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**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 the members in each Section. Reports and club reports are also desired by all ARRL Clubs for inclusion in QST. All ARRL Communicators are available to assist League members. These include OH6S, OH6G, OH6O, D0 and OH8S, also, where vacancies exist SCMs desire applications for SE6C, EC, RM, and PAM. In addition to station and leadership appointments for Members, all amateurs in the United States and Canada are invited to join the Amateur Radio Emergency Corps (see Form 7).

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

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

Inquirers regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not a prerequisite, although full voting membership is granted only to licensed amateurs.

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“It Seems to Us…”

RACES

As detailed in “Happenings” and “Operating News” elsewhere in this issue, FCC has now released proposed rules for a new Radio Amateur Civil Emergency Service. These are the long-awaited regulations to govern the furnishing of civil defense communications by amateur radio. It is our fervent hope that the rules will be made final substantially as proposed and in as short a time as possible, and any minor kinks left for ironing out later.

We need to get moving! Too much steam has been lost from amateur interest in civil defense work by the tardy development of national planning and regulations. If these rules can be finalized promptly after February 15th, it will largely complete the picture for amateur participation.

RACES will be an entirely new service, operating in the amateur bands, yet almost indistinguishable from regular amateur network operations. They’ll be amateur calls, amateur frequencies, amateur equipment for the most part, and largely amateur procedure. Then why RACES? Because it actually gets civil defense communication “on the books” in the form of authorized networks and stations, facilities that can continue operation in the event of war after normal amateur activities are shut down. It is foresight, inspired by lessons previously learned, that in this regard, the operating machine can function with full effectiveness right at the start should it be needed.

All this means to the individual amateur the same as previous developments in the field have indicated: join the AREC, get aligned with your Emergency Coordinator, and be prepared to do your part in providing your community with emergency communication in the event it is needed.

TVI COMMITTEES

Not to be lost sight of in the bustle of preparation for civil defense communication is George Turner’s milestone article in January QST, “FCC’s Plan for Handling TVI.” If perchance you missed it, get it out and acquaint yourself now with the proposed program.

The Commission has placed its blessing on a procedure which amateurs have found a useful tool in tackling TVI problems and which we have been urging among clubs postwar — the formation of TV interference committees. Dallas and Dayton have demonstrated how effective this procedure can be. The committee approach can do the same for your city or community. And the encouraging part of FCC’s announcement is that final solutions to many individual cases will be made easier with the agreement by major TV receiver manufacturers to install low-pass filters or other suitable remedies when adequate investigation shows the fault to lie with the receiver.

The call is clear — every community should have a TV interference committee. Certainly every amateur radio club should have one, or in larger cities participate in a council-style city-wide body. Each such committee to be formed, as well as each one already in existence, should get itself squared away with the FCC Regional Manager having jurisdiction — see the January story for names and addresses. While the committee will not in any manner have authority to act for FCC, it is quite possible that local engineers may follow the practice of turning over to the committee for preliminary investigation — and, it would be hoped, solution — such complaints as the office might receive. The ultimate aim is that the committee will produce such satisfactory results and become so well known in its community that any complaints from the public will be directed to it and not to FCC.

The technical hotshot in your club or community isn’t necessarily first choice for your committee. You’ll want him on it, of course. But we’ve learned that this job calls for 90% public relations and 10% engineering. While hardly cut-and-dried, the technical solutions to a TVI problem are pretty well established. Dealing with the public, and especially with a portion of it which may be temporarily irate, is a task for which no one can write specifications as to procedure. So the “front” man for your committee doesn’t have to know a clamp tube from a reactance modulator to do his job well, if he knows how to deal in personalities. Pick him accordingly.

After your committee is set up and aligned with the FCC Regional Manager, the operating procedure is pretty well spelled out step by step in the January QST article. But the first step — formation of the committee — is up to you. Start today!
Painless Shielding for the Plug-in Coil Transmitter-Exciter

The New Type 6146 Tube in an All-Band 90-Watt Outfit

BY GEORGE GRAMMER,* WIDF

There is a certain monotony in the way in which the 807 injects itself into transmitter design. Except for flea-power sets, it doesn’t make much difference what sort of rig is under consideration — the tube always seems to fit in logically somewhere along the line. With the introduction of the Type 6146, it could be that we have a new candidate for ubiquitousness. For besides somewhat higher ratings this new beam tetrode has a lot more versatility, including the ability to work at frequencies where the 807 is not a very good performer.

One useful feature of the new tube is that it is physically small. Mere size, as such, may not always be important: however, the type of construction used in the transmitter shown here would not have been possible with an 807 for the simple reason that there are no standard shield cans tall enough to fit it. In most cases, of course, the small size is more important for electrical reasons — leads both inside and outside the tube are shorter, making for better performance at the higher frequencies.

The 6146 is better described as a larger version of the 2F26 than as a redesigned 807. Its base connections are the same as those of the 2F26, the structure is similar, and it has the three cathode leads that are useful in reducing cathode-lead inductance for better v.h.f. performance. One of the most valuable characteristics of the new tube, in our opinion, is its ability to work well over a large range of plate voltages. It can be driven to the maximum plate current of 150 ma, even at 300 volts on the plate, and the maximum c.w. input rating (ICAS) of 90 watts can be used with any voltage from 600 to 750. This leaves the user free to choose any one of a number of economical power-supply combinations, depending on whether the tube is to be used as the final amplifier or as a driver for a higher-power stage.

The transmitter described in this article illustrates the use of standard parts to obtain complete shielding with plug-in coils, reducing set and lead radiation of harmonics in the television range to negligibility. Pi-network tank circuits are used in a compact three-stage layout ending in a 6146 beam tetrode. The final stage can be operated at any voltage from 300 to 600, delivering outputs from 25 to 65 watts.

The transmitter illustrated is set up to use the maximum c.w. input rating of 90 watts at a plate voltage of 600. This voltage was used not only because it is unnecessary to go any higher, but also because 600 is the maximum rating for plate-and-screen modulation. A single plate transformer will suffice for the whole set. As an exciter, it can be operated from as little as a 300-volt, 200-ma. supply, running an input of 45 watts to the amplifier with an output of 25 to 30 watts.

Owners of prewar Handbooks may recognize the style of construction, since it was used in an exciter that was quite popular in its day. While the basic idea leads to a compact design, compactness as such is not the primary object in the present case. The important feature is that complete shielding, with accessibility for coil changing, is obtained without resorting to special shield construction. The coils are enclosed by standard can-type shields with friction bases - an idea that, if not as old as the hills, certainly dates back to the first manufactured communications-type superhet, the Hammarrud Comet Pro. With the exception of the plug-in coils and the tubes, everything is shielded by the 3 x 4 x 17-inch chassis and its bottom plate, which does not have to be removed except in case servicing should be required. The 6146 has a shield similar to those used for the coils (I.C.A. type 1549), with holes drilled above and below the tube to allow air circulation. The other two tubes, 6AG7As, are metal and therefore more or less self-shielding.

Circuit Notes

The complete circuit is given in Fig. 1. Two 6AG7As are used to give excitation for the 6146 in all bands from 3.5 to 28 Mc. The tube labeled “oscillator”

A compact and completely shielded low-power transmitter using a 6146 as the final amplifier. It can be used at an input of 90 watts on c.w., or 67 watts for plate-modulated phone. The unit is mounted on a 3 x 4 inch rack panel.

* Technical Editor, QST
Fig. 1 — Circuit diagram of the transmitter.  

C1, C8, C9, C10 — 470-μf, mica.
C2 — 150-μf, mica.
C3 — 150-μf, variable (Millen 19110).
C4 — 100-μf, silver mica.
C10 — 0.001-μf, mica, 1200-volt working.
C11 — 470-μf, mica, 1200-volt working.
C12 — 100-μf, section variable, 1000-volt spacing (National TMS-10101).
C13 — 325-μf, variable (Millen 19325).
C14 — 470-μf, silver mica.
C15 to C18, inc. — 0.001-μf, ceramic, midget size.
R1, R2 — 17,000 ohms, 1/2 watt.
R3 — 47,000 ohms, 1 watt.
R4 — 15,000 ohms, 1 watt.
R5 — 27,000 ohms, 1 watt.
R6 = 150 ohms, 1/2 watt.

R7 — 2.2 ohms (2 x shunt for 0–25 milliammeter).
R8 — 0.24 ohm (10 x shunt for 0–25 milliammeter).
R9, R10 — 100 ohms, 1/2 watt.
J1, J2 — Coax connectors, chassis type.
J3 — Closed-circuit jack.
RFC1 to RFC4, inc. — 2.5-mh, r.f. choke (National R-1005).
RFC5 — 2.5-mh, r.f. choke (Millen 34300–2500).
L1 — 13 turns No. 22, diameter 1 inch, length 1 inch.
L2 — 16 turns No. 30, d.c., on 1/2-watt resistor.
L3 — 6 turns No. 11, diameter 5/16 inch, length 1 inch.
L4 — 8 turns No. 16, diameter 1/4 inch, length 5/8 inch.
M1 — 0–25 d.c. milliammeter (Simpson Model 125).
S0 — S.p.s.t. toggle.
S1 — 2-pole 1-position wafer switch, non-shorting (Centralab 2570).

is used as such (the circuit is of the harmonic-generating type) when the transmitter is crystal controlled, but with separate VFO input it becomes either an amplifier or frequency multiplier. The second 6AG7, the "buffer," is also either an amplifier or frequency multiplier.

There are a few circuit tricks in this unit that were adopted as a matter of necessity. We wanted to drive the amplifier on its output frequency on all bands, at least from 7-Mc. crystal, and this requires three stages altogether if the job is to be done in a reasonably satisfactory manner. On the other hand, two plug-in coils represent enough of a chore in band-changing, and besides the chassis was not large enough to take more than two, with shields. Coil switching in the first stage was considered, but there was not enough room inside the chassis without excessive crowding, nor was there much panel room available for another control.

In consequence, the oscillator plate circuit is a permanent tank covering the range 7 to 14 Mc. with a single tuning condenser. When the output is on 28 Mc. the buffer 6AG7 doubles to that band and C4L4 therefore is tuned to 14 Mc. When the output is on 21 Mc. the buffer 6AG7 becomes a tripler and C4L4 is set to 7 Mc. For 14-Mc. operation the second 6AG7 becomes a doubler again and C4L4 is again tuned to 7 Mc. This is so far quite straightforward. However, for 7-Mc. output the buffer 6AG7 has to operate on 7 Mc. and, since there is no special shielding between the grid and plate circuits, it is likely to break into self-oscillation if its grid circuit is also tuned to that frequency. Consequently, it is necessary to detune C1 far enough from resonance so that oscillation cannot occur, but not so far that resonance at 14 Mc. is approached. Since the second 6AG7 gets far more excitation than it needs, this detuning does not affect its output.
On 3.5 Mc, the 6AG7 is in no danger of self-oscillation because its grid circuit cannot be tuned anywhere near that band. It gets excitation simply by brute force across the low impedance represented by $C_2 L_1$ at this frequency. The excitation is ample, the only point to watch being that $C_2 L_1$ should not be tuned to a harmonic of the 3.5-Mc operating frequency, since such tuning will reduce the buffer's output.

This system saves a good deal in constructional complications and works well, but it does require care in adjustment, particularly when operating on either 7 or 14 Mc. On the latter band the second 6AG7 can take off if $C_2 L_1$ is tuned to 14 instead of 7 Mc. However, if the proper condenser settings are used there is no danger of self-oscillation. For utmost safety, a shield partition can be installed between the buffer tank condenser, $C_7$, and the oscillator coil, $L_1$, extending across the chassis close to the center of the 6AG7 buffer. This was subsequently tried in this unit and was found to stabilize the buffer to such an extent that it was impossible to make it self-oscillate on any frequency in either the 7- or 14-Mc bands.

A pi network is used to couple the buffer to the final amplifier. This circuit has the advantages, for interstage coupling, outlined last month.\(^1\) $C_5$ is the fixed output condenser shunting the grid of the 6146. It not only suppresses grid-circuit harmonics very effectively but also stabilizes the amplifier to prevent self-oscillation at the operating frequency. A value of 100 $\mu$fd. was found necessary for this purpose, along with careful pruning of the buffer plate coil. Like all beam tetrodes of high power sensitivity the 6146 tends to take off without neutralization unless stabilized by other means; in this case, no means for neutralizing was available without sacrificing other circuit features we wanted to retain. $C_7$ is the tuning control for the buffer plate circuit. The coupling to the amplifier grid is determined by the $L/C$ ratio in the buffer plate circuit, and is set at an average value for each band by the size of the plate coil. On the 3.5-Mc band an additional output capacitance, $C_9$, is connected in the circuit by means of a jumper in the coil form, so that proper coupling can be secured with a plate coil of reasonable size.

The amplifier output circuit also uses a pi network, designed for working into coaxial line. It was impossible to use a variable inductance as discussed last month,\(^1\) so the loading control is a variable condenser, $C_{13}$. Although the harmonic suppression in the TV range is not as good, by actual test, as could be secured with a series-resonated fixed output condenser, it is still quite a lot better than could be obtained using the same components connected as a conventional parallel-tuned tank and provided with the customary link winding. The various amplifier plate coils specified have been carefully adjusted to work, with the range available in $C_{13}$, into flat lines of 50 to 75 ohms characteristic impedance. At the lower frequencies $C_{13}$ has just about enough range to do the job. On the 3.5-4-Mc band, where an additional capacitance $C_{14}$ has to be connected in, it is necessary to use two tank coils to secure proper amplifier loading. One, for 3.5 to 3.75 Mc, is adjusted to give the full 90 watts input for cw operation. The other is adjusted to give the maximum phone input of 67.5 watts over the 3.75- to 4-Mc range.

![Buffer and Amplifier Coils Table](image)

<table>
<thead>
<tr>
<th>Wire Size</th>
<th>Turns</th>
<th>Turns per Inch</th>
<th>L, ohm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5-4 Me.</td>
<td>25</td>
<td>42</td>
<td>28</td>
</tr>
<tr>
<td>7 Me.</td>
<td>22</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>14 Me.</td>
<td>18</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>21 Me.</td>
<td>18</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>27-30 Me.</td>
<td>18</td>
<td>31/4</td>
<td>10</td>
</tr>
<tr>
<td>Amplifier coil Lp</td>
<td>25</td>
<td>31/4</td>
<td>10</td>
</tr>
<tr>
<td>3.5-3.75 Me.</td>
<td>18</td>
<td>25/4</td>
<td>16</td>
</tr>
<tr>
<td>3.75-4 Me.</td>
<td>22</td>
<td>25/4</td>
<td>20</td>
</tr>
<tr>
<td>7 Me.</td>
<td>18</td>
<td>17/4</td>
<td>12</td>
</tr>
<tr>
<td>14 Me.</td>
<td>18</td>
<td>10/4</td>
<td>8</td>
</tr>
<tr>
<td>21 Me.</td>
<td>18</td>
<td>6/4</td>
<td>5</td>
</tr>
<tr>
<td>27-30 Me.</td>
<td>18</td>
<td>4/4</td>
<td>5</td>
</tr>
</tbody>
</table>

* Measured values with coil unshielded.

The amplifier plate tuning condenser, C12, a double-section unit, has both sections in parallel for the 3.5-Mc. band but uses only one section for all other bands. The two are connected together by a jumper in the 3.5-Mc. coils. This arrangement makes the tuning at the higher frequencies less critical than it would be if a single-section condenser of the same maximum capacitance were used.

Parallel plate feed is used in all three stages. This permits grounding the variable condensers directly to the chassis, and also takes the d.c. off the plug-in coils so there is no shock hazard in band-changing.

**Miscellaneous Features**

L2, L3 and L4 are small coils used for parasitic suppression. The 6146 has an advantage over the 807 in this respect, since its shorter leads raise the parasitic frequency and a relatively small coil can be used in the plate lead to kill it. In this transmitter the plate return circuit, with L3 as specified, resonates between 110 and 120 Mc., well out of the TV band, and thus does not boost harmonic output in the TV range. With the 807, a coil that tunes the plate return circuit to 80 Mc. or below usually is required for suppressing parasitics. The writer prefers this plate-coil method — when it can be used without setting up damaging resonances — to the grid choke and screen resistor combination, which tends to increase the harmonic voltage in the grid circuit as well as to increase the feedback at the operating frequency through the grid-plate capacitance of the tube.

The 6AG7, like all high-sensitivity tubes, is only too willing to generate parasitic oscillations, and it was necessary to use small coils in both the grid and plate circuits of the buffer to suppress them in that stage. Connecting L3 as shown, rather than in the plate lead itself, was found to reduce the harmonic output of the stage (in the TV band) by a large factor.

The meter circuit is arranged so that the cathode currents of any of the three stages can be read, and also the grid current of the amplifier. The meter is a 0–25 milliammeter with shunts (wound with resistance wire on half-watt resistors as forms) to increase the range up to 50 ma. for measuring the buffer current, and to 250 ma. for measuring the amplifier current. The screen and control-grid currents are of course included in the reading along with the plate current, but do not represent an important fraction of the total. The values of resistance for the multiplying shunts are for the particular make of milliammeter specified, and do not necessarily apply for other instruments. The proper values can be found in any case by following the method described in the measurements chapter of the Handbook.

A key jack is connected in the amplifier cathode circuit. It could be connected in any of the three cathodes, or the keying can be done in an external VFO if desired. In the event that any tube other than the amplifier is keyed, some provision must be made for holding the amplifier input to a safe value during key-up periods. The constructor can use any system he prefers for this purpose, since the screen lead is brought out separately and a lead is also brought out from the “hot” side of the amplifier grid leak to operate a clamp tube or other type of automatic protection system. (A clamp tube alone will not hold the plate current of a 6146 to a safe value without excitation; a VR-75 should be connected between the clamp-tube plate and the 6146 screen.) The currents taken by the other two tubes, with a 300-volt supply, are held to within ratings by the choice of screen-dropping resistors and cathode resistors, with no excitation applied.

The d.c. and heater wiring in the transmitter

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Bottom view of the transmitter completely wired. The oscillator plate coil, L14, is between the two variable condensers at the right. The amplifier circuit occupies the left-hand portion of the chassis in this photograph. The bracket on which the amplifier socket is mounted is supported at one end by the plate tank condenser and at the other by a partition that shields the amplifier section from the oscillator-buffer section. The amplifier plate choke is mounted on the chassis between the tube-socket bracket and the chassis wall, just below the plate-lead terminal. The meter is enclosed by a right-angle shield to prevent stray harmonic pick-up that might cause radiation through the meter hole in the panel.
is all shielded, as indicated by the symbols in the circuit diagram, and the shielded leads are bypassed at the ends using the technique described in QST some time ago.\(^2\) The effectiveness of this method of lead filtering is attested by the fact that we have been unable to detect any trace of interference radiated from the set and the external supply leads, even with the transmitter and a TV receiver side by side and with a TV signal so weak that the receiver will just barely hold sync.

**Construction Pointers**

The layout of the unit is pretty well shown by the various photographs. The actual makes of parts are given in the caption for Fig. 1 in many cases where physical size and shape are important; and if a substitution is made it should be determined beforehand that that particular part will fit.

A chassis 3 inches high and 4 inches deep does not provide much scope for a soldering iron when a fair number of parts has to be fitted in. However, the assembly job is not really difficult if it is planned out in advance. Without such planning it may tend to be impossible.

The secret of easy assembly is to do practically all the wiring before the parts are mounted, and to drill all the necessary holes in the chassis beforehand. A separate subassembly is used for most of the amplifier circuit. This should be built before any of the chassis wiring is started, as should also the shield partition to which one end of it mounts. The latter must have small cutouts on its inner edge to allow the shielded wiring, which is all laid flat on the chassis, to pass through. When the amplifier assembly has been made, temporarily mount it by means of the condenser mounting studs, then fit the shield partition in place and use it as a template to determine the right positions for the mounting holes in the chassis. Make the right-angled shield for the meter and use it as a template for its mounting holes similarly. At this stage it is a good idea to mount all the parts temporarily, both to make sure that everything fits properly and to study the layout a bit to determine just how the wiring should go. It will save time in the end if a wiring plan for the shielded supply leads is sketched out at this point.

To start the job, mount the 6AG7 sockets, the terminal strip, the crystal-VFO switch, S\(_1\), the amplifier plate-lead by-pass condenser, C\(_{10}\), and the coaxial connector, J\(_3\), for VFO input. Temporarily mount the meter switch, S\(_2\), and also RFC\(_2\) and RFC\(_3\). Then, starting from the terminal strip and the cathode terminals of the tube sockets, run shielded wires to the proper points. In each case mount the disk ceramic on the end of the wire at the starting end, lay the wire exactly where it is going to be on the chassis, determine the proper length, and then trim and finish it off, but do not solder anywhere except at the starting point. (The switch and chokes have to be removed before the amplifier assembly can be put in place and before some of the other work can be done.) Then take out the switch, install the amplifier assembly and shield partition temporarily, along with RFC\(_3\), and run in the shielded screen and grid leads, again connecting only at the starting ends. The leads can be held down to the chassis by using soldering lugs as miniature clamps. When all the wires are in place, spot solder the shield braid to each lug. When all the shielded wiring is in (including the leads from S\(_2\) to the meter), remove the temporarily-mounted parts and finish off all the wiring, including installing small parts, around the 6AG7 sockets.

At this stage the amplifier coil socket should be mounted— with the mounting ring on the outside of the chassis, since the socket prongs may interfere with the amplifier assembly if the ring is inside—and leads soldered to it for later connection to C\(_{18}\). Mount J\(_2\) and wire it to the amplifier coil socket. Then install the amplifier assembly, the meter switch, and J\(_3\), and complete the wiring to the latter two. After this RFC\(_3\) can be mounted permanently and its wiring finished, and then the wiring of the entire amplifier circuit may be completed. RFC\(_1\) can be installed by making use of the chassis hole through which the amplifier tube projects.
The rest is quite straightforward, since it involves only parts in the oscillator and buffer circuits that are easily accessible. The buffer coil socket has to be mounted after the amplifier assembly and shield partition are finally in place, because it interferes with installation of the partition.

**Power Supply**

For operation at maximum ratings the power supply should deliver 600 volts at approximately 150 ma. and 300 volts at 50 ma. A single transformer of the type designed to give a d.c. output voltage (through the filter) of 600 at a current of 200 ma. or so will suffice. The 300-volt output can be obtained by using two VR-150s in series, with a dropping resistor that will allow a bleed current of 10 ma. or so to flow through the VR tubes. The total current taken by the two 6AG7s varies between extremes of 30 and 50 ma., depending on the frequency and whether or not the tubes have grid excitation.

Under operating conditions the screen voltage for the 6146 should be around 200 volts. It is advisable to get this voltage through a dropping resistor from the 600-volt plate supply, rather than from a fixed voltage source. A resistance of 35,000 ohms is about optimum for either c.w. or plate-modulated 'phone. If a clamp tube is used for c.w. work with a VR-75 as recommended earlier, the dropping resistor should be reduced to 25,000 ohms.

If the transmitter is to be used as an exciter at lower plate voltage, it is recommended that the 6AG7s still get their voltage from VR-150s as described above. The screen resistor for the 6146 should be reduced to a value that will put about 200 volts on the screen under operating conditions. With a 400-volt plate supply this requires 10,000 ohms, and with a 300-volt supply a 5000-ohm resistor is about right. Both these values are for cases where the VR-75 is not used.

The VR-75 will of course introduce an additional drop of 75 volts.

**Operating Notes**

As stated earlier, the amplifier output circuit has been designed to match into either 50- or 75-ohm resistive loads. If the antenna does not use coaxial feed, then a coax-coupled antenna tuner or matching circuit should be used, and the set-up should be adjusted to make the standing-wave ratio on the coax line come as close to 1 to 1 as possible. If this is done the amplifier tank coils specified in the table will allow adjusting the load on the tube, by means of C12, to the rated value. The simplest way to adjust the s.w.r. is to use a resistance bridge such as is described in the *Handbook*. Matching circuit design also is discussed in the *Handbook*. Without some means for measuring the s.w.r., loading becomes a rather hit-or-miss proposition and rated input can be achieved only by trial and error settings of C12. In every case, of course, C12 should be adjusted for minimum plate current, since this condenser is the one that keeps the circuit resonant at the operating frequency.

Providing the line s.w.r. is low, there should be no difficulty in setting the plate current to 150 ma. in all bands except 3750–1000 kc., using a 600-volt plate supply. In the 3750–4000 kc. range the amplifier coil inductance is chosen to load the tube to 112 ma. for the maximum plate-modulated 'phone rating. On any frequency, the loading decreases when the capacitance of C14 is increased; i.e., the higher the capacitance the lower the plate current, C12 being tuned to resonance. If for some reason the proper full-load plate current cannot be secured at any setting of C13, increasing the inductance of the tank coil, L0, will decrease the loading and lowering the inductance will increase it.

In the circuit coupling the buffer to the amplifier grid there is an optimum value for L5 that will result in maximum amplifier grid current. The specifications given for L5 in the coil table represent, in general, an inductance somewhat different than the optimum value, particularly at the higher frequencies. The reason for this is that, for a given capacitance at C5, the amplifier grid circuit is more effectively loaded (with improved stabilization) if the impedance drop-down from the buffer plate to the amplifier grid is made as large as practicable. Under these conditions maximum power is not delivered to the amplifier grid. The specifications given are based on a compromise that allows the amplifier to get sufficient driving power with amplifier stabilization. It is easily possible, for example, to more than double the grid current at 28 Mc. by reducing C5 to about 50 μfd. and adjusting L5 to the optimum value. However, with these constants the amplifier may oscillate when tested, without excitation and without load, with a plate input equal to the maximum rated plate dissipation. This is undesirable, even though under normal operating conditions the amplifier is perfectly under the control of the drive.

