington Blvd. Chicago 7, Illinois

Attention: Harry Harrison W9LX

Telephone — Taylor 9-2200 Ext. 161

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DEPT. TN
Valparaiso, Ind.

ALMO SPOTLIGHT SPECIAL

GRID DIPPER OSCILLATOR KIT $21.50

Here’s the famous GDA Grid Dipper in kit form. Saves hours in improving your rig. Kit comes complete with all parts, tube and instruction book. Range: 3 Mc to 250 Mc in six steps.

Write for FREE broadcaster newspaper

ALMO RADIO CO.

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6205 MARKET STREET • West Phila.
6th & ORANGE STS. • Wilmington
4401 VENTNOR AVE. • Atlantic City

2-METER STATION

(Continued from page 47)

horizontally. The position should be determined by the polarization in use in one’s own neighborhood. Except under very favorable conditions one cannot expect to work more than 30 or 40 miles with such simple antenna systems. This may be enough to provide many contacts in areas of dense population, but the enterprising 2-meter enthusiast will want something better soon.

Fig. 8 — A simple antenna for 2-meter work is the folded dipole. This may be made of any metal tubing, rod, or wire that may be bent into the desired shape. It is fed with 300-ohm Twin-Lead, terminated with a Millen 37412 plug, to fit the antenna terminal on the control unit. The antenna may be used either horizontally or vertically, depending on the polarization used in one’s own locality.

Experimental work with high-gain antenna arrays is, in fact, one of the most intriguing fields of amateur endeavor. Because of the relatively-small size of arrays for 144 Mc, the 2-meter worker can almost always find room for something better than the simplest dipole, and he will find that the results obtained will be directly proportional to the effort he spends in putting up the best antenna within his means.

Two minor errors in the parts list for the 2-meter converter, Part I, have come to our attention. Under Fig. 1, R3 should be 10,000 ohms, 1/2 watt, instead of 1 watt. C7, C9, C10, and C11, the 0.005-µfd. ceramic condensers, should be Sprague 20C-1. The 20C-4 specified is actually 0.001 µfd., but either type may be used.

Crystal Filters

(Continued from page 69)

proper use of the phasing control by which interfering signals can be dropped to a very low level. Try increasing and decreasing the capacity of C2, and you will be amazed to find that heterodynes and cross talk can often be reduced to a point where they are not even noticed. It may be necessary to tune slightly on either sideband when “phasing out” interference.

Even when operating correctly it will be necessary to advance the audio gain and possibly the r.f. gain control on the sharp position, but the loss is in the high-frequency audio components rather than the r.f. There may be a slight reduction in r.f. gain but, if the signal is tuned carefully on sharp positions, the loss in sensitivity is very small. Careful checks on our particular filter show no appreciable reduction in r.f. gain.

That’s it, boys — an addition to your receiving set-up that can give you a new outlook on QRM and certainly help on both phone and c.w. Build it up, use it for a day, and you’ll be sold.
Of Course You don't have to PREFER the
ASTATIC D-104 MICROPHONE
Just because the Great Majority of Amateurs do

BUT... Often manufacturers tell you that their product is preferred
by most buyers and, therefore, you should prefer it, too. Such
reasoning is open for question. It depends upon whether the preference is
the result of studious, qualified decisions on the part of buyers or is
the result of other factors. Seldom do you find a group of buyers
so well informed technically on the products they
buy as among purchasers of equipment for
amateur radio rigs. Certainly this gives
real weight to the overwhelming
popularity of the D-104 Microphone.
Astatic feels justified in taking unre-
served pride in this ”opinion of ex-
erts” on the D-104... feels that it
merits your consideration.

Astatic Crystal Devices manufactured
under Brush Development Co. patents

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Entrance examination May 22nd.

Literature upon request. Veteran training
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BROOK All Triode High Quality AUDIO-AMPLIFIER

Combines all these features
Distortion and intermodulation
at a new low.

Brilliant, clear tone.

Reduction of listening
fatigue.

Separate controls-stepped-for
Bass and Treble.