It is a good idea to make the no-oscillation no-loading test if means are available for reducing the input to the rated plate-dissipation value of 25 watts. This requires reducing either the screen voltage or, preferably, the plate and screen voltage proportionately together. There should be no change in plate current, or any sign of grid current, at any combination of settings of C7, C12 and C13. If there is grid current at some setting of C7 but no marked dip at any setting of C12, remove the buffer tube from its socket. If the grid current disappears when this is done it is a good indication of parasitic oscillation in the buffer stage (assuming that C12L1 is not inadvertently tuned to the same frequency as the buffer plate circuit, as mentioned earlier), and it may be necessary to add a few turns to either L3 or L2 to cure it since the parasitic circuits may vary somewhat with slight differences in layout and wiring.

In the oscillator and buffer stages, pulling out the crystal should cut off the amplifier grid current completely (this test should be made
with the amplifier plate and screen voltages off, unless some form of no-excitation protection is provided) and the oscillator and buffer currents should be approximately 20 and 30 ma., respectively, with a 300-volt supply. These currents should not vary with settings of C₄ and C₇ except for the “taboo” combinations mentioned earlier. With the crystal operating, the plate currents of these two tubes will not differ greatly from the no-excitation values (the buffer current is around 25 ma.) although they show the usual resonance dips. The one exception is the buffer current on 7 Mc., which is in the vicinity of 10 to 15 ma. in normal operation.

On all bands the resonance setting of C₇ is in the low-capacitance third of the scale. A 50-μfd. condenser can be used instead of the 140-μfd. unit shown.

For c.w. operation of the 6146 a grid current of 2.5 to 3 ma. (through the 27,000-ohm grid leak) is sufficient for maximum output at full ratings. In our experience with plate-and-screen modulation a somewhat lower value of grid current — slightly under 2 ma. — gave best linearity at 100 per cent modulation, using the maximum ICAS’ phone ratings.

Those who are used to the 807 will find that the 6146 has considerably different operating characteristics with respect to plate-current behavior. When an 807 is used with a screening resistor the off-resonance plate current does not rise a great deal above the normal operating value of 100 ma. Tuning off resonance with the 6146 will send a 250-ma. meter off scale, if the grid excitation is normal, so a little more care must be used to keep the plate circuit resonated. The proper tuning procedure is to adjust C₄ and C₅ for a grid current of about 3 ma., with the 6146 plate and screen voltages off, and then set Cₓ at maximum before applying plate and screen voltage. With power on, swing C₁₂ rapidly to find the plate-current dip. Then decrease the capacitance of Cₓ gradually, keeping C₁₂ at the plate-current dip with each change, until the plate current approaches the rated value. Check the grid current at this point and if necessary readjust C₇ to bring it back to 3 ma., and then make the final adjustments to the plate circuit for the desired plate current. The tube works just as efficiently at 30 Mc. as it does at 3.5, and the measured output of the transmitter is about 65 watts on all bands at the 90-watt input rating.

A coax connector is provided for VFO input, and when a VFO is used the oscillator cathode should be shorted to ground for r.f., by means of S₇. The VFO should be of the type having a length of coax as part of its tuned output plate tank circuit, and the VFO output frequency should be in the 3.5-Mc. band.

**Harmonic Radiation**

Although the harmonic radiation in the TV bands from the transmitter itself and the external (Continued on page 118)
The author's interest in radio control, which is fairly recent, stems from the helpless feeling experienced while watching a friend's free-flight model plane meet the inevitable. The control system to be described here was designed in an effort to improve on the simple on-off control with a minimum of complexity. It is a first model and improvements are in order, particularly in the matter of weight. A complete tally, including batteries, for a two-channel two-control unit for model plane use, resulted in a weight of 33 ounces. Although not prohibitive, it can and should be trimmed down considerably.

At present this system is installed in the four-foot two-masted sailing schooner shown in the photograph. Since weight was no problem here, wet cells and a small vibrator supply were used. Some of the mechanical linkages are still in the process of development, since machine tool facilities are lacking at present. Two channels are used, providing full control of rudder and sails independently. An auxiliary motor is also provided and operated by a limit switch on the sail control mechanism. Two quarter-wave 6-meter vertical antennas are provided by the mainmast stays.

Circuit

The basis for this control system, which gives "proportional" control in contrast to the "sequential" or simple "neutral-right-neutral-left-
\* 18 Reids St., Plainview, L. I., N. Y.
neutral" of an escapement system, is a square-wave signal. When the positive peak has the same duration as the negative peak, the control is in the neutral position — longer positive time than negative time moves the control in one direction, depending upon the ratio of the two times, and vice versa. The amount of movement is dependent only upon the ratio of the times and not of the signal strength.

The system can best be illustrated by the simplified diagram of Fig. 1A. With a square wave coming in, condensers $C_1$ and $C_2$ charge to equal voltages, and the net voltage to ground is 0 at the center of $R_1$. If the value of $R_2$ is adjusted so that the current from $B_1$ through $Ry_1$ is just equal to the current from $B_2$ through the relay and tube, the net pull of the relay will be zero. Thus the relay will not make contact.

When the ratio of the incoming signal is changed, as in Fig. 1B, $C_1$ and $C_2$ will not charge equally. In the case shown, $C_1$ will charge to a higher value than $C_2$. The point on $R_1$ where the net voltage to ground is 0 will now be somewhere toward $C_2$, and if the arm is in the center of $R_1$, the grid of the tube will be positive with respect to ground. The plate current from $B_2$ will exceed the steady current from $B_1$, and the relay armature will be pulled down as shown. Closing the contact energizes the motor and it turns the control surface and the arm of $R_1$, driving the arm down toward the $C_2$ end. When the arm reaches the point on $R_1$ where the voltage to

The radio-control system of W2TTZ is used to operate the rudder and sails of this four-foot two-masted sailing schooner. Full proportional control is obtained, permitting setting to any desired position.

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ground is 0, the relay will open and the motor will stop. The control surface and the arm of \( R_1 \) will now remain in this position until the shape of the input signal is changed.

It is obvious, of course, that if the square-wave signal had been modified in the opposite direction, the current from \( B_1 \) would exceed that from \( B_2 \) and the relay armature would be pulled up. The motor would then rotate in the opposite direction until the arm of \( R_1 \) reached the point on the resistor where the voltage to ground was 0.

The setting the motor drives the arm of \( R_1 \) to depends only upon the shape of the signal and not its amplitude, and accurate and resettable control is obtained at the model by controlling the signal shape at the transmitter. In the practical circuit, audio-stage limiting on strong signals helps to keep the peak-to-peak voltage constant, and weak signals show up only as reduced error sensitivity rather than lack of control. The sensitivity of the system can be defined as the number of discrete positions of the controlled surface, and an ideal system would have an infinite number and hence be perfectly smooth. This particular system, as built and used, is capable of approximately 20 positions between each extreme position.

The Receiver

The complete circuit diagram of the receiver is shown in Fig. 2. A triode-connected 1U4 is used in the superregenerative-detector circuit, followed by a 1U4 audio amplifier. The output of the audio amplifier is applied to the pulse-width discriminator, where 1N34 germanium crystals are used for the rectifiers. The signal from the

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**Fig. 2** — Wiring diagram of the 50-Mc. radio-control receiver.

- \( C_1 \) — 7-45 \( \mu \)fdl. ceramic trimmer.
- \( C_2 \) — 50-\( \mu \)fdl. midget variable.
- \( C_3 \) — 150-\( \mu \)fdl. ceramic.
- \( C_4 \) — 17-\( \mu \)fdl. ceramic.
- \( C_5 \), \( C_6 \) — 0.01-\( \mu \)fdl, disk ceramic.
- \( C_{10} \), \( C_{11} \), \( C_{12} \), \( C_{13} \) — 0.35-\( \mu \)fdl, 200-volt paper.
- \( R_1 \) — 0.47 megohm.
- \( R_2 \) — 10 megohms.
- \( R_3 \) — 0.1 megohm.
- \( R_4 \) — 2.2 megohms.
- \( R_5 \), \( R_6 \) — 1 megohm.

- \( R_{7} \) — 10,000 ohms.
- \( R_{8} \) — 10,000-ohm miniature potentiometer.
- \( R_{9} \) — 1-megohm linear potentiometer, midget. All resistors \( \frac{1}{2} \) watt unless otherwise specified.
- \( L_1 \) — 6 turns No. 12, \( \frac{1}{4} \)-inch diam., 1 inch long.
- \( B_1 \) — 7\( \frac{1}{2} \) volts (5 Mallory bias cells in series).
- \( B_2 \), \( B_3 \) — 1.5-volt flashlight cell.
- \( B_4 \) — 67\( \frac{1}{2} \)-volt miniature B battery.
- \( M \) — Supermite motor. See text.
- \( RFC_1 \), \( RFC_2 \) — 10-\( \mu \)h. r.f. choke.
- \( R_{1y} \), \( R_{2y} \) — 8000-ohm sensitive relay (Sigma 4F).
- \( S_1 \) — Toggle switch.
Fig. 3 — Wiring diagram of the 50-Mc. radio-control transmitter.

Two 958-As are used in the push-pull Hartley circuit and, in our particular set-up, they feed into a quarter-wave vertical antenna. These low-powered tubes are satisfactory for ship-model control, but it might be necessary to use more power when controlling a model aeroplane. The modulator consists of a 3A5 multivibrator to generate the square waves, and this signal is used to grid-modulate the oscillator. A triode-connected 1U4 is used as the modulator. To simplify connections and give good response, the 1U4 modulator is direct-coupled to the oscillator.

This requires separate batteries B2 and B4 for the modulator. The linear potentiometer, R8, varies the shape of the signal and thus controls the position of the controlled surface on the model.

**Operation**

The construction of the receiver and transmitter is best left up to the individual, since it will vary with the application (aircraft or boat) and with the parts on hand. Shock mounting of the receiver, whether by rubber-band suspension or other means, is quite important in any flying or gas-powered model. Proper connection of R9 in the receiver will be obvious when the system is given a dry run, since the motor rotation should be in the direction to reduce the voltage between ground and the arm of R9.

To adjust the receiver, apply the voltages and adjust R8 until both relays are open. Optimum control-tube and relay operation is characterized by equal minimum grid differential voltages in either direction (positive or negative) to operate the relays. To obtain this setting, use a 1.5-volt battery, a potentiometer and a reversing switch from the arm of R9 to ground. Make fine adjustments on R8, the relay spring tensions and contact spacings, until the relays close with equal voltages. Closing with 0.5 volt is the maximum permissible voltage — closing with 0.1 volt represents excellent performance.

The receiver is adjusted for normal superregenerative operation, tunning the signal with C2 and adjusting C1 for best sensitivity.

In marine use, good operation at ¼ mile can be expected with this equipment. Model plane operation would entail use of a better (and horizontally-polarized) antenna and higher power, to offset the blind spots more apt to be encountered.

One question will be immediately apparent to the model plane fan — what happens during loss...
After reading the editorial in October QST I decided to write something concerning the TVI situation at this QTH. My operation has been confined to 80- and 40-meter c.w. and 75-meter phone. Those are my favorite bands. Therefore, my TVI has been of the 80, 40 variety; however, some of my procedures and methods may be as effective for 20, 10 as they have been for the lower-frequency bands.

The local TV picture: Oxnard is located on the beach approximately 50 miles due west of Los Angeles. We are approximately 60 miles from the L.A. TV transmitters, with seven TV channels being received here. They are Channels 2, 4, 5, 7, 9, 11, and 13. Incidentally, there is a range of mountains between us and the L.A. stations. The Channel 8 station, which is also received (on a now-and-then basis), is in San Diego, about 150 miles away. Average signal strength here for the seven L.A. stations is 150 microvolt-per-meter, with Channel 5 the strongest and Channels 2 and 7 the weakest. In the absence of interference, good pictures are the rule on all channels. Most antennas are of the stacked-array variety. Vee-cones, Yagis, Arrows, etc. Very few people use boosters; TV set population is heavy. In this town of 30,000 I would estimate 70 per cent of the homes have TV. With the exception of Channel 8 (San Diego), all TV stations are at one location, so that one antenna array, pointed toward Mount Wilson, suffices for all channels.

My experience with TVI dates from the summer of 1948, when the first TV owner pounded on my front door to horrified me with the announcement that my brass pounding was knocking out his pictures. At that time the TVI problem had me flabbergasted, and I considered suicide as the only solution. Since then, however, I have built and rebuilt a few more and have arrived at some highly satisfactory solutions. During the last year my TVI problem has been practically nonexistent, although I am surrounded by a forest of TV antennas and have one of my own.

Many fellows still think that 80- and 40-meter rigs cause no appreciable TVI. How wrong can you be, I ask? The old-style 80/40 rig can murder TV in very fine style. Some of the gang would be amazed at their harmonic strength in the TV channels from the old 807 rig on 80-meter c.w. Of course, in a primary TV service area the problem would be considerably reduced, but in this fringe-fringe area it doesn’t take much of a harmonic to wreck a TV channel, where the TV signal strength may be on the order of 25 microvolts.

The following items have been found necessary in order to be able to check in on a traffic net in the middle of the evening:
1) Shielding. This is of primary importance. The rig must be completely enclosed. Chassis must have a solid bottom cover. Use solid shielding on all stages except those in which a great deal of heat is liberated. Shielding for an 813, for instance, may be fine-mesh copper screen. Contrary to popular belief, transmitter stages can be run totally enclosed in many cases, with no ventilation. As an experiment, I enclosed an 807 driver with solid shield ... no openings at all, no ventilation. The shield enclosure was just large enough to enclose the 807 tube and its tank coil. The tube run at 700 volts and 90 ma. and, needless to say, the shield box was a miniature bake oven. The same 807 operated continuously for over a year at my shack with no troubles, and it is still in use at W6HVJ and going strong.

2) Filtering. Very important for all leads leaving the shield enclosures. The ideal situation is to have as few leads leaving the shield as possible. This means mounting power supplies on the same chassis with the stages they operate. Key leads, microphone leads, meter leads, etc., should be filtered where they leave the unit. Effective filters here consist of 30 turns of No. 22 enamel, close-wound (air), in series with the lead, by-passed to chassis at each end with midget 500-µfd. mica1 condensers. For high voltages, those TV

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1 The new ceramic disk-type condensers are also excellent for high-frequency by-passing. See Grammer, "By-Passing for Harmonic Reduction," QST, April, 1951. — Ed.
high-voltage filter condensers make nice by-passes. Naturally, in all cases the filters must be inside the shielding and not in an r.f. field. For 80 and 40 meters the main 110-volt power lead only needs a line filter. It doesn’t seem necessary to filter each power supply lead inside the chassis.2

3) External leads should be shielded. Cork cable with appropriate fittings makes good keying leads between rig and key. Two-conductor shielded wire makes good meter leads. Not wishing to go to the trouble of shielding meters, I have found it very effective to mount meters in the open on a separate panel and plug them into appropriate circuits by means of plugs and jacks. The jacks are filtered inside the shielding. While shielded meter leads are to be preferred, I have found that in most cases unshielded leads can

2) Particularly if all of the wiring is done with by-passed shielded wire, as described in the reference in Footnote 1. — Ed.

4) But give some consideration to the path the harmonics take in getting back to the cathode. In many cases the condenser should be insulated from the chassis and the rotor returned to the underside of the chassis by a heavy lead running through a hole in the chassis. This permits returning the condenser directly to the cathode. See Goodman, “How To Build a Transmitter,” QST, Dec., 1951. — Ed.

5) Tuned harmonic traps in plate circuit should be avoided, at least on 80 and 40. It has been my experience that, while a trap may be

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Fig. 1 — Recommended treatment of a tetrode stage. All grounds are one point on the chassis, as close as possible to the cathode pin.

C1, C2 — 5- or 10-mfd. disk ceramic.
C3 — Normal grid-coupling condenser.
C4 — Normal screen by-pass condenser.
R1, R2 — 47-ohm composition resistor. ½-watt rating for 807s and smaller tubes.
C5 — Plate-tank tuning condenser, grounded as described in text.
C6 — 0.002-mfd. mica.

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Fig. 2 — Keying circuit used at WD4FY.

C1 — Normal screen by-pass condenser.
C2, C3 — 100 μfd.
L1 — 0.47 microh.
L2 — Screen-dropping resistor.
tuned to reduce harmonic trouble on one TV channel, it may increase harmonic trouble on another channel at the same time.

9) Use a separate antenna tuner, and couple it to the rig by means of link coils and coax link line. The antenna tuner should be built on a metal chassis of fair dimensions, and regular coax fittings should be used for the link line. On 80 and 40 I have not found it necessary to shield the antenna tuner, although it probably wouldn't hurt a thing to do so.

10) Eliminate key clicks. This is important, as severe TVI can be caused by clicks. And just because you have no audible clicks on the broadcast band, don't assume you have no clicks at TV frequencies. By far the most effective method for eliminating key clicks is to key the oscillator or other low-power stage in the plate or screen circuit and use a clamp-tube/VR-tube combination on the final screen circuit, as shown in Fig. 2. Using this method you can dispense with the old key-click filters, making for cleaner keying all the way around, and you won't have clicks, even smack alongside your sigs on 80 or 40.

11) Do not use triodes in the rig. They require too much drive. Use a beam-power final and drive it as lightly as possible consistent with reasonable output. Use an excitation control somewhere in the driver section. A wire-wound potentiometer in a driver-tube screen is very fine business; adjust excitation to the final for normal output to the antenna but no more! Do not reduce excitation by detuning a driver stage off resonance. A detuned r.f. amplifier can sometimes produce ruinous harmonics in the TV channels. Keep everything tuned on the nose. Granted this may make for a lot of knob twirling as you scoot around the band, but it can help materially to keep you off the Milton Berle show.

12) Use shielded internal wiring in the rig, bonding the shield to the chassis at frequent intervals.

13) Use large C to L ratios in tank circuits. At an early stage of the game (TVI-wise), I had an unshielded crystal oscillator operating on 40 meters, driving an exciter and push-pull 812

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Dick Hauff, W3SCY, who earned his license at the age of ten, made a most unusual entry into the ranks of on-the-air amateurs. He was originally assigned the call W3RVU. Trying his hand at 10 c.w., Dick had several contacts and then was dismayed to work a station who also signed W3RVU! The “other” W3RVU turned out to be YL Verna Resch of Temple, Pa., and both ends of this contact assured the other that each had really been issued the call sign. A hurried letter to FCC brought quick results: a duplication had been made and Verna, being the first licensed, was allowed to retain her W3RVU while Dick was given W3SCY. The young gentleman is a sixth-grade pupil in Trappe, Pa., and also a Cub Scout. His mother is W31NL and dad is well known as W3GIS.
Simplified Adjustment of the T and Gamma Matches

Getting a Low S.W.R. by Reactance Cancellation

BY FREDERICK Q. GEMMILL, W2VLQ

The variable condensers are mounted in plastic drinking cups to protect them from the weather. Metal straps mount the assemblies to the ends of the T bars.

Some time ago the writer put up a commercial 3-element close-spaced 20-meter beam using 95-ohm Twinax line to drive the T match. No combination of T-section lengths could be found which would match, and no combination of director, antenna or reflector lengths improved the situation beyond an s.w.r. of about 3 to 1. While it is entirely possible that the right combination happened to be missed, walking up and down the roof adjusting antenna elements lengths is not to be indulged in unnecessarily.

A study of the articles on impedance matching that have appeared in QST from time to time suggested that tuning out the residual reactance at the T match might help matters. With the s.w.r. meter inserted between the transmission line and the antenna, and with tuning condensers in series with each terminal of the T match, only a few minutes were required to adjust the T-match bars to a 95-ohm load with an s.w.r. of less than 1.1 to 1.

The writer later had a chance to check W6STC's 10-meter 3-element beam, which uses a Gamma match. Here again it was found that a variable capacitor would tune out the inductive reactance of the matching section, reducing the s.w.r. from a previous minimum of 4 or 5 to 1 to less than 1.1 to 1. Considerable improvement in performance resulted, and the strength of the field about the matching section was noticeably greater, as measured with a one-turn loop and flashlight bulb field-strength indicator.

The capacitors used to tune out the residual inductive reactance in the balanced T match at W2VLQ were midget variables having a capacitance of 140 μfd. Greater plate spacing probably would be required for high power, but there have been no arc-overs with 160 watts input. Weather-proofing was solved by mounting the condensers in plastic drinking cups, as shown in the photograph. The bottom surface was drilled for the condenser shaft, and two metal washers were used to get a watertight seal around the shaft bushing. An extra nut was used inside the cup to make a suitable surface for tightening. A heavy copper strap fastened under the outside shaft-bushing nut was used to attach the assembly to the T match, mounting it so that the condenser shaft is vertical. The tuning knob keeps water off the shaft and the end of the shaft bushing. The cup sheds water, although the bottom is open to the weather.

A Convenient Maxwell Bridge

In making adjustments as described an s.w.r. bridge is indispensable, and the Maxwell bridge circuit shown in Fig. 2 has been found to be especially convenient since it is only necessary to throw a switch to change the direction of power flow through the bridge. The addition of R2 makes the bridge a symmetrical device for either position of the switch S. R1 and R2 must

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Fig. 1 — Using variable condensers to tune out inductive reactance inherent in the T match (above) and Gamma match. Condenser C should have a maximum capacitance of about 110 μfd, for use at either 11 or 28 Me.
The salty ham call W3SEA is assigned to a Naval Reservist (W. F. Fallet of Ridley Park, Pa.), while W2GQG is held by a former Navy radioman (Roy Butler of Fair Lawn, N. J.).

A group of radio amateurs whose active military service assignments are concerned with the Naval Reserve Electronics Program hold an informal ham get-together on 7 Mc. at 2200 EST each Friday. The frequency 7250 ke. is the center of activity, with the gang spreading out between 7225 and 7275 ke. for individual ray chews.

A recent survey indicates that more than 1500 radio amateurs are members of the Naval Reserve and the Marine Corps Reserve. In addition, there are 500 amateur radio stations at activities of the Naval Reserve and the Marine Corps Reserve. These stations have the distinctive "K" calls (KINRA, KINAA, KINKR, etc.).

An SCR-269 mobile communication van was in operation on the amateur bands, both 'phone and c.w., at the 1951 New Mexico State Fair held at Albuquerque. Over 600 messages were handled for visitors to the week-long affair. The van was moved to the Fair site from Naval Reserve Training Center, El Paso, Texas (K5NRE). That activity cooperated with personnel of Naval Reserve Training Center, Albuquerque (K5NRY), in making the exhibit a success.

During the recent South Dakota Hamfest, James W. Fowley, W9GQY, was presented with the Armed Forces Communications Association medal for his many years of meritorious activity in communications work. Lieut. William Spanke, USA, W9GQU, made the presentation — the first time an amateur has received the award. For many years a member of the Naval Reserve, W9GQY is now associated with Organized Surface Division 9-208 at Naval Reserve Training Center, Sioux Falls (K9NRI). (Photo courtesy of DHHH)

**Fig. 2** - Maxwell bridge with reversing switch. This arrangement eliminates the necessity for interchanging the source and load terminals when using the bridge for obtaining a null indication when making adjustments to matching sections.

C1 = 140-μfd. variable.
C2 = 500-μfd. mica.
R1, R2 = 2700 ohms, 1-watt carbon.
R3 = 120 ohms, ½-watt carbon.
L1 = 14 turns No. 20, diameter ½ inch, length 3½ inch (B & W Miniductor No. 3003).
MA = 0-1 milliammeter.

be equal, and the capacitance of S1 must be small so as not to disturb the bridge balance. The capacitance of the milliammeter to ground is in parallel with the adjustable capacitor C1 and hence reduces the high-impedance limit at which balance can be obtained. A load-impedance range of 39 ohms to 250 ohms is obtained with the constants given in Fig. 2.

While the addition of R3 reduces the sensitivity to unbalance, it in no way affects the actual balance position. With S1 in position A, the source voltage is adjusted for a full-scale reading of 100 divisions. On switching to position B, the meter will read less than one division when the bridge is balanced for a given load resistance. The meter deflection with S1 in position A is proportional to the source voltage and the deflection with S1 in position B is proportional to the reflected wave. Unfortunately, there is a voltage drop across L1 so that the transmitted wave on the transmission line is less than the source voltage. As a result, this bridge will not read true s.w.r. without applying a correction factor, but from a practical point of view this limitation is not significant since a null indication is sufficient for obtaining the proper matching adjustments.

In the construction of such a bridge the usual precautions should be taken with respect to stray capacitances and to avoid coupling between the rectifier circuit and the other parts of the bridge carrying r.f. current. The writer used a sloping-panel meter case which, although not overburdened with excess room inside, was the most convenient ready-made chassis shape available. The variable capacitor is mounted on the top surface above the milliammeter, the input and output terminals are at the sides, and the switch is on the front, just below the milliammeter. The meter itself is on the sloping front, but is mounted on ¾-inch spacers to make more room inside and to reduce its capacitance to the case.

**SWITCH TO SAFETY!**

QST for
A Battery-Operated 2-Meter Portable Station

A Versatile Transmitter-Receiver for Portable or Mobile Service

BY LAURENCE LEPAGE,* W3QCV

In contemplation of a motor trip through New England last summer, the writer developed a strong desire to take along a small portable rig operating on 2 meters, his favorite band. This idea also had Civil Defense aspects, and the little rig about to be described appears to have great potential in this application. Operation is possible on dry batteries, a vibrator supply in the car, or a combination of a vibrator supply and small non-spillable batteries, carried as a separate unit.

Believing that special circuits aimed at extreme light weight and low drain would be a source of trouble, the rig was designed according to conventional lines, except that everything was handled in miniature. The general appearance is shown in the photographs. Housekeeping had to be very neat and compact. Everything is mounted on the U-shaped front of a Hammeroid-finish box (Bud CU-2110), measuring 10 by 6 by 3 inches.

Both transmitter and receiver are built on miniature aluminum chassis (Bud CB-1628) measuring 3 by 6¼ by 1¼ inches. This is an open-ended chassis from which approximately ½ inch was removed from the length dimension to fit inside the box. In the photographs showing the back removed, the transmitter chassis is at the bottom, the receiver above it. The modulator is on a cut-down chassis approximately 3 inches square, mounted on end in the upper left corner.

Transmitter Circuit Details

All tubes are 1½-volt filament-type miniatures or scrcons. The oscillator uses one half of a 3A5 dual triode, working on the third overtone of an 8-Me crystal.1 It was decided to avoid a 48-Me. stage, a potential source of TVI trouble on Channel 10 in the Philadelphia area, so the second stage triples to 72 Me. It was felt that an audio pentode like the 3A4 might not work well at 144 Me., so it was used as the tripler to 72 Me., coupling capacitively back to the second half of the first 3A5 for doubling to 144 Me. A very low-powered rig could stop right there, but we added a 3A5 operating as a neutralized push-pull amplifier on 144 Me. While the book says that this tube is good only up to 40 Me., it appears to perform admirably and without apparent loss of life expectancy.

It will be noted from the circuit diagram that each stage has a metering point for initial

* The usefulness of a low-powered 2-meter station is greatly enhanced if the rig is designed so that it may be carried to spots that are inaccessible by car. The little rig described here by W3QCV can be operated from dry batteries, a vibrator supply for mobile operation, or a separate wet-battery portable kit.

tune-up. In the operating set-up of the complete rig only the driver and final stages are metered, being connected to an 0–1 milliammeter with a selector switch. Because of the space problem the temptation to use one of the new miniature meters was great, but their sensitivity is poor. It was therefore decided to use a good 2-inch meter, so that careful tuning of the transmitter would always be possible. This is important if the most is to be had out of so small a rig. With 150 to 180 volts on the plates the final delivers enough power to burn out a 2-volt 60-ma. pilot lamp, connected to the antenna coil through the coaxial fitting, if it is left on for extended periods.

Modulator

The modulator uses a carbon microphone and a 6-volt battery, coupled through a miniature transformer to the grid of a 181 speech amplifier, transformer coupled to a pair of 3Q4s as push-pull modulators. A temptation to simplify this

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1 27 Love Lane, Ardmore, Penna.

Transmitter and receiver of the W3QCV portables are housed in a box only 10 by 6 by 3 inches in size.

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modulator will result in a beautiful carrier poorly modulated. The writer went all through this, starting with a one-tube modulating system.

The 3Q1s require 15 volts of negative bias, while the 1S4 calls for only 7 volts. This introduced bias complications, until it was found that there was hardly any loss in output or quality when 15 volts was applied to the 1S4. The Burgess K1OE hearing-aid battery, measuring little more than a one-inch cube, handles this...
well, and fits neatly into the top or the case.

**Receiver**

The receiving circuit is a straightforward superregenerator, and no originality is claimed for it. A 959 acorn pentode r.f. amplifier is capacitively coupled to a 957 acorn triode superregenerative detector. A miniature transformer coupled the detector output to a 3A5 dual triode, providing two stages of audio amplification. High-impedance headphones are used and received signals are frequently sufficiently strong to be heard clearly when the 'phones are laid on the table. It is entirely practical to wire the headphone jack onto the output of the first audio stage and use a small 'speaker in the plate circuit of the second audio stage, in place of $R_{18}$.

Except for the constant necessity for compactness, there are no particular construction or wiring problems involved in the receiver. Placement of the r.f. and detector tubes is important. To provide shielding the r.f. tube is mounted horizontally on a small vertical aluminum plate, with the grid prong pointing toward the near end of the chassis, permitting direct connection to the r.f. input coil. National type XLA sockets were used for both acorn tubes. This socket has small 50-µfd. by-pass condensers that can be inserted within the socket itself. The detector tube is mounted upside down under the chassis, so that its circuit leads are as short as possible, and to isolate it from the r.f. stage.

The B supply to the receiver was originally fed through a dropping resistor, cutting the voltage to about 100, at which point maximum receiver sensitivity was achieved. However, when a vibrator supply was tried it was found that the output voltage varied with the speed of the ear motor, so an 0B2 regulator was squeezed into a corner of the receiver chassis to stabilize the detector voltage.

**Construction**

All parts are mounted on the front of the case or on the chassis,

Rear view of the 2-meter portable station. The transmitter section is at the bottom with the receiver chassis in the middle. The modulator is on a small chassis at the upper left. The large cables are coaxial lines for the antenna and microphone circuits.

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dile on top and removable front and back panels. Holes 1½ inch in diameter are punched in the cabinet so that the condition of the batteries, as indicated by red, white, and green balls, can be observed without removing them from the case.

The cabinet is a perfect fit for the 6-volt battery, which rests on a pad of sponge rubber at the bottom of the case. The 2-volt filament battery is supported on a small bracket on the side of the cabinet just above the 6-volt unit. On the other side the vibrator supply fits in nicely on end, leaving enough space at the top for two switches, a pilot light and a pair of polarized sockets for connection to external chargers. Fig. 2 shows the wiring. A Mallory type 6-AC-4 is used for charging the 6-volt battery and a home-built charger, consisting of a 6.3-volt filament transformer and a Selectron type 5M1 rectifier, charges the filament battery.

**Mobile Operation**

"Pixie," as the rig is now known, is giving good service as a mobile rig. Another vibrator supply of the type used in the portable unit mentioned above is installed in the trunk compartment. This supply is rated at 200 volts at 75 ma., but its output voltage drops to about 180 under the load the rig imposes. A simple rack which latches onto the car radio grill holds the rig in a convenient location. The A and microphone batteries are strapped under this rack, while the B-plus comes from a cable running under the floor covering from the luggage compartment. B-minus is a ground to the dash.

The antenna for mobile operation is a coaxial type made from aluminum tubing. The supporting tube is a push fit into a socket that is bracketed to the skirt and rear bumper of the ear. This socket is made of sheet brass bent to form a sleeve. The transmission line terminates in a coaxial fitting at this point and is readily coupled to a mating fitting on the end of a permanently installed line of 72-ohm coax. This goes down through a rubber-grommeted hole in the skirt, up under the rear left fender, through a hole that was already there to carry lighting wires. It was easy to get into the passenger compartment from the trunk without drilling, and to bring the transmission line up through the grommet of the steering wheel column. Thus the only drilling consisted of two 1/8-inch holes for the antenna mast bracket and the 3/8-inch grommeted hole for the coax in the rear skirt. With this rig, "Pixie" can be installed or dismantled in a matter of two minutes, leaving little or no trace when removed.

**Adjustment and Operation**

In operation the little portable is similar to a fixed-station rig. The receiver r.f. stage is broadbanded, but it can be adjusted with an insulating screwdriver from the front panel. A friction-type tuning dial using a 1¾-inch dial plate and a friction drive from a standard National or Bud dial of this type tunes the receiver.

The oscillator and tripler circuits are screw- (Continued on page 118)
W2ZXM/MM—
“Captain Stay-Put”

One of the truly great epics of the sea was enacted as the New Year began. Battered by high winds of gale velocity and mountainous waves from the worst storm to hit the European coast in the past half century, the Isbrandtsen Line cargo ship Flying Enterprise started listing so badly that the skipper, Captain Henrik Kurt Carlsen, ordered the ten passengers and forty crewmen to abandon ship. Captain Carlsen chose to remain with his ship, radioing that he would stay aboard “until she is towed to port or sinks.” The long ordeal of this heroic sea captain is now familiar to all of you.

The master of the Flying Enterprise will not only go down in history as a great ship captain, but as an amateur radio operator, W2ZXM, who in the true spirit of the amateur carried on emergency communications despite the odds. (The 87-year-old skipper from Woodbridge, N. J., is an active maritime mobilizer, his phonograph signal well known on the ten-meter band.) To maintain communications he rigged up a battery-powered transmitter and a temporary antenna.

Captain Clayton McLaughlin of the Isbrandtsen Line in New York City early in this historic battle against the sea indicated to us that Carlsen was using amateur radio equipment. Subsequently, with the aid of Joseph Meyers, manager of operations of the National Broadcasting Company news department in New York City, word was received from NBC newsmen in England that Carlsen had been using amateur radio to maintain his communications. The Navy Department reported that escorting ships used channels in the 2.7-Mc. band. As QST goes to press, we are unable to ascertain the frequency on which Captain Carlsen had been operating.

Carlsen was licensed as W2ZXM in 1949. His shipboard transmitter ran 1 kw. on c.w., 800 watts on phone, with a 50-watt rig operating 3.5 to 144 Mc. also available. A 3-element rotary beam was used for ten meters. Current was supplied to the station by a 2-kw. motor generator.

The valiant master, dubbed “Captain Stay-Put” by the British press, is a member of the ARRL and the Maritime Mobile Amateur Radio Club. He obtained his berth as master of the Flying Enterprise in 1948.

Just two years ago, Carlsen figured in another dramatic incident at sea. On January 4th, while the Flying Enterprise was off the Virginia Capes, the child of one of the passengers became seriously ill. The skipper put his maritime mobile station on the air and obtained medical advice from a doctor through an amateur in Minneapolis. Following administration of the proper drugs, the child recovered sufficiently to be out of danger.

Edgar D. Collins of the League’s advertising department has sailed with the Captain and confirms his intense interest in amateur radio. A radio message and cable were sent to the heroic skipper from League Headquarters, the cable saluting him on behalf of the amateur radio operators throughout the world. — H. P.

Air photo of the badly-listing Flying Enterprise with Captain Carlsen on deck (circle). — Wide World photo

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How To Wire a Transmitter

The Basic Techniques of Radio Wiring

BY BYRON GOODMAN,* WIDX

One’s first attempt at wiring a piece of radio gear is somewhat similar to one’s first efforts at golf or skiing - the result is not likely to be mistaken for the work of a professional. But, fortunately, the rig will probably work, and the stations that hear your signals won’t know that the rig isn’t wired as neatly as a Bell Telephone switchboard. As a matter of fact, how well you wire your rig depends almost entirely on your pride and your experience — you will need both to come up with a good job. It is the object of this article to point out a few of the principles and considerations that are involved.

Obviously, the most elementary type of wiring is one where the small components are laid in haphazardly and the uneclipped wires are run to the necessary points, while connecting wires between large components are placed in the most convenient way. This will work for anything from power supplies up through audio equipment to r.f. circuits. You find it in many broadcast and TV receivers. It’s called “point-to-point” wiring, and it usually looks like a rat’s nest. Some of the better jobs, of course, clip unnecessarily-long leads and try to lay the long wires out of the way, but the result is still something that will never carry the Tiffany label. At the other end of the scale you find the “quality” wiring that is used in the better test equipment and gear built for the Government. Every component seems to have a proper place, and there isn’t a hodge-podge of crossed wires. A nice wiring job like this, or any other, isn’t an accident — it is the result of careful planning.

Since point-to-point wiring is “just doing what comes naturally” — provided you can follow a wiring diagram and know a little about soldering — most of this article will be taken up with the quality approach. There is, however, one simple trick that will dress up point-to-point wiring, and we’ll tell you about it later.

Soldering

On the off chance that you haven’t done much soldering, a short discussion of it is in order. In the early days of radio, many rigs were put together by wrapping the wires around binding posts that were provided on each component, but “them days is gone forever,” and it is only in an emergency that one would build a rig without soldered connections.

Soldering requires a clean hot iron (actually it’s copper), some solder and flux, and two or more wires or terminals that are to be soldered. The wires furnished with resistors and condensers are usually already tinned, as are the terminals on sockets and other components, so soldering is made easier and faster, because tinning allows the solder to flow freely over the wires when they are heated. Bare copper or brass (and insulated wire) must be cleaned or scraped before it is soldered, to expose shiny clean metal. Flux is used in soldering to prevent oxidation of the metal by the heat, and if you don’t use flux-cored solder you must provide yourself with a can of rosin-base soldering paste, to be spread thinly on the metal to be soldered, before the iron is applied. Radiomen take a dim view of acid-base fluxes, because they have the reputation for corroding the joint and adjacent wires after a year or two. If you must use acid fluxes, be sure to remove any residue immediately after soldering.

We can’t tell you what soldering iron to buy for your first one, any more than we can tell you how to select a wife or an automobile (and for the same reasons). However, you will probably wind up with an iron in or around the 100-watt class, or a soldering gun. A 60- to 100-watt iron will be

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*Assistant Technical Editor, QST.

†Two earlier “how-to” articles in this series were “How to Lay Out a Transmitter,” and “How To Build a Transmitter,” in the July and December, 1951, issues. — Ed.
satisfactory for all but the heaviest work (such as soldering to large masses of brass or copper, where it won’t be able to supply enough heat), and the soldering gun has the advantage that where you are working slowly and sporadically you don’t have to worry about the tip burning out. The gun or the iron will have a small-enough tip to enable you to get into some of the small places where a larger iron won’t fit. As you develop skill, you will probably want a small “pencil” iron for very light work and a heavy iron for the big stuff. However, you can use a 100-watt iron for heavier-than-normal work by adding the heat from a small alcohol blow-torch during the soldering process.

The soldering-iron tip should be kept clean at all times, with a thin coat of shiny solder on it. Wiping it with a rag or steel wool will do this for you. If the tip becomes pitted or irregular after some time, file it smooth again and re-tin it. Tinning instructions usually come with the solder and with the iron, so they won’t be repeated here. The iron must be hot and shiny when soldering, because if it is dull and dirty it won’t transmit the heat to the work.

Apply the hot iron right next to the joint to be soldered, and touch the joint with the flux-coated solder. The solder will melt and flow over the joint, provided the joint is already tinned or has been cleaned properly. Don’t hold the solder against the iron — you may get a sleeve of solder but no real bond. It won’t take long to get the hang of soldering — soldering a few pieces of scrap wire will give you the “feel” better than a thousand words could. Just remember that there are two enemies to good soldering: dirty surfaces, and an iron that isn’t hot enough or clean enough. When the solder is flowing over the work, remove the iron and the solder and watch the surface of the molten solder. After a few seconds, the bright shine of the molten solder will suddenly change to a duller finish — this indicates that the solder has cooled and hardened. In a good soldered joint, the solder will flow freely over the work and seem to combine with it, leaving no visible joint. Anything less than this should be suspect, and wiggling the wires (after cooling) will usually show that you have acquired a “cold” joint or a “rosin” joint that has made no bond. Resist any temptation to blow on the joint before the solder has set — let nature do the cooling.

Sometimes the flux will flow over the work and leave a thin film after cooling. This film will injure nothing but it doesn’t look neat, and it can be wiped off with a rag or brush while it is still warm.

When soldering a wire to a terminal, you have two choices. You can thread the wire into the terminal and then wrap it around the terminal once or more before soldering, or you can simply solder the wire as it lies in the hole of the terminal. The first, or “wrap-around” type of connection, is the one insisted upon in most high-grade commercial equipment, because the solder is not depended upon for the mechanical support but only for the electrical connection. It is recommended for any mobile equipment or anything likely to receive any shock or vibration. On the other hand, it is more difficult to replace components when this type of connection is used and, for experimental work, the simpler type of connection will work satisfactorily and will also speed up your work somewhat.

Your choice in wire lies between solid and stranded. The high-quality equipment usually calls for stranded wire, on the theory that if one or two strands break you still have a connection left. Solid wire is a little easier to work with in some instances, and for amateur work there isn’t much choice. Whenever there is to be any flexing of a wire or wires, however, the stranded wire should be used, since it will take the bending better over a long period of time. Solid conductor is generally preferred for r.f. work, but this is probably as much superstition as anything else, since we have never heard of anyone finding r.f. that refused to flow along a stranded conductor.

Any bare wire that runs far enough to offer the chance of hitting another wire under vibration should be covered with any of the many “spaghetti” or insulating tubings that are available, or it should be anchored so that it cannot possibly touch another conductor or the chassis. The insulating tubing has no electrical effect that you will be able to measure.

When wires are run through a hole in the chassis, for any of a dozen reasons, a rubber grommet should be used in the hole to furnish some insulation (for a single bare wire) or to prevent chafing of the insulation on an insulated wire. Insulated bushings of polystyrene or co-

Like the man said (in a previous article), it is the wiring under the chassis that clutters up a piece of radio gear. But placing the components at right angles, as in this example, will minimize the effect.
until it is shiny, and then use a very hot iron. It is
hard to do a neat job. You can only solder to an
aluminum chassis with special aluminum solder
and sufficient heat, but here again it is difficult to
do a neat job. However, the next best ground is a
soldering lug with teeth in it (usually called a
"star" or "Shakruf" lug) that will bite into the
metal of the chassis. There are times when a good
ground to the chassis is not vital, as when "link"
interstage coupling is used, but it is good practice
to get into the habit of making good grounds to
the chassis at all times. Whenever the chassis is
used to conduct current, as in capacity-coupled
stages, the chassis connections should be good
ones. It is also good practice to make all of the
grounds for any one stage (whether link- or
capacity-coupled to the next) to a single soldering
lug that makes good connection to the chassis. If
they won't all fit on one lug, at least fasten the
two or more lugs to the chassis with the same
screw. And don't fall into the trap of thinking
that a lug on one side of a chassis and one on the
other, held down by the same screw, means
that you have only one ground point for those
two lugs. That is true only in d.c. and low-fre-
quency work — at r.f. they represent two differ-
ent grounds, since r.f. flows only on the surface
of a conductor.

Dressing It Up

Back at the start we promised a trick on mak-
ing your wiring look neater, so here it is. And
don't laugh if it sounds too simple — try it, and
you'll see what we mean. The secret is: lay in
the components parallel to the chassis sides. A lot
of old hands do this automatically, without stop-
ing to think why, but you will find upon exami-
nation that even the worst "rat's nest" can be
dressed up by following this simple rule. If you
still don't believe it, take a good wiring job where
this has been done, and put a few of the com-
ponents in at an angle — you'll see the difference.

There are other tricks, too, but we believe that
that one is the key to the whole thing. Another
trick is to make generous use of tie points and
terminal boards, so that components can be laid
in side by side (parallel to a side of the chassis, of
course). Wherever possible, avoid stacking the
components one above the other, to sidestep
"peeling off" components to get at the bottom
one. If you can't avoid stacking the components,
at least make their leads accessible so that the
bottom one can be snaked out from under the
others. Proper use of tie points and terminal
boards permits unsoldering a component or a wire
without disturbing the other leads on that par-
ticular point.

The third and last trick to neat wiring is to run
the long and loose leads around the edges of the
chassis or as laced cables across the center of a
chassis. In commercial work the laced cables are
usually made up beforehand, but this is usually
unnecessary in amateur work, and the wires can
be laced after they are in place and the equipment
has been given a rough check. Ordinary grocery

(Continued on page 114)
"RACES" RULES PROPOSED

On December 19th the Federal Communications Commission released its long-awaited proposals for regulations governing civil defense communications to be furnished primarily by amateur radio under the name "Radio Amateur Civil Emergency Service," or "RACES." This action logically, if belatedly, follows the announcement nearly a year ago that portions of the amateur bands had been cleared for use by amateurs in c.d. communications even in the event of war.

RACES will be a brand-new service. It is of course closely allied to the amateur service; in fact, the proposed regulations are to be Sub-Part B of our present rules. Wherever they might be found incomplete, present amateur rules apply. The text of the proposal is of considerable length: the Headquarters has sent copies to ARRL administrative and interested field organization personnel, as well as clubs, and here we shall cover only the highlights. Any comment must be filed with FCC by February 15th. See your SEC or club secretary if you want to make a detailed study of the proposal.

RACES licensing and operation is based on organized networks under the direction of community or area civil defense authorities. There must be a complete communications plan in existence, and a copy on file with FCC. A key man in the local set-up is the Civil Defense Radio Officer, who must hold a commercial 1st or 2nd license, or an amateur license except Novice or Technician; must be qualified in the technical and administrative fields; and must have been cleared by local authorities for loyalty and integrity. He, primarily, organizes the networks, sets their drill and test schedules, and in general supervises all operations. He must endorse each amateur application before the Commission will issue a RACES station authorization. He is responsible to the director of civil defense, or to the intermediate communications officer if there is one.

Station authorizations will be issued upon application using FCC Form 480, endorsed by the radio officer, to a person who holds an amateur station license with operator privileges other than Novice or Technician. Normally the term will be concurrent with that of the amateur li-

1 Abbreviations here show first a numeral indicating bandwidth in ke., then a letter showing type of modulation (A for amplitude, F for frequency or phase), and then another numeral showing type of emission (1 for telegraphy, 2 for tone-modulated telegraphy, 3 for voice, 4 for facsimile). For example, 6F3 is frequency-modulated telephony, bandwidth 6 ke.

2 Subject to the priority of the Loran system of radio navigation in this band and to the geographical, frequency, emission and power limitations contained in Section 12.111 of Rules Governing Amateur Radio Station and Operators' Licenses. If the station is inactive for a period longer than three months, the authorization is to be surrendered. Multiple units under the same call are provided for; i.e., a home station and additional portable or mobile units may be operated under the same authorization and call sign, plus a supplementary numeral to identify multiple units (e.g., W1ABC/1 for a home or other fixed station, W1ABC/2, etc., for additional fixed or portable or mobile units).

While only amateurs of General-Conditional Class or higher may obtain station authorizations, Novices and Technicians may participate in civil defense activities as operators, except on c.w. circuits. Provisions are also made for participation of commercial licensees, generally according to qualifications.

The c.d. earmarked portions of amateur bands are usable with various types of emission, as follows:

<table>
<thead>
<tr>
<th>Frequency Band</th>
<th>Authorized Emission</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.55–28.75 Mc.</td>
<td>0.1 A1, 6 A3, 6 A4, 6 F3</td>
</tr>
<tr>
<td>29.45–29.65 Mc.</td>
<td>0.1 A1, 1.1 F1, 6 A3, 6 A4, 40 F3</td>
</tr>
<tr>
<td>50.35–50.75 Mc.</td>
<td>0.1 A1, 2 A2, 6 A3, 6 A4, 6 F3</td>
</tr>
<tr>
<td>53.35–53.75 Mc.</td>
<td>0.1 A1, 1.1 F1, 2 A2, 3 F2, 6 A3, 6 A4, 40 F3</td>
</tr>
<tr>
<td>145.17–145.71 Mc.</td>
<td>145.79–147.33 Mc.</td>
</tr>
<tr>
<td>220–225 Mc.</td>
<td>0.1 A1, 1.1 F1, 2 A2, 3 F2, 6 A3, 6 A4</td>
</tr>
</tbody>
</table>

Additional assignments "for use only by authorized stations or units of such stations which are operated under the direct supervision of duly designated and responsible officials of the civil defense organization" are:

<table>
<thead>
<tr>
<th>Frequency Band</th>
<th>Authorized Emission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800–1825 kc.</td>
<td>1875–1900 kc.</td>
</tr>
<tr>
<td>1900–1925 kc.</td>
<td>1975–2000 kc.</td>
</tr>
<tr>
<td>3500–3510 kc.</td>
<td>0.1 A1, 1.1 F1</td>
</tr>
<tr>
<td>3990–4000 kc.</td>
<td>0.1 A1, 1.1 F1, 6 A3, 6 A4</td>
</tr>
</tbody>
</table>

The Commission makes it quite clear that this is a temporary service and that if the need for its existence disappears, authorizations may be cancelled before their normal expiration date. RACES shares frequencies with the amateur service, but otherwise has no effect on present normal amateur operations.

EXTRA CLASS LICENSES

On December 7th FCC released a Notice of Proposed Rule Making which in effect grants the Amateur Extra Class ticket without special examination either in code or advanced theory to applicants who hold or can qualify for at least a General Class license, and who submit evidence of having held an amateur license during or prior to April, 1917. December 21st was the final date for filing comment; on the 27th the Commission made the rule final.

It is difficult to tie this action into FCC's announced objectives in creating its Extra Class

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license in the first place, "exceptional proficiency . . . a very real target for those among the amateurs in whom pride of superior ability and accomplishment would constitute a spur to special endeavor," and "an incentive to all amateurs to become highly proficient in all phases of the radio art." However, the Commission indicates that it feels recognition should be given early pioneers not necessarily on the basis of proficiency but of seniority.