Extremely low
volume without
any loss of
quality.

for the
maximum
in listening
Pleasure

Write TODAY for FREE Technical
Bulletin and Detailed
Distortion Analysis

BROOK ELECTRONICS, Inc. Dept. QD-O,
34 DeHart Place, Elizabeth N. J.

ILLUS. Model 10C3-30 watts
Also available, Model 12A3-10 watts.

119
50 Years of Progress

(Continued from page 49)

conclusions have been reached beyond the fact that the phenomenon exists. But remember — amateurs noticed it first!

Neophytes will be interested in simple equations that can be used to determine S reports when working a country from which they have no QSL card, thus eliminating any guesswork or personal factors. After thorough study and two weeks use of the autocorrelator and the differential analyzer made available through the courtesy of M.I.T., the following relations were derived. DX signal strength reports can be determined by

\[ S = 6 + \frac{N}{33} \quad \text{for } N < 100 \]

or

\[ S = 7 + \frac{(N - 50)}{75} \quad \text{for } 100 < N < 200 \]

In either equation, \( N \) = number of countries confirmed by card, \( S \) is given in the nearest whole number.

**Conclusions**

The history of amateur radio is a glorious one of 50 years of progress. A proud history, and who knows what the next 50 years will bring? Surely we need new fields to conquer.

**How’s DX?**

(Continued from page 87)

New York City, N. Y. — W4BYF has good news from PJSTJ. Liberalization of amateur regulations in Curacao is anticipated in the near future. W5WVY got quite a bang from being PJ5KG’s first QSO, the latter employing a freshly-homemade rig — LH211D/XX is still sending cards through as W9AND will attest and, in a P.S., the fellow lays claim to being the only ham in Bulgaria (and strictly under cover) — PK1RI flipped over W9DAW and sent a PEI QSL bureau as “Pop Factory, Djakarta, Indonesia,” while ZD4AU would like to clear up his QSL debts as W11KE is informed and may be reached in this respect as follows: J. L. Speer, Opera-Joburg, Mail Clerk, Pan-American Airways, LaGuardia Field, N. Y.

— Ex-F0QIF/FSM, now FM7WE, vows to lick his QSL backlog and whistle his W contacts be patient, says W4PU. We’ll wait about for some info concerning the new switches in French Colonial prefixes (numerals) although it appears a matter of small importance since alphabetically they are still fairly consistent — HB9JJ will put H61JJ on the air April 7th through 10th and will try to give 3.5-, 7- and 14-Mc. e.w. a try as well as 3.5 and 7-Mc. phones. Clarity is a 100%-QSL man and you may fire him cards direct or via USKA.

Wia QLU and TO express considerable curiosity as to what country the prefix EX1 represents inasmuch as so many QSLs from EXIT are to be noted adorning the doorways of public buildings. He’s a new one to us, we’ll admit, but savor a reminiscence of the P111YY confirmations tacked up on stands in rural areas, now less often seen.

**Correspondence**

(Continued from page 68)

more fun to a low-power job than with the big ones. For me the difficulty lends enchantment and the kick when some remote bird comes back is greater because of the low power.

Now it is not easy but there are tricks one can use. A VFO is essential and break-in is essential. You gotta stay away from the pile-ups where a lot of high-power boys are fighting each other. You must pick clear spots in the band, and you must know which band to use at what times of day.

Many is the time I have run away with some DX by calling a little below or above the pile-up and then I leave the h.p. boys to fight themselves to a standstill while I QSO the DX.

Another thing you must do is to go to bed early and get up early, say 8 P.M. and 2 A.M., if you want DX. Then the local boys are tired out with their h.p. fights and the little pile squeak you operate has a chance.

So the low-power boys can do it too!

— Keith Henney, W4GU/KB8H
2 New Harmonic Filters by R. L. Drake for TVI Reduction

20-Meter Half-Wave Filter
TV-300-20HW
$10.95 Amateur Net
22.5 Mc. Cut-off Low Pass Filter
TV-52-20LP
$12.95 Amateur Net

ATTENTION 20-METER MEN! If your 2nd and 3rd harmonics are interfering with other services, in addition to TVI from your higher harmonics, these new Harmonic Filters are just what the doctor ordered.

The TV-300-20HW is patterned after the "G. E. Harmonictics" and uses same construction as our TV-300-10HW 10-11 Meter Filter announced in March OST. Attenuates all harmonics of a 20 meter xmtmr. For use in 300-ohm twin lead or open lines 200 to 600 ohm. Will handle a 1 KW AM phone xmtmr.

TV-300-10HW For 10-11 Meter Xmtr.
TV-300-20HW For 20 Meter Xmtr.
Either Model $10.95 Amateur Net.

The TV-52-20LP is identical to our popular TV-52-40LP except the cut-off frequency has been lowered to 22.5 Mc. For attenuation of the 2nd and 3rd harmonics of 20-meter xmtrs in addition to all harmonics in the TV bands. Use in 52 or 72 ohm coax lines or coupling links. Will handle a KW.

TV-52-20LP Cut-off 22.5 Mc., for xmtra 15 to 160 mrts.
TV-52-40LP Cut-off 44.5Mc., for xmtra 10 to 160 mrts.
Either Model $12.95 Amateur Net.

TV-300LP Low Pass Filter for 300-ohm Twin Lead, Cut-off 44.5 Mc., for xmtras 10 to 160 mtrs. $12.95 Amateur Net.

Tell your neighbors about the R. L. Drake High Pass Filter

Two types available—TV-300-50HP for 300-
2nd and 3rd harmonics.
TV-52-50HP for small
72-ohm coax.
Either
type $5.95 List
Installed in the antenna input to a
TV set this filter suppresses inter-
ference (50 mc. and lower), from amateur
xmtr's and many other
sources. Especially effective where
fundamental overloads the TV set.
Write for our folder "The Need for
a High Pass Filter."

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Works SMOOTHLY! EASILY! PERFEKTILY! Never tires the
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In radio service work, time means money.
Locate trouble faster, handle a much greater
volume of work with the SIGNALEETTE. As a
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equal. Merely plug in any 110 V. AC-DCl,ine,
start at speaker and of circuit and trace back,
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National's famous receiving-type condensers are available with either straight-line wavelength plate shape or straight-line capacity plate shape. Special features can be supplied in quantity, such as serrated rotor plates, staked rotor and stator plates, shaft extensions for ganging and special capacities as high as 335 mmf. for single-section and 100 mmf. per section for dual condensers. Commercial inquiries invited.

A.R.R.L. QSL BUREAU

The ARRL maintains a QSL bureau system to make it easy for you to receive your DX QSL cards, but in order for it to function it is necessary that we receive your cooperation. All you have to do is send the QSL manager for your call area a stamped self-addressed envelope of the No. 10 stationer's size (No. 8 post-office size), with your name and address in the customary place and your call letters printed prominently in the upper left-hand corner. When he has an envelope full of cards for you, he'll return the envelope to you. Upon receipt of that envelope, be sure to send him another.

If you've previously held a different call, send an envelope to the manager for that call area. All QSLs for portable operation are routed via the home district.

Do not send cards for other W or VE stations for distribution via the QSL bureau; they cannot be accepted. Likewise, do not send cards for distribution to foreign stations via this domestic QSL bureau system. For the addresses of the proper bureaus to which foreign cards may be sent, see page 61 of December, 1949, QST.

The bureau handles only incoming DX QSLs.

W1, K1 — Frederick W. Reynolds, W1JNX, 83 Needham St., Dedham, Mass.
W2, K2 — Henry W. Yahuel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3 — Jesse Biehler, W3KT, Box 34, Philadelphia, Penna.
W4, K4 — Johnny Dorohe, W4DFF, 1011 East Cadal Ave., Nashville, Tenn.
W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas
W6, K6 — Horace R. Groer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
W8, K8 — William B. Davis, W8JNF, 4228 W. 217th St., Cleveland 16, Ohio
W9, K9 — John F. Schneider, W6CFU, 304 W. Ross Ave., Waukesha, Wis.
W10, K10 — Alva A. Smith, W1ODMA, 238 East Main St., Caledonia, Minn.
VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 — Austin A. W. Smith, VE2CUW, 6104 Jeanne Mancer, Montreal, Que.
VE3 — W. B. Knowles, VE3QJ, Lanark, Ont.
VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
VE5 — Fred Ward, VE5OP, 99 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6BO, 329 15th St., North Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B. C.
VE8 — Jack Spall, VE8AS, P. O. Box 268, Whitehorse, Y. T.
KP4 — E. W. Mayer, KP4KD, P. O. Box 1061, San Juan, P. R.
KZ6 — C.Z.A.R.A., Box 407, Balboa, Canal Zone
KH6 — Andy H. Fuchiki, KH6BA, 2543 Nanauu Dr., Honolulu, T. H.
KT7 — Box 73, Douglas, Alaska