The amended rules are paragraph (a) of § 12.21:

(a) Amateur Extra Class. Any citizen of the United States who either (1) at any time prior to receipt of his application by the Commission has held for a period of two years or more a valid amateur operator license issued by the Federal Communications Commission, excluding licenses of the Novice and Technician Classes, or (2) submits evidence of having held a valid amateur radio station or operator license issued by any agency of the United States Government during or prior to April, 1917.

and the following new paragraph, with old paragraph (d) becoming (e):

(d) An applicant for Amateur Extra Class operator license will be given credit for examination elements 1(C) and 4(B) if he so requests and submits evidence of having held a valid amateur radio station or operator license issued by any agency of the United States Government during or prior to April, 1917, and qualifies for or currently holds a valid amateur operator license of the General or Advanced Class.

FCC has now released a study guide for the Amateur Extra Class written examination, consisting of nearly 300 questions to indicate its scope. These example questions, together with suitable answers, appear in the latest edition of the ARRL License Manual, just coming off the press.

SERVICEMAN ACTIVITY WAIVER

Because so many amateurs are in the armed forces and unable to get on the air to accumulate sufficient hours of operating time to apply for renewal of their tickets, there has been in effect a waiver of the activity requirement for such persons in service. This waiver has now been extended to include licenses expiring during the year 1952.

F.C.D.A. COMMUNICATIONS CONFERENCE

Designed to evaluate and provide answers for technical and practical problems posed in planning civil defense communications, a users-industry-government conference was held in Washington the week of December 10th under the sponsorship of the Federal Civil Defense Administration. Nearly 100 representatives of federal, state and local governments, national organizations, industry and commercial services, took part in the discussions. The amateur service was represented by ARRL Vice President and Communications Manager F. E. Handy, W1BDI, and National Emergency Coordinator George Hart, W1NJM.

In fields relating to amateur activities, the conference committees endorsed the proposed set-up for a Radio Amateur Civil Emergency Service and urged a speed-up in the machinery to put it into effect. It was recommended that the military be asked to review the earmarked frequencies for a limited number of additional channels near 3.9 Mc., so long as this would not delay implementation of the plan as so far approved.

Operationally, there is no limit as to what equipment may be used in c.w. communications, but as a prerequisite to the Federal Government matching funds provided by states and communities for purchases of civil defense material, communications equipment presently must meet technical standards much more stringent than is customary in the amateur service. Looking to the future, a resolution was adopted suggesting the drafting of additional equipment specifications reflecting practical requirements for RACES that would warrant matching funds.

The Existing Radio Services Committee included amateurs high among the services "so affected by a major disaster as to make the communications facilities appropriate for inclusion in c.w. activities." ARRL emergency coordinators and other officials in the League field organization are receiving more detailed information about the conference and its tangible effects on amateur planning and participation.

LEAGUE REQUESTS POSTPONEMENT OF 7-MC. BAND PLANNING

As reported in December QST (page 38), the Federal Communications Commission combined the ARRL request for f.s.k. teletype privileges in 7250-7300 kc. with others for 'phone on 40 meters and teletype for all bands below 27 Mc., in a notice soliciting general comment. This action, the League's Executive Committee concluded after study, made a complex problem out of a comparatively simple one, to the extent that ARRL comment could not be made by the stipulated filing date, January 2nd. As a result, the League requests an extension of this date to June, to permit completion of the Planning Committee's study and later consideration by the Board of Directors at its meeting in May. The text of our request follows:

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of

Docket Amendment of Section 12.111 of Part 12, "Rules Governing Amateur Radio Service."

REQUEST FOR EXTENSION OF TIME (American Radio Relay League)

I.

Pursuant to Paragraph 3 of the Notice of Rule Making Proceedings in Docket No. 10073, released November 1, 1951, the American Radio Relay League, Inc., files these comments.

II.

The League is eager to assist the Commission by furnishing comprehensive and detailed comment on the issues listed in its Notice. However, for reasons which will be detailed hereinafter, the League finds itself unable within the time indicated in the Notice to apprise and comment adequately on the various issues which the Commission has inter-related for consideration with our own proposal for f.s.k. teletype privileges in 7250-7300 kilocycles. This being so, it is requested that additional time for the date of filing be authorized. For its own part, the League would contemplate a date subsequent to the annual meeting of
A Letter to TV Receiver Manufacturers

In mid-December the American Radio Relay League addressed the presidents of principal television receiver manufacturing companies commending their action in agreeing to apply suitable remedies to receivers found by FCC to be deficient in design or construction when interfered with by amateur stations, and pointing up the need to prevent this problem on the design table and drafting board rather than in the field, especially in view of the imminence of opening the u.h.f. TV bands. The letter follows:

Dear Sir:

As you may know, the operation of an amateur radio station frequently interferes with the reception of television signals. Broadly speaking, the causes of such interference fall into one of two categories: spurious radiations from the transmitter, or receiver defects such as susceptibility to overload and lack of adequate selectivity. Thanks to an intensive development program aimed at eliminating transmitter difficulties, the radio amateur has succeeded in devising methods for solving his part of the television interference problem. In many cases the interference still exists, however, due to receiver deficiencies.

For some months now the Federal Communications Commission has been endeavoring to obtain assurances from manufacturers that suitable remedies will be applied without cost to the customer when interference patterns exist in sets of their make because of inadequate design or construction. The Commission has now announced substantial progress in this campaign. As information, I enclose copy of an article appearing in the January issue of QST. The industry deserves a bouquet for its cooperation in taking the first step—discharging its obligation when the customer’s receiver is found at fault.

Yet at best this is only a remedy for a past miscalculation when TV was in its infancy. There still remains the obligation to provide, in normal design processes, adequate protection in current and future models against transmissions not in the television channels themselves. Recognition of this fact becomes especially important since we stand on the verge of opening u.h.f. channels for an expanded television service. TV receivers—and converters—designed for u.h.f. will bear the same responsibility for performance as their predecessors, with perhaps a slightly greater problem in interference rejection. The mistakes which have led to much needless interference in v.h.f. television—mistakes that, we feel certain, have occurred principally because of lack of awareness of the problem, rather than inability to cope with it—should not be repeated in the u.h.f. field. Your engineering group can provide the appropriate answers, once it is brought to their attention that solutions must be found.

In this connection you will be interested in the attached copy of my letter of May 1st to the RTMA. I understand the subject is receiving active consideration by the RTMA Committee on Television Receivers.

Action must be taken now to ensure that models of television receivers and converters for either v.h.f. or u.h.f. channels will incorporate adequate selectivity characteristics and protection against transmissions not in the television channels themselves. If the TV Corporation would like to conduct cooperative tests on interference susceptibility of your engineering or pilot models, our laboratory facilities and engineering experience in this specialized field are gladly offered.

Sincerely yours,

A. L. Budlong
General Manager
its Board of Directors, now expected to be early May, 1952, where final recommendations on some of the issues presented in the Commission’s notice will be made as the result of studies now in progress. A final filing date not earlier than June 2, 1952, is suggested therefore.

III

So that the Commission may better understand a request for what may seem an unusually lengthy deferment, we explain briefly why the nature of the problem will take some months of study by the Board, and reference to some of the preceding developments, may be in order. After some discussion of the matters covered by the Notice, other than that proposed by the League.

1) The Board’s current study. As the Commission knows, the ARRL Board of Directors has been discussing the practice of examining and re-examining matters of special amateur interest. At its regular meeting in May, 1951, the Board discussed the possibility of requesting opening part of the 7-Mc. amateur band to A3 emission. It quickly became apparent that there were many factors, several indeterminable at the time of the meeting, which would need careful study and thorough consideration before any sound and intelligent action could be taken. The Board, therefore, referred the matter to its Planning Committee, one of its standing committees, a study of this question looking to a report and recommendation sometime in the early part of 1952, on which the Board could base its final study and conclusions. As it happened, then, the League was already engaged in a study of the more difficult questions posed in the Commission’s Notice when the Notice was released. The Planning Committee has not yet completed its report, however, and the Board will not take final action on the matter until after further study of its meeting in May. At that time the League expects to have gathered data sufficient to enable filing of a suitable comment.

2) The needs and desires of amateur radio operators. Past expressions of amateurs, in sizeable polls of opinion conducted by the League, have indicated that a substantial majority feel that opening part of the 7-Mc. band to A3 emission would be detrimental to amateur interests. However, amateur interests and needs change rapidly; the most recent expression of opinion by amateurs on this highly controversial matter was four years ago and the Board feels that a current appraisal is needed. Numerous members of the League’s Board are now engaged in a canvass of opinion in their respective areas of the country. Adequate comment by the League on the Commission’s present Notice must await the results of such canvass, so that there may be a more general expression of amateur sentiment on this question.

3) Effects of the Atlantic City allocations table. At the present time, international regulations (Cairo, 1938) permit the use of amateur frequencies 7200–7300 kilocycles in other regions outside the Americas. Under the Atlantic City allocations table broadcasting in these other regions is allocated exclusive use of the AMateur band, from 7150–7300 kilocycles, and shared use with amateur for an additional 50 kilocycles, to 7100 kilocycles. Such an allocation portends considerable effect on present amateur operations in the 7-Mc. band. Adequate comment by the League on the Commission’s present Notice requires careful appraisal of this problem, as well as knowledge of the proposed allocations schedule as may have been evolved by the Extraordinary Administrative Radio Conference, just ended.

4) Worldwide displacement effects. Amateur stations in other parts of the world, on the long-distance bands such as the one under discussion, customarily conduct their voice operations outside the portion of such bands available for A3 emission in the United States and Canada. At the present time, with no U. S. or Canadian voice operation in this band, foreign voice operation, both elsewhere in the Americas and in other parts of the world, is only marginal and is distributed generally throughout the band. If, however, U. S. and Canadian amateurs were permitted to use voice here, it is possible there would be a marked influx of new foreign voice stations, and almost certainly a shift of all such foreign operation to the remaining portion of the band, affecting its utility for c.w. purposes. Adequate comment by the League on the Commission’s present notice requires careful appraisal of these factors.

5) Informal liaison with Canada. It has been the custom for many years for Canada to provide her amateurs with frequencies for A3 emission which not only encompass those available to U. S. amateurs but to extend somewhat beyond the U. S. limits. In its consideration of this whole subject, it is the hope of the League’s Board that some informal indication of what allied action Canada might take can be developed through its Canadian member. As this will be a considerable factor in any evaluation of some of the questions the Notice poses, adequate comment by the League must await its further exploration.

6) Laboratory project needed. It is the opinion of the League that comment on question No. 6 in the Notice, if it is to be of any substantial value, will require the inauguration of a special laboratory project, which the League is prepared to undertake provided the extension is granted.

7) Development of Novice operation. The new Novice Class of license made available by the Commission is attracting many newcomers to amateur radio. The low-frequency assignment for Novice uses 3700–3750 kilocycles, is already becoming badly crowded and considerable interference exists. While there has not been sufficient experience with Novice operations to permit conclusions to be drawn at this time, it is possible that the Commission or the League may soon be disposed to propose additional lower frequency privileges for the Novice; it is conceivable that part of the 7-Mc. band would be more desirable for this purpose than expansion of the present 3.7-Mc. segment. Further experience under the new rules permitting Novice operation is desirable so that our Board may be able to appraise this factor properly.

IV

These are the major problems which need study before intelligent comment can be made on the Commission’s present Notice, a study which, as stated, is already in progress. The League hopes the Commission will be disposed to defer the final date for comment, as requested, so that continuance and completion of the League’s present study will permit an adequate appraisal.

AMERICAN RADIO RELAY LEAGUE
PAUL M. SEGAL
Its General Counsel
A. L. BUDLONG
Secretary
December 17, 1951

RULES CHANGES

On January 3d FCC announced two actions aimed at relieving its administrative-licensing load: (1) removing the requirement that a Conditional Class licensee must appear for examination if he moves into a General Class area or if the FCC establishes a new quarterly examining point within 125 miles of his location, and (2) removing the four-month limit on operation at a temporary location.

So if you are a Conditional Class (old Class C) licensee and move to a location within 125 miles of a quarterly examining point, you no longer have to worry about taking the exam again. FCC does say, however, that if you get put on quiet hours because of citations for BCI or TVI or other unwarranted interference, it may call you up for the General Class examination.

The second action saves you a series of applications for modification if you are, for example, in military service and moving from one post to another every six months or so. So long as you have a permanent address you should have that shown on your license as the fixed station location and then operate as you wish in various portable or temporary locations. You must follow the notification procedures, of course, as specified below.

FCC asks that amateurs who have applied for

(Continued on page 114)

36 QST for
BANDSPREADING THE "COMMAND" TRANSMITTERS

If you use one of the "Command" series transmitters as the VFO in your station, you may be interested in having a bit more bandspread than that obtained with the original. In the case of the BC-458, remove the iron slug from the oscillator coil and replace it with a large brass slug. Now adjust the slug so that when the dial is set at 6.7 Mc., the oscillator frequency is actually 7 Mc., and when the dial is set to 7 Mc., the oscillator frequency is 7.3 Mc. This works out to 10 kc. per dial division. To make the dial direct-reading simply add 300 to the dial reading to get the actual frequency.

For the BC-457, glue the iron slug from the BC-458 onto the bottom of the slug in the oscillator coil, and adjust so that when the dial is set to 4 Mc., the oscillator is actually tuned to 3.8 Mc. With this arrangement, tuning the dial from 4 Mc. to 4.2 Mc. results in tuning the oscillator from 3.8 Mc. to 4 Mc., again resulting in a convenient 10-ke.-per-division arrangement for use in tuning the 75-meter 'phone band. — George Young, W5KQD

[Editor's Note: While this system may work out well in practice, it should be pointed out that no provision is made for correcting the tracking error in the amplifier stage caused by the change in oscillator tuning rate. Over the limited range involved, however, the error may not be serious enough to cause trouble.]

ANTI-SKID TREATMENT FOR BUGS

The tendency for a bug to slide across the smooth top of the operating table can be cured easily without resorting to unsightly rubber pads, screws, etc., and without marring the finish of the finest table. Merely rub a small piece of beeswax on the rubber feet of the bug and it will stay in place as though fastened down. This will work on surfaces as smooth as glass. If beeswax is not available, the wax coating from an old paper condenser will do as well. — William J. Wright, W5KYK

CURE FOR MAGNETIZED SCREWDRIVERS

The annoyance of working with an accidentally magnetized screwdriver may be eliminated easily by following this simple procedure. Place the business end of the screwdriver inside a quarter pound spool of No. 20 or smaller wire. Momentarily connect the free ends of the spooled wire across a 2- to 10-volt a.c. source and quickly withdraw the screwdriver. — Neil A. Johnson, W8OLU

IMPROVED TUNING RATE FOR RECEIVERS

If you have sharpened the selectivity of your receiver to keep pace with the increased occupancy of the ham bands, you'll probably feel the need for a slower tuning rate. The sketch in Fig. 1 shows one way to attach a vernier dial to the bandspread tuning condenser of your receiver without drilling into the panel. An angle bracket is formed to fit under the front edge of the receiver so that the vernier dial can be applied. Most receivers are heavy enough to hold the bracket in position without additional support, but if necessary, small self-tapping screws can be passed through the horizontal lip into the bottom plate of the receiver. — Robert J. Morrison, VO6VB

CHECKING CRYSTAL FREQUENCY

The method described below is a simple way to determine the approximate fundamental frequency of an unknown quartz crystal. It is especially useful in checking surplus crystals, many of which are unmarked, or at best marked only with a channel number.

Connect the crystal in series with the antenna to a receiver that tunes the proper range. A BC-458 (Q5-er) can be used to check low-frequency units, and the station communications receiver for the rest. Turn up the gain of the receiver until the background noise is heard plainly, and tune until a definite "ping," or a change in noise level is heard. This occurs at the fundamental only. The method is not accurate enough to depend on for more than a rough check, but it does eliminate the need for construction of a separate oscillator just to find the approximate frequency of the crystal. — Arthur C. Erdman, W3VTW

February 1952
An Inexpensive Sine-Wave Audio Oscillator

A Simple Unit for Audio Checking or Code Practice

BY C. VERNON CHAMBERS,* WIJEQ

At one time or another many of us have tuned up a 'phone transmitter by using the "shout, whistle and watch-the-plate meter" system. There can be no denying that this method of adjustment has resulted in many good sounding 'phone signals. On the other hand, the throat-and-eye test is neither adequate nor convenient for trouble shooting made necessary by audio equipment defects or deficiencies. Audio-circuit tests are best made with the aid of a steady, stable input signal and an oscilloscope. Very often it is the more simple instrument — an audio oscillator — that is not available.

![Simple audio oscillator using a twin triode. Tip-jacks are used as the output terminals and the variable attenuator is located on the front chassis wall.](image)

The simple one-tube oscillator shown in the accompanying photographs can be built from a handful of parts in less time than it would take to drive across town to the friend who owns a commercial model. It incorporates the features useful in 'phone transmitter testing — sine-wave output, low output impedance, and a wide range of attenuation. The cost of new parts is less than ten dollars.

The wiring diagram, Fig. 1, shows that one half of a Type 6SN7GT tube is used in a Colpitts circuit. This section oscillates at approximately 450 cycles and the sine-wave output voltage is fed to a cathode-follower circuit employing the second half of the twin triode. A variable attenuator and two ladder-type voltage dividers are included in the output circuit. Each divider reduces the output voltage by a factor of about 10 to 1. The maximum undistorted peak voltage obtainable from the unit is approximately 1.5 volts.

This particular oscillator-output combination was selected after several other circuits had been tested. The Colpitts was favored because it requires only a single triode tube, thus leaving the second half of a dual triode for use as a buffer and impedance transformer. Furthermore, the Colpitts will generate a good sine wave even when an inexpensive interstage transformer — iron core included — is used as the inductor for the frequency-control circuit. With the other circuits tested, it was necessary to employ both sections of the 6SN7GT for the oscillator or else to use a fairly high-inductance filter choke from which the core had been removed.

The frequency of oscillation is determined by the inductance of the winding that is normally the secondary of $T_1$ and the effective capacitance of the series-connected capacitors, $C_2$ and $C_5$. The junction of these two capacitances is connected to the cathode of the oscillator triode. Resistor $R_2$ provides a d.c. ground return for the plate circuit of the oscillator and also serves as a cathode-isolating resistor for the audio frequency. Output from the oscillator is coupled to the cathode follower by means of the primary winding of $T_1$.

The cathode-follower circuit uses the variable attenuator, $R_3$, as the bias resistor. Audio output is coupled through $C_4$ to the fixed attenuators.

The heater and plate-supply requirements for the unit are 6.3 volts a.c. at 0.3 amp. and 150 volts d.c. at 7.5 ma.

**Construction**

The top and bottom views of the oscillator show the parts mounted on a 5 × 7 × 2-inch chassis. The layout may be made to suit the tastes of the individual, but the types and values of $C$ and $L$ for the oscillator tank circuit are critical factors, and the specified transformer and capacitors should be used if at all possible. If substitutions are made the waveshape and output voltage of the oscillator should be checked with an oscilloscope. When checking with the 'scope, first observe the waveform at the grid of the cathode follower. If it is not a good sine wave the probable trouble is in the tank components,

*Technical Assistant, QST.*
particularly capacitors $C_2$ and $C_3$. The circuit is quite critical as to the type used and even may refuse to oscillate with the common cardboard-cased paper tubulars. If a sine wave is obtained at the grid of the output tube, the 'scope should then be connected to the high-output terminal. If the output appears to be clipped, it is necessary to reduce the input to the cathode follower. This can be done by lowering the oscillator cathode resistance, $R_9$. The turns ratio of the interstage transformer also is important. A ratio other than 1:1 will result either in excessive drive for the output tube or a reduction in output voltage.

The output cable for the oscillator is made from a length of Belden type 8885 shielded wire. One end of the cable is terminated with a pair of insulated 'phone tips and the output end of the lead is soldered to a set of alligator clips.

Chapter 9 of the Handbook explains how a simple audio oscillator can be used for checking a 'phone transmitter. It can also be used for trouble shooting in receiver audio circuits or any other purposes — such as code practice — for which a fixed-frequency audio oscillator is useful.

This bottom view of the test oscillator shows the interstage transformer mounted to the rear of the tube socket. Resistors for the ladder-type attenuators are supported by the terminals of the output jacks. The power plug is mounted at the rear of the chassis.

February, 1927

With deep regret, QST announces the resignation of John M. Clayton, 1DQ, assistant technical editor. He goes to New York City to become assistant secretary of the Institute of Radio Engineers.

... Ross A. Hull, 63JU, honorary federal secretary of the Wireless Institute of Australia, has associated himself with ARRL Headquarters and is in charge of Information Service.

... The Old Man returns with pointed comments. He clerk's "Botten Reasons" for some to believe that the average amateur's interest in his hobby is tending to wane.

... The Colpitts circuit is discussed by Technical Editor Robert S. Kruse in the third of his "How Our Tube Circuits Work" series.

... 2SB of Jamaica, Long Island, will test with a power of one kilowatt on 3 meters at scheduled periods for the benefit of Australian and European observers.

"An Airplane Transmitter" by R. S. Briggs, 1BVI, and G. H. Browning, describes a 70- to 120-meter range rig for aeronautical use employing UX-201-A tubes throughout.

... Robert H. Marriott writes on the new Loftin-White magnetico-electric coupling circuit.

... Hammard and announces a two-plate screw-type neutralizing condenser, adjustable from 2 to 50 micro-microfarads.

... A ready-made quartz crystal mounting is now available, offered by General Radio of Cambridge.

In DXing circles, Austria, Madagascar, Iceland, the Madeiras and the Leeward are rare countries reported on the air.

... Canadian S5V gives interesting observations on the effect of the aurora borealis on short waves and S8AD add his opinions concerning peculiarities of short-wave fading.

... 181G, winner of the Trophy, and n5AO, "on top of the world" in Canada's far north, are described.

February, 1952
The Wavelength Factor

Influence of the Antenna on the Choice of Wavelength for Best Communication

BY YARDLEY BEERS,* W2AWH

Good radio operating always requires detailed knowledge of the properties of all wavelengths available and the intelligent choice of the one best suited for a particular purpose. At the present time two general problems facing the amateur fraternity require particular consideration of this subject: (a) selection of the best band for Civil Defense nets, and (b) the development of the microwave bands, which is stimulated by the recent establishment of Technician Class licenses.

Superficially, the selection of a band for Civil Defense and the development of the microwave bands appear unrelated questions. However, the same reasoning may be applied to both, although with completely opposite conclusions. It will be shown partly in this article and partly in others to follow that, except for ionospheric communication, there is every advantage in placing mobile operation on the longest possible wavelength, while the u.h.f. and microwave bands are suited for fixed-station operation partly because of the necessity for using high-gain antennas with narrow beam widths and partly because of the complexity of the apparatus required to exploit the chief advantages of these very short waves.

At the lower frequencies the choice is based primarily on the ionospheric properties of the various bands, as these are by far the most important. However, at frequencies greater than 30 Mc. — as well as in ground-wave operation at lower frequencies, where the ionosphere plays no part — the principal factors governing the choice of a band are instrumental: that is, the characteristics of the transmitter, receiver, and especially the antennas, although there are also some effects produced by the lower atmosphere. For sky-wave operation at the lower frequencies the instrumental effects are also present, of course, but to a large extent are obscured by the ionospheric ones. The purpose of this article is to review these instrumental effects in the hope of aiding the solution of the problems mentioned above. Ionospheric effects at the lower frequencies will not be discussed: those readers whose main interest is in sky-wave communication may nevertheless find some of the topics to be of value.

Most of the instrumental factors are very familiar by name. A list of the more important ones follows:

Transmitter power.
Type of modulation.

* The choice of the optimum wavelength for a given type of communication — fixed station to mobile, fixed to fixed, etc. — is considered objectively, based on known principles of antenna operation. The conclusions that logically follow may be surprising to many amateurs, especially those not familiar with the "effective area" concept.

Although the discussion here and in subsequent articles principally deals with v.h.f. and u.h.f., the low-frequency man will find it of considerable interest, too.

Gain and efficiency of the transmitting antenna.
Gain and efficiency of the receiving antenna.
Noise figure of the receiver.
Bandwidths of the r.f., i.f., and a.f. portions of the receiver.
Gain of the receiver.
Overload properties of the receiver.
Type of demodulation.
Relative frequency stability of the transmitter and receiver.

There remains one more item, which although familiar to engineers and physicists who have worked on microwaves, is not widely known in amateur circles: the equivalent area of the receiving antenna, which is a measure of the effectiveness of the receiving antenna in intercepting radiation. As one would expect, the equivalent area is related to the gain, and whenever anything is done to increase the gain, the equivalent area increases in proportion. However, gain is not the only consideration. The equivalent area also depends, as we shall see, on the wavelength. The gain of the transmitting antenna and the equivalent area of the receiving antenna are the two most important instrumental factors in the selection of an optimum wavelength, and therefore these will receive special attention.

The Antenna Factors

Before going any further let us define a few terms to prevent confusion. Not all of the power supplied to a transmitting antenna is radiated. Some of it heats up the metal conductors of the antenna. The ratio of the total power radiated to the total power supplied is the efficiency of the antenna. The radiated power, however, is distributed over many different directions. The ability of the antenna to concentrate its radiated
power in a preferred direction or directions is called the gain of the antenna. More quantitatively, the gain of an antenna is specified with reference to a standard antenna. It is the ratio of the power radiated (per unit solid angle) in the preferred direction, by the antenna in question, to the power radiated in the preferred direction by the standard antenna. It is assumed, of course, that the total power radiated in all directions is the same for both antennas.