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Output 425 V.
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Weighs only 9 lbs., overall length 7 inches, height 4 inches. Has standard 4-hole mtg. base and black wrinkle finish case. Input current 46 amps. when loaded to maximum output of 425 V. at 375 MA. On actual test, other ratings are 30 A. input with 285 MA load, 25 A. input at 160 MA load, 20 A. input with 100 MA load. Both windings completely isolated from frame.

Top make, beautifully engineered. Originally manufactured for use with Western Electric equipment. Brand spanking new in original factory cartons. Shipping weight, 11 lbs. No. 32B235—Available only at B-A.............$9.88 For Parcel Post Shipment add 91c (over remittance promptly refunded.)

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HAM-ADS

(1) Advertising shall pertain to radio and shall be of such character as to interest amateurs or experimenters in their pursuit of the art.

(2) No advertisement for sale or purchase of any apparatus, or for the purchase or sale of any material, or for the purchase or sale of any location, or for the purchase or sale of any service which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30c per word, except as noted in parentheses.

(4) Remittance in full must accompany copy. No discount allowed unless noted.

(5) No advertiser may use the term "free" in an advertisement, with the exception of "free library" or similar.

(6) The closing date for Ham-Ad is the 25th of the second month preceding publication date.

(7) All advertising shall apply to advertising which, in our judgment, is obviously non-commercial in nature, and signed and accepted by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used, and for sale, or for a separate offer of exchange or advertising inviting for special equipment, if by a member of the American Radio Relay League takes the 7th place. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 9th rate.

(8) Provisions of paragraphs (1), (2), and (4) 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 not vouched for their integrity for the grade or character of the products or services advertised.

Please note the 7th rate on hamsizes is available to ARRL members only.


GREAT LAKES Division ARRL Convention Hotel Statler, Detroit, May 27-28-29. Registration and Banquet, $7.50. Mammoth Swap 'n' Sell session. Complete line of apparatus and parts. Berlinski, 31, Michigan, for tickets or buy through local club or dealer.


700 MHz QST. Excellent deals: Hallicorder 2-60C, National 184, 350-watt 8000$ transmitter modulator, TS-403, Clarion speech, in 4 ft. bud cabinet, 160 to 10, scales and mikes, working. All parts sold for component work. 1-000 1960, 1-000 1965, M. Mrs. Mary C. Frazer, 130 Front St., Lewes, Delaw. 0.

SELLING: Hammond 24-20 transistor and 4-11 modulator with coils for 10 and 20 meters, $30.00. New SCC-522 transmitter and receiver, $250.00. Million exciter, $200.00. Bopac 2X-100 exciter in box, $280.00. All units are in excellent condition. Write Kenneth L. Hendeburg, Box 1236, Key City, Cincinnati, Ohio.

30-WATT complete all band living room console, 48" wide, drop down tuning plates, solid state, meggered. Price, $100.00. In "phone C", VFO, NC-100X, receiver, nitted antennas, terrific deal for beginning DX'er to plug in and operate. Cost $300.00. Other takes offer 2W1K, 3 Knecht Court, Auburn, N. Y.

RECENTLY re-arranged RME 405 receiver and DR-22A Preselector, both for $125.00. SP-44 Panametric Adapter, used less than one hour, $50.00. RME "Boombox", never used, $18.00. "Mon-Key", new, $20.00. All F.O.B. E. V. Carpenter, W3BSF, 14586 Chestnut St., Wayne, Mich.

WANTED: HT-144 Handi-Talk or any other make. $800 McMurdo PRC-503, or 2 or more, for best offer. E.B. Bob Brink. QSLs made to order. Ham stationery, Prices right. Samples. Snyder, W9DHP Print, Peru, Illinois.


BARGAINS: New and reconditioned Collins, Hallicorder, Hammarlund, etc., at wholesale prices. For cash or 30 day lay out. Write to Frank D., 22-24 Atlantic Ave., New York City 17, N. Y.

QUALITY cards, priced right Samples. Ferris, W9UTL, 1768 Polkadale, Indianapolis, Ind.

QSLs, SWL's. Samples free. WH4UD, Albertson, Box 322, High Point, N. C.

CRYSTALS: Benson Type 100A precision low-drift units made to your exact specified freqency within the 80 or 40 or 20 amateur bands, at $1.50 each, plus postage. Rex Bassett, Inc., Bassett Building, Ft. Lauderdale, Fla.

MOBILE antenna mounts: spring type, whip detachable for garaging, mounting without visible body holes, price, $3.75, postpaid. Wayne, W9PFE, 130 Sumt Mill Norwood, Conn.

WANTED: QST for February, March, July 1965. I have 500 other copies QST and Radio for trade or sale, WM6C, 1022 N. Rockhill Rd., Rock Hill, 19, Camden, N.J.

WANTED: Mikes. 00-Watt, 00-Watt, 00-Watt, 00-Watt. QST, Box 2109, Cambridge 9, Mass.

SUBLIACRATIONS, Radio publications a specialty. Earl Mead, Huntly, Mo., W7XM.

DON'S QSL — "The finest". Samples. 2106 South Sixteenth Avenue, Maywood, Illinois.

QSL's, SWL's. Highest of fair prices. Sample W7GPP R. D. Dawson, 1308 F Street, The Dallas, Oregon.

QSL's, SWL's. Highest of fair prices. Sample W7GPP R. D. Dawson, 1308 F Street, The Dallas, Oregon.

ZIPPO lighters, ARRL insignia and call sign enamel badge, $5.00. Ideal birthday gift. McCarron, W2BNO, 3050 Decatur Avenue, New York, N. Y.

QSL Quality cards, priced right Samples. Ferris, W9UTL, 1768 Polkadale, Indianapolis, Ind.

WANTED: QST for February, March, July 1965. I have 500 other copies QST and Radio for trade or sale, WM6C, 1022 N. Rockhill Rd., Rock Hill, 19, Camden, N.J.


CARBON tetrahydrocarb. cleaner, solvent 27 oz., 1.50. Polyurethane high frequency coil and splice dope, 1.00 pint. Special thin epoxy, 50c pint, Crafting Lab., 4536 4th East Exchange St., Akron 4, Ohio. Cast Permalloy, 100 cards for $1.25. W4VRK, 2012 First Ave., Utica, 2, N.Y.

QST — the leading journal of QSLs of distinction. Three colors and up. Rainbow map QSLs. Special DX QSLs. Samples. Uncle Fred, Box 86, Lima, Penna.


GREAT LAKES Division ARRL Convention Hotel Statler, Detroit, May 27-28-29. Registration and Banquet, $7.50. Mammoth Swap 'n' Sell session. Complete line of apparatus and parts. Berlinski, 31, Michigan, for tickets or buy through local club or dealer.
Crystal Holder Sockets
33002, 33102, and 33202
Plus new 33302 for CR7

In addition to the original 33002, 33102 and 33202 exclusive Millen “Designed for Application” steatite crystal holder sockets, there is now also available the new 33302 for the new CR7 holder. Essential data:

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Reliable Power for Mobile Operation

To those of you who are making plans to equip the family automobile with a ham band transmitter and receiver this summer, we suggest an efficient Mallory Vibrapack* vibrator power supply, as the sensible and reliable means for obtaining the high voltage and current necessary to operate your mobile gear.

With almost 20 years of design and operating experience behind them in police, utility and amateur radio communication from moving vehicles, the Mallory 6 volt DC Vibrapack vibrator power supplies are the finest power supplies obtainable for your own mobile equipment.

Seven models of 6 volt Vibrapacks are available with voltage outputs from 125 to 400 volts and power from 15 to 60 watts. Such a wide selection of models means that a unit may be chosen which most nearly answers the voltage requirements of your rig. This eliminates power wasting voltage dividers and voltage dropping resistors and improves the over-all efficiency of the installation.