The definitions of efficiency and gain of receiving antennas are similar. The efficiency is the ratio of the power supplied to the input terminals of the receiver to the total power extracted from the radiation. The gain is the ability of the antenna to discriminate in favor of signals coming from a desired direction or directions over signals coming from other directions and is usually specified numerically with respect to a standard antenna. As a result of the so-called "reciprocity theorem," the directional properties of a given antenna are the same when it is used as a receiving antenna as when it is used as transmitting antenna. Therefore, the numerical values of the gain are the same for both applications.

Two types of antennas are used as a standard for the specification of gain. One of these is an imaginary antenna which would radiate equally well in all directions, called an "isotropic" antenna. The other is a half-wave dipole, which has zero radiation along its axis and a maximum in the plane at right angles to the axis. The power radiated (per unit solid angle) in the direction of maximum radiation of a half-wave dipole is 1.64 times (2.1 db.) that radiated in any direction by an isotropic antenna radiating the same total power. Therefore, gains expressed in terms of the isotropic antenna may be expressed with respect to a half-wave dipole by dividing by 1.64 (or subtracting 2.1 db.). In the present article the isotropic antenna will be used as a standard.

With these definitions in mind we shall explain why the equivalent area of a receiving antenna depends upon the wavelength. Let us suppose that we have a receiving antenna of some definite type — for example, a three-element broadside array — pointed at a transmitter. Then suppose that the wavelength of the transmitter is doubled, keeping the efficiency and gain of the transmitting antenna and the power of the transmitter the same. No longer will our receiving broadside array operate correctly. We must double both the element length and the spacing. In doing this we do not change the directive properties nor the gain. Nevertheless, the array "looks bigger" to the transmitting antenna and therefore is more effective in intercepting the radiation, just as a large pan will collect more water in a rainstorm than a small pan.

We shall defer a precise definition of equivalent area to a later article. When this is done, there is a very simple formula relating the gain, \( G \), the equivalent area, \( A \), and the wavelength, \( \lambda \):

\[
A = \frac{G \lambda^2}{4\pi}
\]

(1)

This formula is general and applies to antennas of all types. It shows, as we expected, that \( A \) is proportional to the gain and also that \( A \) increases with the square of the wavelength. If, as in our example, we double the wavelength and keep the gain constant, the equivalent area and therefore the strength of the signal would increase by a factor of 4 (or 6 db.); or if we increase the wavelength by a factor of 3, the received signal increases by a factor of 9 (or 9.5 db.). Equation (1) shows also, since \( G \) is a pure ratio, that \( A \) has the same units as \( \lambda^2 \), which are square meters, square centimeters, or possibly square feet. These are, of course, units of geometrical area. This gives still further significance to the concept of equivalent area.

Finally, in the case of large broadside arrays, horns, and parabolic-mirror antennas, the effective area is between 40 and 100 per cent of the actual geometrical area of cross-section of the antenna. Therefore, the effectiveness of these antennas for receiving depends primarily on their geometrical area. For example, if we replace a large broadside array by another one having the same area but operating at twice the wavelength, to operate correctly the new array requires elements of twice the length and twice the spacing, and therefore will have approximately one quarter the number of elements. Because of the smaller number of elements the gain will be reduced and the beam width will be greater. In order that Equation (1) will be satisfied we conclude that the gain must have been reduced by a factor of 4, and in general we may conclude that for antennas of the types mentioned having constant area the gain varies inversely with the square of the wavelength. It can be inferred that much of this reasoning also applies to end-fire and linear arrays, except for the fact that with them there is no related geometrical area that may be so clearly identified with the equivalent area.

It may be concluded that the effectiveness of
a receiving antenna—that is, its equivalent area—(a) increases with the square of the wavelength if the antenna has constant gain, and therefore the wavelength from this point of view should be as long as possible, while (b) it is independent of the wavelength if the antenna is a directional array of constant geometrical area.

The Transmitting Antenna

While the strength of the received signal depends on the equivalent area of the receiving antenna, its dependence upon the properties of a high-efficiency transmitting antenna is through the gain. Therefore, many of our previous arguments have to be reversed when applied to transmitting antennas. As long as the transmitting-antenna gain is constant, there is no advantage of any wavelength over another so far as the transmitting antenna is concerned. But, if we are limited to a definite size—or, more exactly, a definite area—we see that the wavelength should be as short as possible because the gain varies inversely with the square of the wavelength.

However, if we attempt to operate with antennas of very high gain we must expect that as the gain increases the beam width will become narrower, and for certain purposes it may become so narrow as to give difficulty. For example, a parabolic mirror antenna 3 feet in diameter operating in the 3300-Mc. band (9 cm. wavelength) would have a gain of approximately 800 (or 29 db.) and a beam width of approximately 7 degrees between the extreme directions at which the power gain is one-half maximum. The difficulties in general coverage operation without prearranged schedules, using an antenna with a beam width of only 7 degrees, may be seen by comparison with the following angles: The New York City limits (not including suburbs) would subtend an angle of 15 degrees from Philadelphia (75 miles away) and 7 degrees from Boston (180 miles away). Also, Los Angeles and San Francisco differ in direction as "viewed" from New York by 7 degrees.

Some alleviation could be obtained by using an antenna with greater vertical directivity than horizontal. However, there is a practical limit to usable vertical directivity because of errors in alignment, unevenness of the ground, and atmospheric effects. This writer would guess that a vertical beam width of 10 degrees and a horizontal width of 45 degrees would be the most narrow beam that could be tolerated in operation without prearranged schedules. In the case of parabolic mirrors and horns, the beam width, $\theta$, in degrees, is given approximately by a simple formula:

$$\theta = 2.3 \frac{\lambda}{d},$$

where the wavelength, $\lambda$, is expressed in centimeters. This formula applies to antennas of circular cross-section, strictly speaking. In this case $d$ is the diameter expressed in feet. However, little additional error is introduced if the formula is applied to antennas of rectangular cross-section. In this case $d$ represents the dimension in feet corresponding to the plane in which $\theta$ is measured. Thus for the horizontal beam width, $d$ would represent the width of the antenna. Probably the error in this formula is not greater than 25 per cent for antennas which are adjusted correctly. More accurate formulas would take into consideration the exact shape as well as other details neglected in the present article.

Table I gives the approximate dimensions of parabolic mirror or horn type antennas which according to Equation (2) would have a horizontal beam width of 45 degrees and a vertical beam width of 10 degrees for three amateur bands of interest. In all three cases the gain is about 135 (or 21 db.).

The upper limit on the size of an antenna depends upon the financial resources and mechanical skill of the builder. Undoubtedly, the following figures can be or have been exceeded, but it is unlikely that antennas larger than those indicated would be built often. A mirror or horn 5.7 feet by 1.7 feet is of practical size, but ones 16 feet by 3.6 feet would be too large for convenience. Therefore, the 1215-Mc. band is probably the lowest frequency where antennas of this type and beam width would be used. However, because of its open construction a broadside antenna 16 feet by 3.6 feet and having about 40 half-wave elements for the 420-Mc. band is within the possibility of practical construction. Such an antenna would have approximately the same equivalent area and gain, but it would be bi-directional and therefore it is to be presumed...
that the major lobes would be somewhat narrower than 45 X 10 degrees. By adding a group of elements to act as reflectors the array could be made unidirectional, but then the gain would be somewhat greater and the beam width somewhat smaller than 45 X 10 degrees. This could be corrected by reducing the cross-section of the antenna slightly. The adjustment of an antenna with 40 elements is, of course, a problem but not an insurmountable one. These arguments tend to indicate that an antenna of the minimum usable beam width and maximum gain for general coverage operation is within the realm of practical possibility for the 420-Mc. band. At the same time it may be inferred that such an antenna for 220 Mc. would be too large for the resources generally available.

Of course, it is the combined performance of the transmitting and receiving antennas which is significant in the choice of a wavelength. This subject will be summarized a little farther on. For the moment, however, we shall consider some antennas of types that are of principal interest at the longer wavelengths.

**Dipoles, "Super-Gain" Antennas, and Unorthodox Antennas**

As mentioned previously, the gain of a half-wave dipole is 1.64 relative to an isotropic antenna. Its equivalent area then may be calculated by substituting this value into Equation (1). Since by definition the length is one-half wavelength, we may conclude that the equivalent area depends upon the geometrical size of the antenna. Thus the properties of the half-wave dipole are not in contradiction with any of the ideas we have considered.

If we now consider what happens if we replace a half-wave dipole by one considerably shorter, we shall encounter a situation which is very different in several respects. The radiation pattern of a "short" dipole in free space is similar in general to that of the half-wave dipole, having a zero along the axis and a maximum in the plane at right angles to the axis. However, in detail the pattern is slightly different, resulting in a gain of 1.5 (or 1.7 db.) instead of 1.64 (or 2.1 db.). Thus the gain of the short dipole is 0.91 (or minus 0.4 db.) relative to the half-wave dipole. If we substitute the value $G = 1.5$ into Equation (1), we find for the equivalent area

$$\frac{1.5X^2}{4 \pi}$$

while for the half-wave dipole we would have the factor 1.5 replaced by 1.64. However, we are no longer required by definition to change the length of the dipole every time we change the wavelength, and therefore we conclude that with the short dipole both the gain and equivalent area are independent of the geometrical size. Furthermore, it would appear that by replacing a half-wave dipole by one very much shorter we still have an antenna that is 91 per cent as effective in both transmitting and receiving! This conclusion is difficult to believe, although to a large extent it is true. However, this situation requires us to consider a matter that we have been able to overlook up to now: the efficiency.

A transmitting antenna is characterized by a quantity called the radiation resistance, referred to a point which is usually taken at the center of a dipole or, in the case of long-wire antennas, at a current loop. The radiation resistance is defined in such a way that when its value is multiplied by the square of the current flowing at that point one obtains the radiated power. This impedance is quite real in the sense that it may be measured by an impedance bridge connected to the antenna. The value of the radiation resistance and the measured current will vary with the choice of reference point, although the changes in the resistance and current are interrelated in such a way as to keep the power constant. Therefore, by itself the value of radiation resistance has little meaning; only when it may be compared with other resistances in the output circuit does its value have significance. These other resistances include the plate resistance of the final amplifier, losses in the final tank, antenna coupler, transmission line, and the radiator itself. By consideration of the impedance step-up properties of the intervening circuit, the equivalent series resistance at the reference point due to each of these may be determined. If the radiation resistance is high compared with the total of these other equivalent resistances, the efficiency is large; if it is low in comparison, the efficiency is poor. If the antenna is used for receiving, the efficiency (and also the noise figure) will depend in a similar fashion upon the comparison of the radiation resistance with the total equivalent resistance resulting from portions of the input circuit as far as the grid of the first tube.

It is true that the voltage developed across the terminals of a perfect voltmeter connected to a short dipole will increase in proportion to the length of the dipole. However, the radiation resistance also varies with the square of the length in order to keep the available power and there-
fore the equivalent area independent of the length, as required by our formula. Therefore, as we decrease the length of an already "short" dipole while keeping the wavelength constant, the radiation resistance will drop until it becomes comparable with or even smaller than the equivalent resistance of the rest of the circuit, with a deterioration of efficiency.

Some countermeasures may be taken against this loss in efficiency. On the one hand, we may load the antenna in various ways to raise the radiation resistance. On the other hand, losses may be reduced by using heavy conductors in the antenna and elsewhere, and components of high quality. From the widespread success of 4-Mc. mobile stations with 10-foot antennas operating against the car body as ground it may be concluded that dipoles of a twenty-fifth and possibly one-fiftieth of a wavelength can be made of sufficiently great efficiency to be practical.

The effect of low antenna resistance and these countermeasures combine to make the circuit very selective, necessitating retuning for very slight changes in frequency. In itself this is not always an advantage, since it may result in the suppression of unwanted signals in receiving and suppression of unwanted harmonics in transmitting. However, the design of the coupling circuit may depend in an important way upon parasitic capacities and the L/C ratio in the antenna coupler, factors that ordinarily have little effect. Also, in transmitters very high voltages may be developed across the variable condensers with the result that these may have to have higher voltage ratings than usual with transmitters of the same power. The coils must be of low-loss construction, and changing inductance by shorting turns will result in a serious loss of efficiency. Finally, the performance will be affected by rain and swaying in the wind.

Advanced antenna theory indicates that it is possible to build antennas of any desired gain with arbitrarily small size, or at least of much smaller size than is in accord with present practical designs. However, Chu has shown that as the size is reduced the radiation resistance of these "supergain" antennas falls, with the result of reduced efficiency and bandwidth. Therefore, while high-gain antennas of small size may exist in theory, the theory also predicts that they will be of limited practicality. Although the short dipole perhaps is not included in the definition of a "supergain" antenna, its behavior as described above is completely in accord with that of antennas of this type.

Incidentally, the reasoning of the previous paragraphs justifies theoretically the success of the many unorthodox antennas put up by amateurs because of lack of adequate space, unsympathetic landlords, or lackiness. The requirement that a dipole or a long-wire antenna be cut exactly to "resonance" is to a large extent superstition.

The Antenna Factors Summarized

The combined effects of the transmitting and receiving antennas as dependent upon the wavelength may be summarized conveniently by considering three cases which correspond more or less exactly to most situations likely to be encountered. In the following it is assumed that a mobile station would use a dipole, or at any rate an antenna of very little gain. The question of efficiency will be neglected.

1) Both antennas having constant gain. This situation is likely to be encountered at any wavelength when both stations are mobile, and almost inevitably also by fixed stations at low frequencies. In this case the effectiveness of the transmitting antenna will be independent of wavelength, while the equivalent area of the receiving antenna will increase with the square of the wavelength. Hence in this case the wavelength should be as long as possible.

2) Both antennas of constant size. This is the situation encountered normally with fixed v.h.f. and microwave stations. The equivalent area of the receiving antenna will be independent of the wavelength while the gain of the transmitting antenna will increase inversely with the square of the wavelength. Therefore, the wavelength should be as short as possible, provided that the beam widths do not become too narrow. According to the considerations of Table I, we may conclude that the most favorable antenna factors for general coverage operation would be realized in the 420-Me. band under practical conditions. For point-to-point operation on prearranged schedules, much higher frequencies would be desirable.

3) Station A having antenna of fixed gain, while Station B has antenna of fixed size. This might be encountered with a fixed station with a rotary beam antenna in communication with a mobile station. When Station A transmits, the gain of the transmitting antenna and the equivalent area of the receiving antenna are both independent of the wavelength. When Station B transmits, the gain of the transmitting antenna varies inversely with the square of the wavelength, but this is compensated exactly by the equivalent area of the receiving antenna, which varies directly with the square of the wavelength. Thus in both cases there is no over-all dependence upon the wave-

(Continued on page 118)

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FUNDAMENTAL TELETYPEWRITER OPERATION

SIGNALLING SYSTEMS AND BASIC CIRCUITS

BY A. J. SABEL, W4SQF

While radio communication to the average amateur classifies itself into two means of "thought transfer" — communication by 'phone and c.w. — within the last few years there has been a growing interest in a new form of ham communication, namely, radio teletypewriter communication. Unfortunately, unless one has had experience with the commercial or military application of RTTY, there is a rather vague understanding of the principles involved. However, the circuits and equipment used represent no unorthodox approaches. Circuitry, while perhaps not so familiar as that used in c.w. and 'phone equipment, is standard and well-defined. It is merely the combination of low-frequency (a.f.) circuits with high-frequency circuits used every day. Assuming the reader is an amateur with an average background, the following should not be difficult, nor should the principles involved be too unfamiliar. Since the scope must be limited, the individual phases will not be delved into too deeply.

Communication by c.w. makes use of transmitted signals which are broken up, or keyed, in accordance with a prearranged code. The code normally consists of short pulses (dots), long pulses (dashes), single spaces, letter spaces and word spaces, the only object of the single spaces being the separation of dots and dashes. Communication by teletypewriter, or "printer," is also based on a "code." There are several differences, however, which should prove interesting. In contrast to the Morse code in which the symbols vary in time length from a single dot (letter E) to five dashes (numerical 9), all TTY symbols are of the same over-all length. This standard length of time is divided up into seven standard units or blocks, as shown in Fig. 1. In the simplest teletype system, the dark spaces indicate time blocks during which a signal is being transmitted (called "mark"), while the empty blocks indicate time units during which no signal is transmitted (called "space"). In comparing teletype code with Morse code, it can be said that the former consists of dashes (or perhaps more correctly, dots) of various lengths, and spaces of various lengths. Five of these unit blocks (those numbered in Fig. 1) designate the letter (or other character). It can be seen, for instance, that the TTY code for the letter A is a sequence of two mark units followed by three space units; the code for the letter N consists of two space units, followed by two mark units, and another space unit. In the TTY code, there is no equivalent for the space between letters as in Morse code. But, as indicated in Fig. 1, the starting of a new letter is indicated by the "transmission" of a space.

The end of each letter is indicated by a mark. This "stop" mark is slightly longer than the standard unit mark. For 60-w.p.m. transmission, each mark or space unit is 22 milliseconds long, while the stop mark is 1.43 times this length, or 31 milliseconds. Thus all characters have a total time length, including the start and stop units, of 163 milliseconds. While a transmission speed of 60 w.p.m. is more or less standard, it can be raised or lowered. Actually, in the preferred systems, discussed later, a signal is transmitted during the space block, as well as during a mark block, a different frequency (audio or r.f.) being used for each (two differently polarized voltages in the case of wire lines).

Fig. 1 — The "five-unit" teletypewriter code.

* Capt., SC, 1018 Columbia Drive, Alexandria, Va.

February 1952
printer machine. The machines are used instead of the keys and sounders used in regular line telegraphy. Each machine consists of a transmitting keyboard and a receiving and printing mechanism. Depressing a key on the printer keyboard releases the transmitting mechanism and automatically keys the correct series of pulses over the line to the receiving printer. The receiving printer translates the received impulses into a mechanical action so that the printing portion of the machine may select and print the proper character. Each key of the transmitting portion of the teleprinter sends a different sequence of pulses and the receiving portion at the other end of the line will react to this difference in sequence by printing a different letter or numeral, or perform some other standard function, such as returning the carriage, etc. The teleprinters transmit any one of the 26 letters of the alphabet and 24 different characters and numerals. In addition, the functions of carriage return, line feed, letter shift, figure shift, space, blank, signal bell and motor stop can be performed by pressing a key for each. There are specialized versions of a standard keyboard in existence which substitute special symbols in place of standard letters or numerals. Among these is the weather-symbol machine used in weather-forecast work.

In wire teleprinter operation are two basic types of operation, known as "polar" and "neutral." Each has its own merits. In present amateur systems, standardization is imminent and the neutral system is being considered very favorably, although no decision has yet been reached. Briefly, a neutral system is one where the operation of the selector magnets or relays is independent of the direction of current flow through the windings, so either terminal of the battery or rectifier supplying them can be connected to the line. (It is standard practice to ground the positive side of the supply and apply the negative side to the line, however.) Signaling is accomplished by interrupting the current flow at specific intervals in accordance with the transmitted sequence of mark or space impulses. The result is a current, no-current type of operation, where the interval during which current flows is the mark and the no-current interval the space. This system is shown in simplified form in Fig. 2.

In polarized operation, shown in Fig. 3, the principal difference is that marking or spacing conditions are obtained by reversing the polarity of the applied voltage, rather than by interrupting the line circuit. While the neutral system is easiest and cheapest to install and maintain, polarized operation is preferred for use over long lines because it is not affected to any considerable degree by the distributed capacitance and inductance of the line. In amateur work, the only line involved is from the machine to the transmitter and receiver so that line characteristics are usually not a consideration.

**Application to Radio Communication**

In applying radio teletype to radio communication, the principles of operation are unchanged. However, in the preferred systems, it is necessary to convert the d.c. pulses normally applied to the line to a form suitable for use with the system selected. Two systems are in most common use. In one of these systems, the d.c. marking and spacing pulses are used to key a relay that causes an audio oscillator to alternate between two standard frequencies — 2975 cycles for space and 2125 cycles for mark. The two tones are then used to modulate the carrier of a regular 'phone transmitter. This system is known as "a.f.s.k." (audio-frequency-shift keying). Better signal-to-noise ratio and an increase in the effective power of the transmitter is obtained with the second system, known as "f.s.k." (frequency-shift keying). In this system, the carrier is not modulated, but its frequency is shifted by the same number of cycles as in a.f.s.k. Then, the b.f.o. in the receiver is adjusted to produce the audio beats of 2975 and 2125 cycles in the audio output of the receiver. The desired change in carrier frequency is usually accomplished through the use of a reactance modulator working on the oscillator, as in other f.m. systems.

A block diagram of the converter used at the receiving end of the circuit to change the audio tone back to d.c. pulses to operate the receiving
printer is shown in Fig. 4. The two audio tones are fed into a filter that passes the two frequencies but excludes noise frequencies outside the passband. The signal then passes to a limiter that holds the output constant over a wide range of signal-strength variations. The signal is then fed into two sharp filters, one passing 2975 and the other 2125 cycles. Thus the two audio tones are divided into two separate channels. Each signal is then rectified, and the d.c. pulses stepped up in d.c. amplifiers to the level needed to operate the polarized relay controlling the receiving printing mechanism.

This, in brief, describes the more important principles involved. There are, of course, many refinements which often make it possible to operate printer service over circuits where other types of communication could not be carried out reliably. It is hoped, however, that this will serve to answer some of the questions that arise in the mind of the average ham when he hears RTTY mentioned.

Quist Quiz

A tells his friend B that the receiver he bought is no good — that the b.f.o. is noisy and he doesn’t know what to do except to return the receiver. He knows the b.f.o. is noisy because when he turns it on the receiver noise increases. B tells him not to return the receiver, that it is a simple job to reduce the b.f.o. voltage and reduce the noise. Which course should be followed?

(Please turn to page 128 for the answer)

Strays

W2 QSL, Bureau Manager Hank Yahuel, W2SN, had “practically nothing to do” in 1951. He handled only 55,075 cards. His record high was 105,050 in 1949 followed by a mere 90,780 total in 1950. Poor DX conditions may explain the decrease in volume. Or could it be by this time almost everybody has worked everybody else?

Silent Keys

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

W1FMY, Arthur Gray, Orange, Conn.
W1GZ, Nestor W. Stobba, Fitchburg, Mass.
K3AW, J. Charles Hauff, Bronx, N. Y.
W3JUD, Lloyd Moore Peterson, Fayetteville, N. Y.
W2WUH, B. A. Govey, Jackson Heights, N. Y.
W2ZMJ, Vernon Whitman, Bronx, N. Y.
W5QIV, Raymond Bell, Pismo, Texas
WSTA, Raymond Collins, Dallas, Texas
W7BQW, Dennis A. Price, Dayton, Wash.
W8SF, Carl H. Ludwig, Lorain, Ohio
W8GIC, Raymond E. Stuey, Lancaster, Ohio
W5AQG, Donald E. Martin, Aurora, Ill.
W3DFZ, William J. Bender, Alexandria, Ind.
W9PFT, E. J. Kuns, Randolph, Wis.
W9MGG, Ray V. Zimmerman, Aurora, Ill.
W8CZR, Francis A. Nelson, Denver, Colo.
W8JE, John Raymond Derby, Denver, Colo.
W5SJC, Henry F. Kirk, Mendota, Minn.
W5TLN, Herbert Erickson, Minneapolis, Minn.
VE2AA, George A. Aucock, Drummondville, Que.
VE3BNQ, A. S. Whetham, Hamilton, Ontario
VR2HI, Perce G. Feinty, Sydney, N. S. W.
Was it tropospheric bending or sporadic-E skip? This question always comes up whenever 2-meter DX beyond a few hundred miles is reported. There is good reason for argument, too, as both types of propagation seem to have been involved in our several instances of 144-Mc. communication over distances of 1000 miles and more in this country. Now we have a report from New Zealand that looks like another point for the ionosphere. It is also the first instance of near-record DX to be reported outside this country. Watch out, 2-meter record holders!

The month of December in the Antipodes corresponds to our June, so it is the peak month for sporadic-E DX on 50 Mc. for the VKs and ZLs. At 7:41 P.M. New Zealand time on Dec. 15th, ZL3AR, Ashburton, New Zealand, worked VK2AH, Ryde, New South Wales, on 50 Mc. VK2AH then shifted to 144.16 Mc., and his signal came through, so ZL3AR changed to 146.19 Mc. and was received in Australia SS. Two-way contact was established at 7:45 P.M., and continued until 7:52. The distance is approximately 1230 miles.

There are several points of interest here, and they check with experience in this country. The distance, for example: all our 2-meter DX that has looked like sporadic-E skip for sure has been over distances of 1200 miles or more. The contact came when 50 Mc. was open for the same path. As we’ve had no indication of tropospheric communication on 50 Mc. over distances beyond about 400 miles, it appears that $E_t$ opened this path, just as it seems to have done when 2 and 6 have been open simultaneously in this country. The path in this VK-ZL QSO is of interest. Note that Ashburton is in the east-central portion of New Zealand’s South Island. The hop to Australia crosses the Southern Alps, a backbone ridge of mountains nearly comparable to our Rockies in height. Not the sort of terrain you’d be likely to cover by tropospheric bending. The latitudes and distances are not unlike hops from Portland to Amarillo, or Los Angeles to Omaha. Those would be nice DX on 2 in these United States!

The closing weeks of 1951 were not unkind to 50-Mc. enthusiasts in this country. WS5FW, Amarillo, Texas, found the band open every weekend for five in a row through Dec. 16th, with some other openings scattered in between. W5FXN, Austin, caught W7QIZ on the night of the 2nd and worked W9MJ, W4FBH, W4RBK, W9MFFI and W9ZILL on the night of the 18th. W8UZ, Columbus, Ohio, worked WS5FW on the 9th and heard him and W5MJD working other Ws and 9s. George also had a productive session with the W1s on the evening of the 16th, as did W9s LPD GZ and NQD. W6GCG, San Mateo, Calif., worked WS4ZU/5 at Ft. Bliss, Texas, on the evening of the 15th.

### 2-Meter Standings

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*V. L. F., Editor, QST.*

48 QST for
These December openings seem to surprise many of the 6-meter gang, though they shouldn’t. Years of experience have shown that we have a winter sporadic-E season, as well as a summer one. It’s not as long, and the openings are not usually as widespread, but there are always some good DX chances in December and January. One cannot escape the feeling that many interesting opportunities are lost for want of activity in the right places in these winter sessions. On Dec. 16th, for example, there were all the indications that double-hop work should have been possible from the East, if they had been some body in business in northwestern W7.

The band was open most of the day, and well into the evening. Conditions were good enough so that W1C7W, Arlington, Mass., was able to work W8e NQD GZ UZ LPD, W9MFE, W9QIN, and VE3AET, with 8 watts input to a portable transmitter-receiver unit designed for civil defense communication! (This rig, now being duplicated in quantity in the Boston area, will be appearing soon in QST.) Your conductor was hearing Ohio, Indiana, Wisconsin, Minnesota, and South Dakota simultaneously, and the Middle West stations were hearing W7s on 28 Mc. We’ve worked plenty of double-hop DX in summer openings when conditions appeared less favorable.

W3OJU, Washington, D.C., comments on the frequent reception of VE3RA and VE9RB, the Canadian beacon stations just outside the low edge of the band. Though these transmitters are of moderate power, and use omnidirectional antennas that keep their effective radiated power well below that of 50-Mc. ham stations, Rick hears them often, even when there is no indication of DX activity otherwise.

The tremendous coverage of the high-powered station of 49.8 Mc. has demonstrated that the average 50-Mc. amateur is a lot closer to DX conditions at all times than we have realized heretofore. Even taking the large difference in power and antenna between that station and the usual amateur layout into consideration, one has only to listen to the signal regularly to realize that a ham station running safely inside the legal power limit might also be heard over similar distances fairly often. If we who have 50-Mc. gear would put it on the air regularly in all seasons, instead of when we just happen to feel like it, all of us would find life on 6 a lot more interesting. It is nothing less than the duty of those of us who have a real and continuing interest in the 50-Mc. band to make better use of it than we have been. Let’s get going now — don’t wait until next May!

**Here and There on the V.H.F. Bands**

The choice of crystal and multiplier frequencies to be used in a crystal-controlled converter should be made with local TV channels in mind, unless one is prepared to do a TVI job on the stages involved. W2OWQ reports that he made large black bars on Channel 4 with the line-up (the 6BQT job for 144 Mc.) described in QST for September, 1951. The second half of the first 6J6 triodes to 68.5 Mc., in the video portion of Channel 4. Running the stages at the lowest possible input, and some care in shielding and by-passing can get rid of the trouble, or the alternative crystal-multiplier line-up described in September, 1950, QST and the 1951 Handbook can be employed. A shift in the intermediate frequency used will also frequently do the trick.

Organizing for civil defense communication is developing v.h.f. activity in many communities where there was no interest heretofore. W7OWP writes that the Richland, Wash., hams have decided to use the 144-Mc. band and are now in the process of getting ready for their first plunge into v.h.f. work.

About the middle of November, newspapers and several weekly news magazines carried stories of the first two-way communication between Cedar Rapids, Iowa, and Washington, D.C., by means of lunar reflection. Signals had been bounded from the moon before, of course, but these stations actually communicated by this means. Right away we began to receive letters asking why hams weren’t doing it, too. The answer lies in the nature of the equipment involved. The frequency was 418 Mc.; the power output 20 kw. Huge high-gain arrays were used, and the receivers employed a degree of selectivity that few of us would care to attempt. Lunar communication may yet be accomplished by amateurs (144-Mc. signals have been received by that means, by hams, though we cannot disclose details at this writing) but don’t expect it to do it with a 5-element array and a 22 ft. It is just within the realm of possibility on 144 Mc. with the legal amateur power limit, the biggest antenna system you can build, and receiver selectivity measured in cycles!
December came to an exciting close for 2-meter operators of several southern states. On the morning of Sunday, the 30th, W4HHK, Collierville, Tenn., was surprised to hear a Texas W5 working W5TIJ, Jackson, Miss. Paul fired up immediately, and between 10:30 and noon he worked W5s AXY and BDT, Austin, W5QIO, Beaumont, and UB, San Antonio, Texas. Returning from work after midnight, Paul found the band still open and Texas stations coming through. W4RCQ, Tuscaloosa, Ala., worked W4s AJG CVW AXY ML, NHT QF9D AQS and DCV on the night of the 30th. W5s, Old City, Fla., knew off W4s LBBLL and KCQ of Tuscaloosa, and FSW and FIG of Birmingham, as well as a long string of Texas and Mississippi W5s. None of these stations would be considered extraordinary in the wintertime, but the 2-meter DX of 600 miles or more is big news in midwinter.

What was perhaps the first two-way radioteletype communication on 220 Mc, is reported by W1CCT, W1KNW, Amherst, Mass., and W5VB, Allentown, made it two-way on 220 on Dec. 16th. The spot-frequency net in the Boston area is still going strong, with several stations ganging up on 222.7 Mc each Sunday night at 8 P.M. An effort is being made to round up the Technicians licensees to augment the 220-Mc DX.

To promote v.h.f. interest in Montana, W7MBV, Geraldine, Mont., is publishing a monthly paper called "Montana VHF." It is a nonprofit venture produced by microwaves. Operators are urged to send in news items and articles are solicited. Subscription is 50 cents a year. Volume 1 No. 1 contains an impressive list of Montana stations now working on 6 and 2. To this list may soon be added W7JRG, formerly of Shoshone, Wyoming, now working in Billings, Mont. If you do as well in Montana as he did just a few miles south of the border, the other 50-Mc stations in the state will have to look to their laurels. Montana is the one remaining state that nobody east of the Allegheny has ever worked on 6.

Utah is also a distinct rarity, a condition that may be corrected by W5EYK. Formerly W4LVA, Harold is now operating on 6 in Grand Junction, Colo., only a short distance from the Utah border. He plans to do some portable work on the Utah side this coming spring and summer.

Hal had an interesting opening to W7 and VE7 on Dec. 27th.

W5ML, Oil City, La., says he is having a hard time finding activity on any of the v.h.f. bands during the winter months, but there is a lot of v.h.f. talk on 75! He and W5DXB fired up on 420 Mc. and had a fine circuit on that band, but they couldn't attract any others. Their gear is ready to go at any time, however, if there are other interested parties.

In the midst of the usual complaints of low winter-time activity that one hears too much, a surge has been heard. Rochester, N.Y., and vicinity is showing real progress, particularly on 144 Mc, according to W2ZIB. A factor in this coming alive is surely the WAR certificate awarded the Rochester V.H.F. Group. This award, details of which were given in June, has been issued to 15 operators in Toronto, Buffalo and Lockport. One Rochester operator, W2YUE, has just completed his required 25 contacts with an output of one watt. The V.H.F. Group is sponsoring a series of "WAR Nights," beginning February 16th and 22nd, during which the Rochester area stations will be out in force to give everyone a chance to round out his total.

Despite lack of any recent DX openings, activity is at an exceptionally high level. Several Novices have appeared on 2, and new stations are showing up in the rural areas of Western New York. W2SPC/2 is in operation from a 1600-foot elevation near Moravia, and though he is 75 miles from Rochester he signal is a steady 59.

More radioteletype reports continue to come in. W7TQ, Milwaukee, rewired his keyboard, and then got acquainted with its functions, with the result that W6KGF, a selenium rectifier power unit is now supplying the 120 volt a.c. needed for the printer magnets. His AFSK system should be working and the set-up ready for attended operation by the time this appears in print. Auto-call operation will follow shortly thereafter.

W9LEE, Westboro, Wis., reports continued success through early December in daily 2-meter excursions with W8BBN, Grand Marais, Minn., at 0745 and 2100. Signal strength variations over this 190-mile path appear to follow a 10-day cycle. W9LEE recently finished a new 6HG7 converter (September, 1951, QST) that is giving excellent results. W9JBF, Waunee, and W9DSP, Chipewa Falls, also join in the sketches with W8BBN.

At least two hams in Portsmouth, N. H., would like to remind the fellows to the south that there is 2-meter activity in their state. WITT and WILMD are doing their best to interest others in 2-meter operation, but they would have better luck if they could point to regular contacts with the Massachusetts gang. They are active on 2 nightly and would be glad to keep skeds with interested parties in any direction.

As you read these lines most of us will be in the process of recovering from a big week-end of v.h.f. activity — the 6th Annual V.H.F. Sweepstakes. Once again we will have seen that concerted effort by many radio clubs and individuals can turn out a surprising number of 6- and 2-meter operators, even in the midst of winter conditions. Almost without exception we will have made contacts that would not have been possible again before next summer, but for the incentive afforded by the contest.

The week end of operating fun will have been an end in itself, but it can serve a much more important long-term purpose if we choose to make it so. Not many of us want to do that much hamming every week end, but almost all would like to be able to make contacts on the bands of our choice more often than we do. Coordinated operating programs, a few regularly-kept schedules, and a resolution to transmit as well as listen could help to maintain a considerable portion of the activity that our v.h.f. contest always shows.

Eighteenth Annual ARRL DX Contest


Amateurs everywhere are invited to take part in the 18th Annual ARRL DX Competition. There will be two week-end periods devoted to c.w. participation and two to 'phone. Special certificate awards will be given to the highest-scoring c.w. and 'phone stations for each country and each continental U. S. A. and Canadian ARRL section entered in the contest. Operators outside the U. S. and Canada will attempt to work as many W, K, VU and VO stations as possible. Exchange of serial numbers will be required. Complete rules and details on scoring appear on page 36 of January QST.

The contest periods will be divided for c.w. and 'phone as follows: first 'phone period will begin on Feb. 1st at 7:30 P.M. EST and end on Feb. 3rd at 7:00 P.M. EST. The second 'phone period will be scheduled during the same hours from Feb. 15th to 17th. The first c.w. period will begin at 7:30 P.M. EST on Feb. 29th and end at 7:00 P.M. EST Mar. 2nd. The second 'phone period will be scheduled during the same hours from March 14th to 16th.

Though not necessary for entry in the contest, ARRL will supply convenient report forms upon request. You may make up your own forms following the samples shown in last month's complete contest announcement. If you request report forms from Headquarters, please indicate whether you plan to enter the c.w. section, the 'phone section, or both.
How:  
It’s here again! It didn’t take as long to roll around as we thought it would, did it? We mean, of course, our annual DX jamboree, the 18th ARRL International DX Competition.  
As seems always to be the case, we’ll wager many of the gang allowed procrastination to force them into much last-minute antenna erection and selectivity-sharpening. Are you ready for the zero hour?

Although the general outlook is for spotty h.f. conditions, this factor may not cut scores greatly. The top-layer guys seem to have the habit of exerting extra effort in one way or another to compensate for punk propagation possibilities. We expect the last drop will be squeezed from our lower-frequency bands unless Ten and Twenty should suddenly experience a remarkable renaissance. By this means the long-wire contingent may have a chance to crack back at night for 10- and 20-meter meter beam shortcomings.

From whichever angle you intend to tackle this activity — big score or new countries or other — may luck be with you. You’ll undoubtedly need your share!

What:

Twenty the Terrific has been hard at work earning its new reputation, Twenty the Terrible. Nevertheless, it occasionally forgets itself and turns red hot for short unpredicatable periods. K2BU found ZD2D CSP (14,082), VP2AO (002), VO2AB (906), VSTNG (968) and VP2SA (200) to his liking. Ken runs 400 watts to 821As. — VQ2JJ (VFO), VP3RU (960), EA8AC (106), FD8AA (067), FVY8B (102), 954st Al (041) and OR (030) assisted W8MDM to reach 125... W8UPN finds the band hottest around breakfast time. Newt wrapped up VPIN/2 on Grenada (995), VQ2s GW (017) WS (100), VO4DO (900), VP3PF (096), SP3PF (020), VU2s EF (101) JG (050), FD8AA (017), FP6AAG (020), OQ8RA (015), K9BAQ (021), JAT6 (024), ZB3JP (035), Z53s O (033) and R (044)... XE1A took time out from his QSL manager duties to score VP6KX (127), OA4A (096) and a JA2... While stamping out TVI in the new QTH, W9HGU encountered HZ1HZ (100), FP6AC (055) and some VQ specimens... W1AUP got up on the right side of his bed to work PX1AA. He was pleased to hear G6GB inform him that the PX1 was a DL4 and all okay... MPA4KAE (045), EA8s BE (044), BF (020), APZK (057), Z2ZEM (029), VSTNG (072), ZDODU (080), FP2V/FO (093) on Comoros, V1KWO (094) of Manipur and FD8AB (020) enhance W8MDM’s log. Bill has it that FD8AA is FD8AB’s boss on the job in Lome... From W1HC we hear that V7TES arranges to be on 14.064 kc. daily at 7:30 P.M. EST. Join the chorus... PFC Bud Rugel, awaiting his DL4 permit, shares interesting stuff from Heidelberg, Germany: LZ5LL (190), U1WSKA, UP6KLD, UD6BM, UA9OM and G6KAA... W0NN found time to work VK2BW, VO4HJ (020) and KT1OC (011) while new neighbor W9WEA broke the ice with OX1GG. W4KE had success with QF8AE (070), HC2KB, OQ8RA, CR7s AF CT, an SP3 and VQ4... A vertical dipole fan. W3MFW has something to show for it: EA8s AB AD (070), V5S0G (065), T6s AG AR SF, VK0KX (010), ZB2A, ZD2HAI, JISIC (008 17), FKAT/FS8, LL3Q, VO2BB (008), Y810, YU3AB, Y63PFI of T. & C., and ZB1KRU... VK1BS (055), VU2s CP (035) NB (057), ISICNQ, VP8AU (002), VO4s CM FCA, VP8AF, KB9AQ (112), F3BB (020), ZD1AN and Z6GZI apund up the collection at W7TIX... Almost anything else on the air lately can be found in this roster provided by W6KUC and the West Gulf Division DX Club: A.M. — C61YP on Formosa, CR8AE (140), EQ0BD (019), F7SSP (020) at SHAPE Hq. in Paris, FK4BS (090), F8SAB (010), FK4BS (115), FR7ZA (115), GC5s OM (040) OU (025), GD3BG (059), HZ1s AB (065) AR (020) FH (082) TL (192), HI2LD (059), K6bAF (050), KT1LM (060), W2BKS/JK6 (020), L2ZI (008), M1LKL (121), OYJ3GO (050), OE9ASJ (122), SP5K (020), ST2GL (021), SU1s GO (010) HJ (050) XY (008), TF3a MB (010) NA (040), UAOFR (075), US3KAA (089), VO2s 2AT (035) AO (040), VR1IA (070), V8s EO (132), VO2s AD (010) CS (010), VU2s EC (090) CB (105) CR (067) CS (070) EC (090) HF (045), Y1s BZL (090) ECU (085) EFE (090), YUs 1AG (011) IAD (015) SFMC (050), YOs AF (053) RD (040), LB6XD (030) of Jan Mayon, ZA1A (040), ZB1FP (056), ZD2s 1AJ (099) AB (090) 7AB (045), APs 2R (120) 4A (090), 3V2A (037), 4xs A (005) DE (029) DF (060) DK (022), 8S9AL (059)... P.M. — AG2AG (008), CT8s AA (045) AN (050), CRs 5AD (070), 7BC (014), EA9AF (002), ETOQ (010), F8SAB (030), G2ZFC (184), DU3DO (052), KM4AX (090), KW2AB (100), M1JUS, OQs 5CP VN, V0s 4HF 4MS (030) 4RR (023), VP5s 2MD (003) of Montserrat in the Leewards, 8AS (050), ZE1AB (038), ZD2 4BD (040) 1B (150) 2FB (050), Z9CSCM (073), ZS3s K (070) (025), F8SAB (010) and SW4AF in Yemen. How do you like that F7SSP moniker?

With the twenty 'phone adherents, we note that CR6s AL (350) AV (351), EA8AX (318), ZP9CM (146), KT1DD (382) and CR7SS (258) were made welcome by W5ABG... XE1AC gave the key a rest to modulate for HCS-MM (370), I1YAK/Trieste (195), O71HI (145), YQ3R (125), KT1PU (370), FR7ZA (388), M1B3BH (189), V2UH (128), Y1BZL (172) and AH2AP... W7TIX knows when to switch to 'phone; Bob couldn’t find these countries on the air... — HIGBC (172) and ZMPB (340)... CR7s AD (140) CF (152), F8SFC (342), OQ5DZ (145), PZ1WK (375),

* New Mailing Address: Effective immediately, please mail all reports of DX activity to DX Editor Newkirk at ARRL Headquarters, 38 La Salle Rd., West Hartford 7, Conn.
Where:

DX stations or DX-working stations should keep in mind a few things when preparing their QSLs. It's down-right tragic to receive a card that doesn't bear the necessary data for DXCC accrediting. The QTH of the confirming station, the call signs of the confirmers and confirmee, the year and date of QSO; these items are just about the bare minimum. There should be no doubt that the card is a confirmation rather than a "heard" card. If confirming a 'phone contact it should state so. Not necessary for DXCC but highly desirable are entries of signal reports, type of signal (local or otherwise) of QSO and the frequency band used.

... K6WSR will act as QSL manager for Wake Island henceforth. His address: Ivan C Lundenblom, CAA, Wake Island.

AP2K (QLSA via DARC)
C8ASB (Lagens MATS, Terecira, Azores, APO 406, % PM, New York, N. Y.)
DA4IE (ex-FA4AC) Manuel Cenalmer, Box 8, Lagauna, Tenerife, Canary Islands
EE8BH (ex-EE8AC) Manuel Cenalmer, Box 8, Lagauna, Tenerife, Canary Islands
HOLD/Trista (Giuseppi Giusi, Strada per Longona 179, Trista
JATFH APO 75, % PM, San Francisco, Calif.
KB6A% % PAA, Canton Island
KB6AT U.S.P.O. X0310, Canton Island
KM0AX Box 24, Navy Station 0000, FPO, San Francisco, Calif.
LB6XD (QSL via NRRL) (W7IOC) Henry B. Poole, Jr., % American Location, Tangiers
MP4KAF Box 54, Kuwait, Persian Gulf
OQ6FE (QSL via QSAF)
OX5EL Sigel Larson, Danish Leigthsam Service, Lorn Station, Frederiksdal, Greenland
PX1A (QSL via DLA QSL Bureau)
ST2EB (QSL via QSAF)
VPINW/2 (QSL via VP1AA)
VPHW (QSL via W3MAI)
YV5MA 037476 S.A.C. West I, % RAF Unit Transmitting Station, Bytan, Aden Command, Aden
XE4PK (QSL via XE4LSA)
Y2DEE (QSL via G3BED)
ZD2FFB Brewer, P.O.T., Enugu, Nigeria
ZP7AW % American Embassy, Asuncion, Paraguay
Z9SCM (QSL via ZP9BA)
ZS4AK (QSL to F4BS or F4LQ)
ZS5AF (QSL via L.A.S. Bureau)
W6WAF Director of Harbours, Port of Mochan, Yemen

For these we owe W1RWS, W5QLG, W4CYY, W5KUJ, W5BFS, W9UPN, W5CFT, W6IIHZ, W5TXK and W5KUC's DX Bulletin a large vote of thanks.

Tidbits:

New prefix assignments have been announced as follows:

AMA-A07 — Spain, JYA-JYZ — Jordan, JYA-2ZZ — Netherlands New Guinea, SWA-SWZ — Viet Nam, 4AZ-4XZ — Israel, 4AY-4YZ — Organization of International Civil Aviation, SCA-SCS — French Morocco, 9AA-9AZ — San Marino, 9NA-9NZ — Nepal, 9SA-9BZ — Saar. Call signs grow more weird by the day!...

From W8DEI we hear VQSAU has taken a portable rig along on a hunting trip to last through several months. Operation on 20, 40 and 80 is intended. He'll be using the call ST2EB...

Surprisingly enough, we receive questions on how to go about applying for DXCC after accumulating the necessary...

Cold and remote, this cluster of buildings housed the equipment of LB5ZC on Jan Mayen, operated late last year by Bjorn Augdalb, IASZC. (Photo courtesy W1FF)

QST for
soon as available. Needless to say, George will thereafter be open for business looking for old on-the-air pals.... W9E5A wasn’t able to carry through his plans for V84/V85D hamming on his recent Far East junket but he did get on the air while visiting the V56 gang. "I was amazed at the absence of W signals on the 14-Mc. band. Throughout my entire stay in Hong Kong, I heard only three W stations." Clyde will try again next spring to put Borneo, Brunei and Sarawak on the air and conditions by then should be improved. "On the trip just completed covering a total distance of nearly 25,000 miles, I had the opportunity to meet many very fine DX men who are not only good radio men but also leaders in their communities. It should be mentioned that their hospitality could not possibly be exceeded anywhere." .... Ex-JN9G is now studying at Ohio State U. and will remain in the States until next summer when he will be widely worked during the prewar period and Harry would appreciate hearing from the Old Gang personally or by mail. Write: Harry Yoneda, 090 River Road Dorm., Columbus 10, Ohio. .... W9XKK, assistant W9YCTT at the W9 QSL Bureau, finds Illinois and Indiana DXers receiving about 80 per cent of incoming pastecards there. Perhaps the Wisconsin mob makes it up in quantity. ....

John Van Lear, who used to operate at YETAKO, holds the call FPR8E and has intentions of using it this summer. He didn’t make St. Pierre last year as planned. .... The operators of YJ1AB (1947) and VB12G (April, 1951) are sought by W5ASA9. Guess why. .... Zoologists, botanists, geologists and archaeologists will descend on the Mexican islands of Revillagigedo in an expedition that was to have left in December. XE1FK will be along to man the key of XE4FK “on all bands, ‘phone and c.w.” It is doubtful that this will constitute a new one for the Countries List but the station is the first to be licensed with the XE4 prefix. A VFO rig running up to 200 watts will do the job. All cards sent via XE1ISA will be answered; SWL cards must be accompanied by reply coupons. .... W6A’s Amer. Radio quotes an English source to say that UFEA, UFP0B and UM8EAA are now the only U.S.S.R. stations permitted to QSO foreign countries. The reason for the general ban is obscure at this writing although it is thought to stem from Russian monitoring of illegal transmissions by U stations. This will make DXCC no easier to obtain! .... Ex-5K1MJ is back in Holland after having lost his entire radio installation in leaving the Indies. He’s set to hear from some of his old contacts who may write: Rudy de Neef, 6 Florida Grifti straat, The Hague, Holland. .... W7FJKX discovered that OX5E1 is ex-OY5E1 and also that MD2JF is set to get the latter. Bob could use some tracing data on JA5JJ, 9X2MN and 9ZLH .... A friendly group at the U. of Minn. is gathering equipment and hit the air. They would be W9s KID7, 9X2MN, K906s AVF OJ and ex-DL1AHU. W7FID has just assembled the required cards for DXCC from his home location in Rotheater. .... HE9R “calls” are held by W9XWM and E840LF is the only transmitting HE9 to our knowledge. .... There is doubt about the status of some of W2XBS/KJ6’s QSOs. He may have rolled up some of them while on board ship. These would be taboo for DXCC, you know. .... W5UCQ, who puts out the dandy bulletin for the West Gulf group, has a new ham in the family. The XYL’s studious efforts netted her the call W5UCQ. She really digs in on that bulletin, too.

Jeeves wonders if it’s true that the U.S.S.R. hams now use iron wire in their Sterba Curtains.

YU1AD runs 150 watts to an 814 and has worked over 150 countries, TI on ‘phone. He uses separate dipoles for each band and has a ground plane for 28 Mc. You may have worked him under his former call, YU1CAB.