The operating efficiency of the Mallory Vibrapack itself is at a high level, thus assuring a minimum of hardship on the battery and the auto electrical system. Day-after-day reliable mobile communication cannot be had with an excessive load on the battery.

All Mallory Vibrapacks are compactly built and quiet in operation so that they may be mounted directly on the receiver or transmitter chassis without fear of mechanical vibration disturbing sensitive circuits.

They are rugged, too, as proven by thousands of hours in service in police squad cars.

Mallory vibrator power supplies, unlike motor driven power supplies, are built entirely of conventional electronic parts which every amateur is familiar. Servicing is easily accomplished using standard radio tools and replacement parts normally found in the ham shack or at the nearest Mallory Radio Parts Distributor.

In case something happens to your mobile rig while on a vacation trip far from the home QTH it is good to know that replacement parts may be had almost anywhere in "W" or "VE" land from a close-by Mallory Distributor.

Your Mallory Distributor will be pleased to give you more information on the Mallory Vibrapack, vibrator power supplies, or if we can be of help in making a recommendation for your rig, communicate with us at P. R. Mallory & Co., Inc., Box 1558, Indianapolis 6, Indiana.

In the meantime don’t forget those other fine Mallory parts you may need in building your mobile rig. They include ham band switches, push button switches, controls—rheostats—potentiometers—pads, dry electrolytic capacitors, tubular capacitors, ceramic capacitors, dry disc rectifiers and bias cells.


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"I have been recently employed at W-O-C-A-M-FM-TV, Davenport, Iowa. Am connected with the Television, and certainly do find the course that I took with you people is helping me out tremendously. If it would not be for taking your course, I would not be where I am today." Student No. 3611 N 12

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Covers 540 kcs. to 31 mcs.
plus 48 to 56 mcs.
for amateur 6-meter band with average sensitivity of 3 microvolts. Separate bandspread dial calibrated for 80, 40, 20, 15, 10
and 6 meter bands. New double-diode noise limiter with variable threshold effective on both phone and CW. Separate AVC useable on phone and CW. New wide-range, 6-position crystal filter, 5-meter, antenna trimmer for maximum performance with any antenna, phono input. Provision for addition of NFM adaptor and new National Select-O-Ject 1-6SG7 tuned R.F.; 1-6SA7 1st det.; 1-615 osc.; 2-6SG7 I.F.; 1-6H6 2nd det. — AVC;
1-6AC7, AVC; 1-6SJ7 BFO; 1-6H6 noise limiter; 1-6SJ7 audio; 1-6V6 output; 1-VR 150 volt reg.; 5Y3GT/G rect.

$189.50 net* (less speaker)

*Slightly higher west of the Rockies
The RCA-5675

...a new "Pencil Triode" for UHF applications

ANOTHER "RCA FIRST" in advanced tube design ... the RCA-5675 "Pencil Type" triode for UHF applications is typical of RCA engineering leadership in developing new and better tubes for communications and industry.

The RCA-5675 is a medium-mu triode employing a double-ended coaxial-electrode structure. As a local oscillator with a plate potential of 120 volts, it is capable of a power output of 475 milliwatts at 1700 Mc., and about 50 milliwatts at 3000 Mc. The tube is less than 2\(\frac{3}{4}\)" long ... and has a heater that requires only 0.135 ampere at 6.3 volts.

The "pencil-type" construction of the RCA-5675 provides low lead inductance and low interelectrode capacitances. Because of these features the tube can be used at medium frequencies with circuits of the line type and lumped-circuit type. It is especially designed for utilizing coaxial-cylinder circuits at the higher frequencies. The 5675 employs a coaxial electrode structure in which the plate cylinder and cathode cylinder extend outward from the grid flange. The latter is particularly effective in isolating the plate from the cathode in grounded-grid amplifier circuits.

In the future, as in the past, the resources of RCA —its manufacturing experience and skill—are dedicated to the development and production of progressively better electron tubes—of which the 5675 "Pencil Triode" is a recent example.

Watch for the new HAM TIPS