100 QSLs. Nothing complicated. Just mail your cards to ARRl Hq. for the attention of W1RWS. Enclose therewith a check or check-off Countries List. You’ll facilitate things for John by stacking the cards in Countries List order. Never fear, they’ll be returned. Don’t neglect to take all precautions in the mail, too. Also, as there is a certain average percentage of QSLs in everybody’s collection that do not qualify for DXCC credit, we suggest you wait until 102 or 103 cards are on hand. That may eliminate extensive correspondence and delay of your award. By the way, DX Century Club rules in detail are available to anyone upon written request. .... The “buddy system” and ‘phone-to-cw, QSOs for ‘phone DXCC credit get a good going-over in a letter from W3MFW. .... QSLs for OQ5AA were being printed in Belgium and the resulting delay caused distress for OQ5A. Andy will get these underway as soon as possible. .... Artie Blas, FRA6A, possibly the best known DXer and v.f.h. in the Indonesian area, is leaving that base in March. He will stop over in Australia for a bit and then head for this country, expecting to reach San Francisco in early May. He desires to visit as many amateurs and clubs as he can. When his itinerary is better established we’ll pass along the pitch. This via W1HDQ. .... W8DAA persuaded at length for a Cyprus QSL and then received three at once. It was ever thus. ZC4TF has pulled the switch for leaves in the U. K. and anticipates reassignment to another rare-DX spot soon. .... W1AW (Chas) received word that VR5GA now awaits a ZL1 label in Auckland and wants to thank the W and K16 boys for their cooperation and good fellowship on the air during his Friendly Islands sojourn. .... One of the old British stand-bys is on the move. George Elliott, G5LI, is to set up camp in Melbourne where he will take on another engineering job. Some pretty stiff competition coming right into our own back yard! We’ll give you G5LI’s new V62 call as

This gathering in Rehat included French Morocco DXers (front, l. to r.): CN8s EG EQ MZ and AQ; (rear): CN8s EY CP MR BR and CR. CN8MZ and CN8818 are inspectors of DP7T which corresponds to our own FCC. The former is also president of the AAEM society. (Photo courtesy CN88EG)

February 1952
A Mobile Installation for 10 and 11 Meters

Converter and Remotely-Controlled Transmitter from Surplus Gear

BY GEORGE J. GABERT,* W9JM

After giving considerable thought to a mobile transmitter and receiver, we made up a set of standards as to what our 10-meter mobile rig should be like. We decided that the transmitter should have a VFO so as to be able to QSY to any part of the band, that all tuned circuits of the transmitter should be ganged to the VFO for one-dial control and easy tuning, and that it should be possible to set the VFO to any frequency with a reasonable degree of accuracy. The converter was to be made as compact as possible with the transmitter controls built into the same housing. The receiver was to be provided with an S meter, as an aid in giving signal reports, along with a good noise silencer. We proceeded to lay out and build our mobile equipment and, as the following description shows, we followed out this set of standards. Although the equipment, built chiefly from surplus parts and units, is modest, the results have far surpassed all expectations.

The equipment consists of two units, aside from the power supply. The first is a control unit mounted on the dashboard, immediately above the car's b.c. receiver. The second is the transmitter mounted on a shelf over the rear fender well of the author's station wagon. The control unit houses the converter and also remote controls for the transmitter, including frequency control for VFO operation. Thus all necessary controls are grouped at one point, which is a decided convenience.

* 834 North Third Ave., Sturgeon Bay, Wis.

- W9JM describes here the mobile equipment with which he made the first mobile WAS—all on 10 meters. The VFO rig, a revamped Command transmitter, is remotely controlled from the dashboard. While you may not wish to duplicate the installation in all details, you will find many interesting and useful ideas that you can apply to your existing equipment.

The Converter

The housing for the control unit is a metal box 6½ inches long, 4½ inches high and 3 inches deep, although a standard box approximating these dimensions would serve as well. The circuit of the converter is shown in Fig. 1. It consists of a 6AK5 tuned r.f. stage, a 6BA7 mixer, and a 6C4 h.f. oscillator. The converter feeds the b.c. receiver by capacitive coupling through a short length of high-impedance coax cable. A toggle switch, $S_3$, shifts the b.c. input from the converter to the antenna for broadcast reception. The converter covers the range of 26,900 to 29,700 kc. The tuning of the three stages is ganged through the use of a triple-unit tuning condenser. The oscillator plate voltage is regulated. A relay, controlled by the push-to-talk switch at the microphone, removes plate voltage from all but the h.f. oscillator during transmissions. The arrangement not only keeps the h.f. oscillator running to minimize frequency drifts, but by tuning about 50 kc. away from the transmitter frequency, the transmitter can be heard with an S3 signal, permitting accurate monitoring.

The converter is built into the left-hand side of the control unit. The coils used are wound on slug-tuned forms. This makes the circuits easier to line up for tracking. The tuning dial and gears

The transmitter is mounted over one of the rear fender wells of W9JM's station wagon. The revised Command unit is fitted with a new panel and a homemade calibrated dial is substituted for the original. The antenna relay is in the small box underneath. At the bottom of the panel, the cable at the center goes to the microphone. At the right is the flexible shaft for the remote VFO tuning control. A pair of surplus right-angle gear units avoids the necessity for a sharp bend in the control cable.
Fig. 1 — Circuit diagram of the mobile converter for 10 and 11 meters.

C1, C2, C3, C4 — Triple-unit variable, 11 μfd. per section
(Bud LC-1845).

C5, C6, C7, C8, C9 — 30-μfd. mica trimmer.

C10, C11, C12, C13 — 10-μfd. ceramic.

C14 — 0.01-μfd. paper.

C15 — 50-μfd. mica.

R1, R2 — 100 ohms, ½ watt.

R3 — 47,000 ohms, ½ watt.

R4 — 10,000 ohms, ½ watt.

R5 — 22,000 ohms, ½ watt.

R6 — 1500 ohms, ½ watt.

R7 — 35,000 ohms, ½ watt.

R8 — 75,000 ohms, ½ watt.

L1 — 15 turns No. 20 d.s.c., ½-inch diam., close-wound on Millen 60946 iron-slug form.

L2 — 2 turns No. 32 d.s.c. below L1 on same form, windings spaced ½ inch.

L3 — 12 turns No. 26 d.s.c., ½-inch diam., close-wound on Millen 60946 iron-slug form.

L4 — 9 turns No. 32 d.s.c. below L3 on same form, windings spaced ½ inch.

L5 — Midget broadcast r.f. coil to tune to 1600 kc. with L5 — approx. 360 μh.

L6 — 12 turns No. 26 d.s.c., ½-inch diam., close-wound on Millen 60946 iron-slug form, tap at 4 turns from ground end.

Rf1 — S.p.d.t. relay (12-volt).

Si — S.p.d.t. toggle switch.

The control panel includes the converter whose dial is to the right. The dial to the left is the remote VFO tuning control. The switch in the upper right is for turning filaments and relay circuits on and off and switching the VFO to low voltage while setting frequency. The toggle at the center switches the b.c. input from the converter to the antenna. The third switch turns the converter on and off. The dial lamps are homemade, using grain-of-wheat bulbs.

February 1952
b.c. receiver input circuit. The latter can be checked by varying the r.f. trimmer in the car receiver antenna circuit while switching back and forth between the antenna and the converter. The correct adjustment for $C_{10}$ is one that makes it unnecessary to readjust the antenna trimmer of the b.c. receiver for maximum signal whether the converter is switched in or out. Each change of $C_{10}$ will require readjustment of $C_{11}$ to keep the output circuit tuned to the i.f. which, in this case, is 1600 kc.

Transmitter Circuit

The transmitter is a converted BC-458A. The revised circuit is shown in Fig. 3. A 14-Mc. high-C Hartley VFO drives a 12A6 doubler and this stage drives the 1625 final on 10 and 11 meters. The plate voltage of the VFO is regulated by the VR-150. Inductive coupling is used throughout and the tuning condensers are ganged to a single control. $R_{21}$ is the antenna changeover relay. It also shorts the input of the converter in the transmitting position. The wiring of this relay is in series with the dynamotor negative high-voltage lead, so that the relay is operated automatically whenever the dynamotor is turned on or off. The negative terminal of the dynamotor should not be grounded except through the winding of this relay.

The audio section consists of a carbon microphone, a 12SF5 speech stage and a 1625 modulator. Since no information could be found on the operation of the 1625 as a Class A amplifier, a test circuit was set up using variables to get the plate current to remain steady. Bias for the modulator tube is obtained from the voltage drop across the winding of the changeover relay, $R_{21}$. An audio gain control was not found necessary. If desired, some change in audio output can be obtained by altering the microphone battery voltage. In this instance a single No. 2 flashlight cell, mounted in the FT-234A connector box, proved to be adequate for the WE F-1 microphone.

A milliammeter is provided in the plate circuit of the final amplifier for checking resonance and loading. Power input to the final amplifier is held to 30 watts.

A rather novel innovation is an arrangement for reducing VFO power for frequency setting.

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Fig. 2 — Circuit of the S-meter added to the car receiver.

$R_1$ — 270 ohms.
$R_2$ — 330 ohms.
$R_3$ — 1000 ohms, variable.
$MA_1$ — D.c. milliammeter, 1-ma. scale.

In the upper left of the control-box panel is a three-position switch. In one position, the switch turns on all filament and sets up the relay circuits ready to be operated by the push-to-talk switch on the microphone. In a second position, these same circuits are held closed, but the relay of Fig. 4 is operated. This switches the high voltage off, but switches the low-voltage tap supplying the VFO to the positive terminal.

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The r.f. section of the transmitter. Across the rear are the doubler tube, the doubler coil and the oscillator tube. The oscillator coil and paddder condenser are in the box. In front of the box are the final-amplifier tube and tank coil, the antenna tuning condenser and the VR tube.
Fig. 3 — Circuit of the 10-meter mobile rig, rebuilt from a Command transmitter.

C1 — 10-μfd, 250-volt electrolytic.
C2, C7, C9 — 0.02 μfd. (triple unit).
C8 — 180-μfd. mica.
C9 — 3 μfd.
C10 — Oscillator padder.
C11 — Oscillator tuning condenser (see text).
C12, C13, C14 — 0.005-μfd. mica.
C15 — 25-μfd. midget variable.
C16, C17 — Doubling tuning condenser (see text).
C18, C19 — 0.005-μfd. mica.
C20 — Neutralizing condenser (plates opened to half original capacitance).
C21 — Final-amplifier padder (see text).
C22 — Final-amplifier tuning condenser (see text).
C23, C24, C25, C26, C27, C28 — 0.01-μfd. paper.
C29 — 100-μfd. variable.
C30 — 8-μfd. 50-volt electrolytic.
C31 — 25-μfd. 50-volt electrolytic.
C32 — 0.03-μfd. paper.
R1, R2 — 20 ohms, 1/4 watt.
R3 — 51,000 ohms, 1/4 watt.
R4 — 1 megohm, 1/4 watt.
R5 — 40,000 ohms, 1/2 watt.
R6 — 1000 ohms, 1 watt.
R7 — 30,000 ohms, 1/2 watt.
R8 — 20,000 ohms, 5 watts.
R9 — 3000 ohms, 10 watts.
R10 — 0.5 megohm, 1/2 watt.
R11 — 2000 ohms, 1/2 watt.
R12 — 20,000 ohms, 2 watts.
R13 — 0.25 megohm, 1/2 watt.
L1 — 8 turns No. 18, 3/4-inch diam., 1/8 inch long, tapped 1/4 turns from ground end.
L2 — 4 1/2 turns interwound from ground end of L1 to tap.
L3 — 8 turns No. 32 on 1/2-inch form inside L1, L2.
L4, L5, L6 — 5 1/2 turns No. 18, 1-inch diam., 1/8 inch long.
L7 — 10 turns No. 32, 1-inch diam., tapped at center, wound below L4 on same form, windings spaced 1/4 inch.
L8, L9, L10 — 4 1/2 turns No. 18, 1-inch diam., 5/16 inch long, tapped at approx. 3 1/2 turns from ground end.
L11 — 3 turns No. 18, 1/4-inch diam., 1/8 inch long.
J1 — 3-circuit microphone jack.
MA — D-c. milliammeter, 100-ma. scale.
R13 — Parasitic suppressor.
Rf — Antenna changeover relay with shorting contact, 200-ohm winding (taken from BC-42A antenna box).
T1 — Modulation transformer, 10 watts (Stanecor A3871).
T2 — Carbon-microphone-to-grid transformer.

* Parts salvaged from Command transmitter.

of the receiver supply through a dropping resistor, R1. This places about 50 volts on the plate of the oscillator so that the VFO can be set without blocking the receiver or putting a signal on the air. R1 can be adjusted, if desired, to limit the VFO signal strength to the maximum reading of the 8-meter, so that the needle of the meter will not be knocked against the pin. The third switch position is the “all-off” position.

**Converting the Transmitter**

In converting the Command transmitter, it is advisable first to remove all wiring, coils and variable condensers, except the oscillator padder in the compartment on top of the chassis. This condenser is used as the oscillator padder, C4 in
The audio section occupies the right side of the chassis. The speech-amplifier tube is toward the front, followed by the modulation transformer and the modulator tube.

will make the poly pieces about 1\(\frac{1}{4}\) inches long. The rod should then be drilled end to end with a \(\frac{5}{16}\)-inch hole. Then a section about \(\frac{3}{8}\) inch long is cut out of the stator rods, at the center of the space between the two stator sections, dividing the stator into two parts. The drilled poly rods are slipped over the ends of the stator rods to again join the two sections together, this time insulated from each other. (See bottom-view photograph.)

The rotor is revamped by removing the first plate and the last plate, then leaving four at the rear and two at the front, and removing all plates in between. The plates of both rotor and stator can be easily removed by clamping a piece of \(\frac{3}{4}\)-inch bar iron in a vise and holding the stator spacer bar or shaft against the iron piece. Then the plates will drop out with a few taps of a hammer. In removing the rotor from the frame, care should be taken to avoid losing any of the small bearing balls.

The final-amplifier tuning condenser -- the one toward the front in the original version -- is revamped into two sections, one serving as \(C_{15}\) and the other for \(C_{14}\). The stator is altered by removing one stator plate at the rear, leaving the next three, removing two at the front and leaving the next three plates. The remainder of plates in between are removed and the sections insulated as described previously for the oscillator-doubler condenser.

The operation on the rotor requires some machine work, but even if it is necessary to have this done in a shop, it should cost little if any more than a new condenser. The new rotor consists of two sections revolving independently. The main final tuning rotor (rotor of \(C_{15}\)) is shown in Fig. 5A. This is made from the rotor of the original final tuning condenser and it operates in the original manner from the tuning control. The second section of the rotor is shown in Fig. 5B. This part is made from the rotor of the original amplifier paddler, since this condenser is not otherwise used. After cutting the shaft off flush at the bearing cone, it is cut off again at a length of \(\frac{3}{4}\) inch. This shaft is then drilled out on a lathe so as to make a bearing fit over the \(\frac{3}{4}\)-inch diameter portion of the rotor shaft of A. When the condenser is reassembled, the rotor of B can be moved by hand to set the paddler capacitance without disturbing the setting of the tuning rotor. To hold the paddler rotor in place after it is once set, it is provided with a locking piece that fastens against the front end of the plate of the condenser frame with a screw in the adjustment slot. This piece also is shown in Fig. 5B.

The reconstructed final tuning condenser is mounted where the paddler condenser was formerly located, using the same mounting holes. Since the oscillator tuning condenser remains in its original position, the flexible driving shaft coupling the two condensers must be shortened. Before cutting the shaft, mark the length and flow in a good penetration of solder at the place to be cut. This will hold the wires of the shaft so that they will not spring apart after cutting. In removing the excess shafting from the sleeve, cut the shafting at about a half inch from the sleeve. Then, by pulling some of the inner wires out, the remainder should be loose enough to be removed without difficulty. The sleeve is then resoldered to the shafting after drilling the sleeve out to a push-in fit. The soldering is done after both condensers are mounted, and the shaft fitted onto the condensers and pinned. An extension shaft is fastened to the front end of the tuning shaft to reach to the front panel, with a spline attached to couple into the flexible shaft going to the control on the dashboard. Another
shaft is fitted to the tuning-dial gear extending to the front panel with a pointer attached, as shown in the bottom-view photograph.

The 12A6 doubler tube is placed in the socket formerly used by the 1620 and the doubler coil is placed in the socket used for the crystal in the original circuit. The oscillator coil is replaced with one wound on a smaller form. Moving the final condenser back makes it possible to mount the speech-amplifier and voltage-regulator tubes, the meter and the microphone transformer at the front of the chassis. The final tank coil is placed at the edge of the chassis, just forward of the 1625 final-amplifier tube. The modulation transformer is placed in front of the modulator tube. An L-shaped shield separates the final amplifier and the audio components and no trouble has been experienced from r.f. in the audio.

In rewiring the transmitter, it is advisable to cable all filament and plate wiring. No. 16 bare wire was used in all r.f. circuits and any lead longer than two inches is supported by polystyrene stand-off insulators cemented to the chassis or other convenient spot. All cables from the dynamotor to the transmitter and control unit are shielded and the shielding used as the ground connection between the various units. No switching circuits are shown, since each constructor usually prefers his own. Switches are shown where necessary to make the circuits complete.

Tracking of the transmitter circuits is obtained by tapping the tuning condensers of the doubler and final amplifier across a portion of the coil. The taps are quite critical. The tracking of the doubler stage is adjusted first with the plate and screen voltage off the final amplifier. Low voltage can be used while the circuits are being lined up. A milliammeter is connected in the plate circuit and the stage being adjusted is resonated with the padder at the high-frequency end of the band. Then the gang is tuned to the low-frequency end of the band and the circuit again resonated with the padder. If the capacitance of the padder must be increased to maintain resonance, the tap should be moved farther up on the coil. If the padder condenser must be decreased, move the tap in the opposite direction. When the tap is placed correctly, the stage should stay in resonance across the entire band without readjustment of the padder.

It is very important that the antenna resonate near the center of the band. Antenna resonance can be checked by a grid-dip meter coupled to a link coil connected to the antenna, by observing the rise in plate current of the final amplifier while tuning the transmitter across the band, or with the aid of an antenna-current indicator. The antenna either should be cut or extended until the 29,200-kc. point is found. On 11 meters, a length of antenna must be added. This was accomplished by removing the metal ball tip and threading the top end of the antenna. The extension then can be screwed on. A new ball tip was made to screw onto the end of the antenna or to the extension for 11 meters, depending upon which band is in use.

A 12-volt power system is used for the transmitter because of less voltage drop through the wiring. A relay is used to change the batteries over from a parallel charge connection to a series connection whenever the filaments of the transmitter are turned on. No trouble has been experienced with run-down batteries or a stalled car. The dynamotor is a PE55 and is installed in the engine compartment along with the extra battery.

The results obtained with this 30-watter compare very favorably with home rigs running many times the power. We have had over 550 contacts, many lasting hours. We have also had many foreign contacts, and at this juncture I would like to say a word to those foreign amateurs who enjoy making contacts with W mo-

(Continued on page 118)
Keeping Up with the Girls

Answering an appeal for watermelons for a cancer patient, W4GTM helped relay the word on 40 c.w., which resulted in speedy delivery of the melons. Several times a month W2OWL operates W2OTF, the American Red Cross amateur station in N. Y. C. W4GTM finds that she can be a busy senior in high school and a very active amateur at the same time. Carol feels that her day isn't complete unless she gets in a QSO on 40, 80, or 100 c.w. using a rig she built herself. For the benefit of W4GTM's many W friends, her current address is 36 Swakelys Drive, Ickenham, Middlesex Drive, England. Hilda is eager to see all that G-land has to offer during her stay there. One night a week W2BNC takes her turn as NCS for the New York State Slow-Speed Net. W7JFM will be found working 75 mobile in Oklahoma City while her OM, W7HAZ, is attending CAA school there. W28WJ holds an 8M certificate verifying her contacts with all seven GM districts. Eda found the certificate a bit different—it's actually a square of linen on which is painted the map of Sweden shown divided into the various sections. Listen for ZS3BE and ZS5KG—they are two very active YLs. Formerly of Miami, W4KM is at Falls Church, Va. Annette's neighbor, W4JKZ, is training women operators in conjunction with the local civil defense program. Two new YLs in Cincinnati are W8HDB and W8HBO. Louise is on 40 c.w. and Frances is on 10 phone. W3PMT/8, W5EKZ, and WSTPZQ are other YLs from the same city. W7NTPWY is just ten years old. KH8TI and W5EWN are members of MARS. W5ATT (ex-W7YOY) and W6EPN are at Loma Linda with their OM's, while the latter, also licensed, studies at the College of Medical Evangelists. W5NWR has started a 75' phone Southern States Rag Chewing Net for YLs which meets Tuesday and Thursday each week at 2000 on 8800 kc. The object of the net is to promote acquaintance among YLs, and all YLs within working distance are invited to check in whenever possible. To date W8E NWR NPS PTEK RXX SBX SJT M7I LIY and QTJ have participated. In addition to her duties as a science teacher at Thoreau's Academy in Boise, Idaho, and her activity on 10, 20, 75, and in various nets, including MARS, Sister Charlotte, W7MHT, has been directly responsible for the recent licensing of five amateurs. Unfortunately, both ZS3MT and ZSSNE are hospital patients. W6BBQ is now residing in the Sixth District. W1MCW ceased 1Xing long enough to tune up on 75 phone for the first time during the YRL contest and consequently gave some of the girls a Maine contact. W2PVS finds mobile operation (on 10) offers the least interference from the "doorbell, telephone, and kids". W5MJU is active in the Oklahoma Emergency and the North Texas- Oklahoma Traffic Nets. W2BIV proudly reports that his secretary, W2QGK, is doing a grand job in the ARQG. "Without her help our ARQG would not be where it is." A student at State Teachers College, Opelousas, W6ZGK has regular schedules with her mother, W2EEO, and her father. Sylvia uses c.w., but her parents reply on phone so that her classmates can understand at least one side of the QSO. W7WOW was elected President of the Ladies Auxiliary of the Rochester Amateur Radio Association. David Earl Beringer, born November 11, 1951, died November 22, 1951. "Davey" was the son of Earl, W9RBC, and Louise, W7JTX. (Continued on page 118)
GRANDFATHER CLAUSE

1926 National Bank Bldg.
Detroit 24, Mich.

Editor, QST:
The proposed amendment would grant special privileges to persons of doubtful qualification. The state of the radio art in April, 1917, was so low, and the qualifications for an amateur radio operator's license or station license at that time so trivial that it would be possible for an amateur licensed in April, 1917, to continue as a licensed amateur of the lowest qualified class to this date with no increase whatsoever in his knowledge of the radio art or his ability to utilize present-day radio technique.

It is contrary to public policy to grant privileges reserved for properly qualified persons whose only claim is "ancient privilege." For example, an aviator who flew an aircraft prior to April, 1917, is not automatically granted the privilege of flying a modern multi-engine aircraft in today's crowded airspace.

— Geo. H. Goldstone, W8MGQ

2223 Bennett
Dallas, Texas

Editor, QST:
I suggest that all licensed amateurs who served in the Revolution (1776) also be included in the Extra Class without code or written examination.

— Geo. C. Becker, W5EVI

Chicago, Ill.

Editor, QST:
They're in a awful rush to get this through without it being printed in QST. Wonder who the fossil is that got a B ticket in the magic month of April 1917 and now wants to get the highest class without taking exam like run-of-the-mill amateur radio.

I thought the Extra Class was for persons who could demonstrate a high degree of ability — now it is to be for persons who demonstrate a high degree of ability and others who think age is proof of ability.

Why not wait five years on this and if one of the big boys wants the Extra Class put it up to a vote of all the Extra Class amateurs and see if they want to invite him into their group without passing any exam? They no doubt would just consider him qualified by vote of the majority — the democratic process, y'know.

— J. R. Evans

1516 Spruce St.
Berkeley, Calif.

THE 7-MC. PROPOSALS

80 Whitney Road
Medford 55, Mass.

Editor, QST:
I am emphatically in favor of extending 'phone to all present DX portions of all bands. Due to unbearable crowded conditions on 20- and 80-meter phones, at least 75 per cent of these bands should be assigned to 'phone operation. Why should foreign amateurs be given nearly clear frequencies while we are mired in QRM.

— Allan S. Donovan, W1BBH

Editor, QST:
The only chance that the man with the low-power rig has is to work c.w. and the 40-meter band is the only good year-around c.w. band that we have.

Therefore my own sentiments are: Whatever you do don't let those 'phone men get into the 40-meter band, or for that matter don't give them anything more than what they already have.

— Maurice J. Bland, 6E8BB

114 Idlewild Drive
Winston-Salem, N. C.

Editor, QST:
Regarding editorial in December QST, I am for 7-Mc. 'phone. I request you do all possible to obtain a portion of this band for 'phone use.

— Louis Kanoy, W4DCW

7128 Patricia Lane
Houston, Texas

Editor, QST:
Unless it is necessary to open the 40-meter band to 'phone to keep the band for amateur use, I am opposed to this change.

— Harold C. Myers, W6SHD

12937 Memorial
Detroit 27, Mich.

Editor, QST:
I want to voice my humble opinion on the 40-meter 'phone situation. We've got the foreign 'phone and broadcast in the band now and nothing can be done about it. That's OK with me. It makes operating a little more difficult which should increase our skill. However, if the band was opened to our own 'phone boys I'm afraid the band would be ruined. For my money, 7 Mc. is the only band and let's keep it like it is.

— Jack W. Norland, W8GMA

1213 N. Sylvaniana Ave.
Fort Worth, Texas

Editor, QST:
I want to register against 'phone use for forty-meter band.

— South Texas Emergency NCS, W5R1J

740 Vogel Place
E. St. Louis, Ill.

Editor, QST:
Heard 'phone to be put on seven megacycles. This is to let you know there are strong objections on my part and the many stations handling traffic and using only c.w.

— Fred W. Deeman, W9BBX

Portage, N. D.

Editor, QST:
For goodness sake, let's not recommend to the FCC that part of the 40 band be made available for the 'phone boys.

Some of us are still c.w. operators, and let us have a little space for some good old c.w. operation.

We have enough foreign stuff in 40 now. Let's keep the U.S.A. 'phone boys off the 40 band.

— W. C. Hoyt, W6DMK

AFF Board 1
Fort Bragg, N. C.

Editor, QST:
I understand that the FCC is considering a new amateur radio rule making to authorize radiotelephone operation in 100 kc. of the amateur 40-meter band.

I am opposed to any such change. I operate my amateur radio station W4KE on both c.w. and 'phone on all authorize

(Continued on page 180)

February 1952
"RACES" a Challenging Development. The new proposed Radio Amateur Civil Emergency Service rules are discussed briefly under "Happenings of the Month." This development, to assist in integrating amateur facilities into civil defense, follows the general pattern discussed in this section, April '51 QST. Announcement of the proposed FCC rule-making follows close on the heels of the government-industry-users FCDA conference of December 10th-15th in which ARRL represented the amateur service. RACES rules would in no way change present requirements and privileges for amateur operation. A new Sub-Part B is designed to provide for continued civil defense operations, in designated subbands, in the event normal amateur operation should have to be suspended because of intensification of the national emergency. It is a way in which selected amateurs who can measure up can operate in controlled fashion to render a public civil defense service. Full text of the proposed RACES rules has been printed and distributed to field officials, including all ARRL Emergency Coordinators.

In RACES we find a responsibility that every licensed amateur should meet. It is a matter of self-preservation for all citizens to do their part in some branch of civil defense. It is in the tradition of amateur radio to render public service by fulfilling communications requirements in emergency. This time the service bears the name radio amateur. May we suggest that it is not a time for us to be flattered at the implied compliment, but rather to gird ourselves to get into RACES at the first opportunity. We must show we can do a responsible job when given the chance. How we embrace opportunity individually will determine the standing of our service in the future. We must accept the challenge.

After determination of this proposal it will require time for Washington to inform state and regional Federal Civil Defense Administration officials of the detailed provisions. Continuing ARRL recommendations are:

1) that amateurs all become registered with the AREC;
2) that SECs and ECs work closely with and become part of their respective civil defense councils, accept posts as Radio Officer and Communications Officer as these may be proffered, looking to implementation of the RACES plan, and;
3) that individual amateurs and EC groups so demonstrate their local radio plans, and participate in any civil defense drills in responsible fashion as to be ready for individual application and RACES authorizations, just as early in '52 as the proposed rules are evaluated and adopted.

Pointers for Novice Operation. One of the Novice QSOs noted while taking part in the recent "SS" drew the number "52," indicating that these newcomers to amateur radio were stepping right along in that weekend activity. A thoughtful letter from WN81DP has some meaty material that may be of value not only in contests but in everyday operation. Here are some of his pointers:

1) To eliminate the string of ———— following an exchange of report, power, antenna, name, QTH, etc., always ask a question not related to ham radio. (Occupation, vacations, articles, equipment, families .. . no limit to the subject.)

2) Be sure to use the ending symbols AR, K, and SK properly. So many place SK after the call instead of after the transmission. (ARRL has an Operating Aid, sent gratis on request, that gives the proper definition and examples of use of each of the ending signals.)

3) Be sure you have a good antenna and are loading it.

4) Don't worry either about receiving equip-
ment, the operating technique you develop is what counts. Learn to lose some interfering signals at zero beat. Become "tone conscious;" this often permits successful copy through QRM.

5) Having contacted the station, it is not necessary to make three times three calls at the end of each QSO. Make it a one times one except when calling initially to insure the chance for the receiving operator to tune you in.

6) It is often quicker to listen for a CQ instead of calling for a CQ . . . . obtaining crystals spaced about 10 kc. apart will make it possible to answer close to the frequency of the calling station.

7) Reserve the thoughts of voice operation until you get that General Class ticket. Keep the code speed coming along.

8) When the QRM is at a peak and QSO opportunities less, spend some time copying a selected QSO in progress to help your code speed. Pick a strong station going just a wee bit faster than comfortable for you to receive.

9) Don’t be discouraged because you are limited to 75 watts. Power is less a consideration than the propagation conditions. Keep track of your states worked and have fun with low power.

Sportsmanship. W7NRB (PAM Washington) would like to see presented some claimed results accomplished on 100 watts or less; we agree they would prove interesting. Low power results are popular. One club just completed a successful low-power contest among its membership. W7NRB writes his sincere belief that The Old Man would find it revolting to hear some of the boys on 20 meters, each running a "cool gallon," having a two-hour rag chew at the amazing distance of eight blocks! VQ3HJP in Tanganika writing of his successful work in the BERU contest wrote "Horries of Ws called DX stations after their CQ BERU . . . . and, as an example, blotted out KD5KW. . . . ." DX should never be that scarce, that we cease to have patience and courtesy in operating. It is this attitude that drives some respectable amateurs to follow other paths in amateur work perhaps? On the contrary it is heartening to see the sportsmanship in helping a Novice make his first QSO when he has the jitters, or to see the loving care and pains to get a message through accurately under adverse conditions.

In working DX it is considered unsporoting to call stations exactly on their frequency! Where many stations are zero beat, few or none at all can be read and the DX listens elsewhere. Also, anyone zero beat with the DX will prevent others from hearing any reply. Then, always move further from the DX station's frequency if you don’t raise him, before sending a CQ. Nothing is less sporting than to deliberately prevent others from working the DX you cannot raise. This is, by the way, one of the quickest methods of purchasing a one-way ticket on the road to unpopularity.

Best DX for February and March! ARRL’s 18th International DX competition is scheduled, rules were completely detailed in January QST. More-than-the-usual advance notice has been sent overseas to invite members of other amateur societies to participate fully this year. Given good conditions we should find plenty of new DX thrills and contacts available . . . . whether or not we end up with really impressive scores!

How one operates should always be much more important to the participant than what the score is. We urge all to avoid the type of operating that constitutes a bludgeoning or discourteous method of trying to get contacts. The calling of loud frequent and insistent CQs is not as productive of DX for Ws, as a rule, as listening and calling the DX at the right time with break-in to minimize unnecessary calls. It is hoped that all operation will be in conformance with the ARRL DX Operating Code. Copies of this as printed Operating Aid No. 5 are available on request. The points were gotten up as a cross-section of DX-operating amateurs’ opinion, both domestically and internationally, and aimed at discouraging those poorer practices that have driven some hams from DX. Contest suggestions: (1) Make calls short. (2) Observe frequency band limits applicable, on penalty of disqualification. (3) Keep signals clean — no clicks, feed-back or splatter, etc. (4) Make reports honest as well as the power figures given as the first and latter section of serial number exchanges. (5) Be guided by tuning instructions, such as 15 U, 20 D, etc., indicating when given the kc. up or down from a frequency. (6) Call DX only after it signs S5, sends QRZ? or calls CQ. The loser in this DX fray is the chap who doesn’t get in on the operating fun. We can hope for good propagation conditions! Here’s luck and DX in the competition.

— F. E. H.

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<th>A.R.R.L. ACTIVITIES CALENDAR</th>
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<td>Jan. 12th-13th: V.H.F. Sweepstakes</td>
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<td>Jan. 12th-27th: Novice Round-up</td>
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<td>Jan. 17th: CP Qualifying Run — W1AW, W7OD</td>
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<td>Jan. 19th-20th: CD QSO Party (e.w.)</td>
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<td>Jan. 26th-27th: CD QSO Party (phone)</td>
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<td>Feb. 1st-3rd: DX Competition (phone)</td>
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<td>Feb. 3rd: CP Qualifying Run — W60WP</td>
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<td>Feb. 15th-17th: DX Competition (phone)</td>
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<td>Feb. 29th, Mar. 1st-2nd: DX Competition (e.w.)</td>
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<td>Apr. 12th-13th: CD QSO Party (e.w.)</td>
</tr>
<tr>
<td>Apr. 15th: CP Qualifying Run — W1AW, W7OD</td>
</tr>
<tr>
<td>Apr. 19th-20th: CD QSO Party (phone)</td>
</tr>
<tr>
<td>May 4th: CP Qualifying Run — W60WP</td>
</tr>
<tr>
<td>May 14th: CP Qualifying Run — W1AW, W7OD</td>
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<tr>
<td>June 6th: CP Qualifying Run — W60WP</td>
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<tr>
<td>June 7th, 8th: V.H.F. Contest</td>
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<tr>
<td>June 19th: CP Qualifying Run — W1AW, W7OD</td>
</tr>
<tr>
<td>June 21st-22nd: ARRL Field Day</td>
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</tbody>
</table>

February 1952 63
The armed services during the last war usually had classification officers in their message centers to set precedent ratings on outgoing messages. Even so, the tendency was to overclassify, and in many cases, the system used came close to breaking down. We amateurs who handle traffic provide the communication; someone else provides the content of that communication and that someone, if anyone, should indicate its importance. As far as we are concerned, whether the text reads "having a fine time, wish you were here" or "I am perfectly okay, Mom, don't worry," we ought to stop reading the messages we handle and give them off our best service.

During September the traffic count of the Transcontinental Phone Net memebers (reporting) in the Eastern areas totaled 4134. The October count will be very heavy due to the fact that the over seas traffic has been very heavy during the past few weeks. The net operates daily, including Sundays and holidays on 3970 kHz. 1830 to 2030 local time.

**WLMF, Area 2 Director**

A total of 326 nets is listed on the new multithill Net Directory which is now in the hands of key emergency and traffic personnel and is available upon request to any others. This 12-page production includes a list of nets alphabetical by name, by state and then by frequency from low to high. The last two pages constitute a directory and routing guide for the National Traffic System. The Directory shows the registration of 133 'phone nets and 111 c.w. nets (some nets operate both 'phone and c.w. sections). Of the 'phone nets, 85 (about one-half) are in the 3.8-4.0 Mc. band; of the c.w. nets, 98 (almost all) are in the 3.5-3.8 Mc. band. The 'phone nets hold 407 sessions per week, the c.w. nets 542 sessions. These data may be of interest.

We are not naive enough to assume that there are no errors in the Directory, or that all nets are included. If your net is not included, or is incorrectly listed, please give us complete and correct information. It may be possible to get out a supplement later in the year.

**National Traffic System, QRM, especially from high-powered commercial stations from south of the border, seems to be the main topic of discussion among the NTS nets. It appears that 3970 has become a popular hangout for two of these stations, disrupting the normally smooth operation of the three area nets. RNG has experienced considerable difficulty with another commercial station on their 3840 frequency.**

ARRL has cancelled protests on these and other such matters through proper diplomatic channels, and there is some justification for hoping for a measure of relief in the near future. Meanwhile, we hope nets affected will not break and flee, but rather stick around and see the two or three kilocycles necessary to work through the interference. While doing so, keep us posted on any developments along this line so that our information on the strength, identity, frequency and type of operation of these commercial stations in the amateur bands will be up to date.

Net Sessions Traffic High Low At. Most Consistent

| 1RN | 21  | 32  | 1  | Conn., E. Mass., Vt. |
| 2RN | 59  | 20  | 0  | NYS |
| 4RN | 44  | 15  | 0  | E. Fl., S. C. |
| RNS | 44  | 95  | 0  | Ark. |
| 9RN | 24  | 27  | 2  | Mich. |
| TBN | 22  | 72  | 0  | N.C., Ia., Kan. |
| TRN | 44  | 80  | 0  | Ont. |
| EAN | 22  | 35  | 11 | 100% |
| CAN | 22  | 32  | 3  | 16 |
| PBN | 22  | 82  | 0  | 29 |
| TLGN (Ia.) | 22 | 31  | 0 | 11 |
| QIN (Ind.) | 74 | 45  | 0 | 13 |

*Out of 44 sessions held.

**Second Regional Net:** Certificates have been issued to W2XMP, W2NAI and W2WCI. The 1930 session of 2RN has been well attended, with increasing attendance from NLI. A bulletin issued under date of November 14th outlined plans for the winter season.
Fourth Regional Net: QRM from the commercial radiotelephone station on 3670 often makes it impossible for the 4RN representative to find the NCS. Plans are being made to send more than one station to EAN when the load gets heavy.

Fifth Regional Net: Certificates have been issued to W5s WEC PCQ RIQ and RWJ. W5RQ has taken on the job as editor of a monthly RN news letter, and does a fine job. The net will conduct weekend sessions the last two weeks in December.

Sixth Regional Net: RN0 has changed frequency to 3615. Pressure of SCM duties has necessitated W6JZ's resignation as Manager.

Eighth Regional Net: W8DXX is the new 8RN Manager, replacing W8SBC who resigned to become Manager of EAN, W8E1W is Assistant Net Manager.

Tenth Regional Net: W8SCA wants to give up the Management by February 1, and negotiations are under way to choose his successor.

Thirteenth Regional Net: VE1HVT has earned a Regional Net Certificate. The Maritime Section has become a full participating member of TRN through the efforts of VE1HVT and VE1JOM.

Eastern Area Net: EAN has maintained its high operating standards under W8SCW. The November report was the last submitted by W2CCL, who leaves EAN as one of the most efficient nets in the East.

Central Area Net: A Saturday night session started in December with W6LXX as NCS. Commercial QRM makes operation difficult.

Pacific Area Net: W6ZJO reports that at last he is getting some help on PAN. W6CCE is back on the job and will help out on PAN.

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.

Ohio
John E. Shriner, W8AWJ Dec. 14, 1951
Eastern New York
North Dakota
Everett K. Hill, W9YKP Dec. 20, 1951

In the Eastern Pennsylvania Section of the Atlantic Division, Mr. John H. DuBois, W3BKE, and Mr. William H. Waid, W3BP, were nominated. Mr. DuBois received 195 votes and Mr. Waid received 175 votes. Mr. DuBois' term of office began November 24, 1951.

ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.) You are hereby notified that an election for Section Communications Manager 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 to file 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 expiring membership, individual signatures 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 [ARRC Section of the]
Division, 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 date 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.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

P. B. Handy, Communications Manager

<table>
<thead>
<tr>
<th>Section</th>
<th>Closing Date</th>
<th>SCM</th>
<th>Present Term Ends</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Francisco</td>
<td>Feb. 1, 1952</td>
<td>R. F. Cookworth</td>
<td>Apr. 15, 1952</td>
</tr>
<tr>
<td>San Joaquin</td>
<td>Feb. 1, 1952</td>
<td>E. Howard Hale</td>
<td>Apr. 15, 1952</td>
</tr>
<tr>
<td>Valley</td>
<td>Feb. 1, 1952</td>
<td>W. Howard Zell</td>
<td>May 1, 1952</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>Feb. 15, 1952</td>
<td>Frank F. Fisher</td>
<td>Resigned</td>
</tr>
<tr>
<td>Alberta *</td>
<td>Feb. 15, 1952</td>
<td>Sydney T. Jones</td>
<td>May 1, 1952</td>
</tr>
<tr>
<td>Utah</td>
<td>Feb. 18, 1952</td>
<td>Leonard C.</td>
<td>Resigned</td>
</tr>
<tr>
<td>Louisiana</td>
<td>Mar. 14, 1952</td>
<td>Robert F. Barr</td>
<td>May 21, 1952</td>
</tr>
<tr>
<td>Manitoba *</td>
<td>Apr. 1, 1952</td>
<td>A. W. Morley</td>
<td>June 15, 1952</td>
</tr>
<tr>
<td>Nevada</td>
<td>Apr. 1, 1952</td>
<td>Carroll W. Short, Jr.</td>
<td>June 15, 1952</td>
</tr>
<tr>
<td>Virginia</td>
<td>Apr. 1, 1952</td>
<td>H. Edgar Lindsay</td>
<td>June 15, 1952</td>
</tr>
<tr>
<td>Ontario *</td>
<td>Apr. 1, 1952</td>
<td>G. E. Farquhar</td>
<td>June 15, 1952</td>
</tr>
<tr>
<td>Idaho</td>
<td>Apr. 1, 1952</td>
<td>Alan K. Ross</td>
<td>June 17, 1953</td>
</tr>
</tbody>
</table>

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Alex Reid, 109 Looza Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

DX CENTURY CLUB AWARDS

<table>
<thead>
<tr>
<th>Honor Roll</th>
<th>W1DFH</th>
<th>244</th>
<th>W6YXO</th>
<th>237</th>
<th>W2BA</th>
<th>230</th>
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</thead>
<tbody>
<tr>
<td>W1HGW</td>
<td>241</td>
<td>W6ENY</td>
<td>235</td>
<td>W8K7</td>
<td>230</td>
<td></td>
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<tr>
<td>W8SBE</td>
<td>250</td>
<td>Q8PL</td>
<td>233</td>
<td>W3G8H</td>
<td>230</td>
<td></td>
</tr>
<tr>
<td>W8PFR</td>
<td>257</td>
<td>W8CPTV</td>
<td>232</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

RADIOTELEPHONE

| W1F8H | 213 | W6QAC | 205 | W5BRL | 187 |
| Y2CK | 208 | L06AJ | 202 | W1NWO | 187 |
| W6QHR | 207 | W5QGW | 197 | W2BA | 186 |
| W1UXJ | 100 | |

From November 15 to December 15, 1951, DXCC certificates and endorsements based on postwar contacts with 100 or more countries have been issued to the amateurs listed below.

NEW MEMBERS

| G3BN | 212 | E30A | 107 | G5COA | 101 |
| W8WB | 114 | Z6BL | 106 | O5QO | 100 |
| W8RT | 112 | Z6OJ | 106 | W5Q | 100 |
| H8AO | 111 | Z6RE | 106 | Z6RE | 100 |
| H8BQ | 109 | W9PQX | 105 | G5AT | 100 |
| H8BI | 109 | Z6HE | 102 | Y5O | 100 |
| W8MJ | 108 | Z6BC | 101 | W9NTT | 100 |
| CTAA | 101 | |

RADIOTELEPHONE

| J2FNN | 121 | G3BN | 114 | V2A0L | 100 |
| W1ND | 109 | |

ENDORSEMENTS

| W1ME | 221 | GM3AYE | 101 | SM5W | 136 |
| W8ZN | 221 | W6YTE | 101 | W6KKE | 132 |
| Z6HZ | 212 | W7H | 100 | W5QZ | 131 |
| F8BS | 212 | W8CCW | 100 | W4YT | 130 |
| W8CVS | 106 | W5Z | 100 | |
| LATY | 103 | O2LB | 103 | W8MB | 125 |
| W8BHP | 101 | W5FHL | 101 | W8AE | 121 |
| W8MHD | 101 | N1X | 100 | L4S | 122 |
| W8HSB | 100 | W5Z | 100 | S3ARE | 121 |
| H8BQ | 108 | ON4PQ | 100 | W4TY | 121 |
| W8UDR | 108 | G5L | 105 | W5TXX | 120 |
| L5C7D | 108 | O1UXE | 102 | Z6K | 112 |
| Q1ML | 100 | T62VW | 101 | G3XN | 103 |
| W8YR | 100 | W5YS | 100 | W5LY | 10 |
| Z6BBW | 100 | W6KV | 100 | W2EQS | 110 |

RADIOTELEPHONE

| Z6H1Y | 170 | W8HUD | 140 | F8K3 | 120 |
| W8JN | 161 | W4OM | 132 | LAY | 115 |
| Z62OX | 100 | W8MD | 120 | SM5W | 115 |
| GM3AYA | 100 | W2Y2T | 120 | W5QF | 110 |

February 1952
Your Communications Manager and NEC spent two weeks at the FCDA Staff College at Olney, Maryland, in early December, one week to absorb some general information on the broad subject of civil defense and a second week to participate as ARRL representatives in a communications conference consisting of representatives of local and state governments, the federal government, manufacturers and national organizations. ECs and other AREC officials will have received further details concerning the facts absorbed during both weeks, but we think it appropriate to make a few comments in this column to acquaint all amateurs with the thinking and attitudes of people concerned outside of amateur circles.

Voluminous notes and mimeographed and printed material acquired during the first week’s session of lectures on civil defense subjects (with emphasis on communications) will testify that we were exposed to a broad and somewhat extensive education on the subject. If we learned nothing else, we learned one thing very well—that there is a terrific amount of information of a background nature which the average civil defense communicator needs but does not have; and that includes us amateurs. In the communications picture alone, we of the amateur service are sometimes prone to close our eyes to two basic premises underlying our participation: (1) That radio facilities are required to back up wire facilities and to provide communication between points where such facilities are not available, and (2) that radio should be the only backup involved. The first premise is fairly obvious if you stop to think about it, and the second is an eye-opener. Of the 99 persons listed in the rosters of the various committees into which the Conference divided itself, 21 were governmental representatives of state government civil defense, and 23 represented national organizations which had radio communication as their only or primary concern. Eighteen different such national organizations were represented, including ARRL. In addition there were 16 representatives of the federal government, 12 of local (city) government, 10 manufacturers and six commercial communications services (mostly AT&T). The Conference started with a full day of orientation and indoctrination into the problems to be considered. The second day the group was divided into seven committees, each to undertake a detailed study of one or more specific aspects of the radio communications problem in civil defense. The committees worked all day long, and sometimes far into the night, to accomplish their desired objectives and come up, at the end of the week, with some recommendations and conclusions which would be useful to FCDA in compiling a program and formulating its future policies. Despite the fact that your two Headquarters representatives could not be everywhere at once, amateur radio was well represented in all committees, and recommendations and conclusions coming out of these committees at the end of the Conference all considered the role of the amateur a significant one, generally speaking. The status of the proposed Radio Amateur Civil Emergency Service came in for a good bit of discussion, and recommendations were made both formally and informally that regulations for this service be finalized at an early date.

At the termination of the Conference, when we were collecting the frazzled ends of our nerves in preparation to returning to our respective occupations, one of our colleagues asked us if the extent to which the amateur figured in civil defense communication was not a little more than slightly disturbing to us. Our reply was that it could to the job expected of them; but it’s going to take some doing, fellows.

Six mobile units of the Birmingham Amateur Radio Club assisted at the wreck of two crack passenger trains on the Southern Railroad near Woodstock, Alabama, on November 25th. Other stations of the Alabama Emergency Net acted as control and contact points for the mobiles. SCM W4BTI organized the Alabama Emergency Net, with the help of W4FGT, to arrange hospital accommodations, notify relatives and handle inquiries about persons on the trains. Five mobile units went to the scene of the wreck, while another went to the fire tower on Double Oak Mountain to act as a relay station. The call-letter license plate on the mobile unit assisted materially in getting past the state highway patrol lines; however, some trouble was experienced in getting railroad officials to recognize the ability of those amateurs to relay communications, although only two telephone lines were in use.

As a result of the experience, the sheriff deputized 11 amateurs so that recognition would be forthcoming immediately in any future emergency. Additionally, public agencies which might be involved in an emergency were given the telephone numbers and addresses of six AREC officials so that amateur assistance can get under way immediately. A probably incomplete list of those who participated includes W4 EBD EJC FGT KNW KXX KZY NS OLG RT1 and SDX.

On November 14th the Kings County AREC supplied communications for civil defense during the simulated atom bomb burst at the Williamsburg section of Brooklyn. In spite of many difficulties we maintained communication with our mobiles over the complete length of Brooklyn. W2BIV operated through control from W2W2U/M receiving the installation of fixed equipment. During the drill, a photographer was struck with a heart attack. W2BUU/M at the scene relayed the information to W2PQ/K, thence to W2BIV. W2BIV contacted W2QGR who called the police and an ambulance was dispatched. The net relayed the information 30 seconds before the c.o.d. authorities could report it by other means.

The drill revealed several weak spots in mobile communications which will be remedied.

W2BIV, EC Kings County, New York

"Operation Airavee," to provide communication for the Civil Air Patrol during a simulated emergency, took place on Sunday, November 18th. The AREC of Wayne County, Ind., first received notice on Wednesday, November 14th. Communication was desired by the CAP between the Richmond Airport and the Connersville and Winchester Airports. Also, between the Richmond Airport and Civil Defense Headquarters in Richmond. Seventy-five meter "phone" was used between the Richmond, Connersville and Winchester

The AREC of Richmond, Ind., under the leadership of WC9ZMF, helped supply some of the radio communication in "Operation Airavee" last November 18th. Shown above is the 75-meter operating position at the Richmond airport with WP9SD at the mike and W9KOF assisting. At the far left of the picture, on the other side of the two unidentified CAP telephone operators, is the 10-meter operating position normally occupied by W9KOF. Amateurs set up transmitters and receivers at three airports and Civil Defense headquarters in Richmond.
Airports. Two-meter 'phone was used between the Richmond Airport and Civil Defense Headquarters in Richmond. In addition a fixed 75-meter station was assigned as a stand-by station to help keep communication channels open for the lower-powered portable units at the three airports.

At 0600 GMT air raid alerts were sounded. All operating personnel proceeded to their assigned stations. Communication was established with W9NVA at Richmond Airport at 0615, with Connerville at 0625, with W9GJG at Civil Defense Headquarters at 0650, and with Winchester at 0645. All departure and arrival reports were handled as received from CAP Headquarters. It was necessary on several occasions to use stand-by station W9MUR to relay messages to Connerville and to help clear a channel for the portable stations. The "all clear" signal was sounded at 1100. Communications were secured when all planes had returned to Richmond Airport at 1130. Taking part were W9E CVG EZB GJO GQG GQG IFK IFO QKQ MQH NTA PSH ZPR and ZMP.

— W9JMP, EG Wayne County, Ind.

Amateur stations in Northern Vermont on November 14th provided a demonstration of civil defense communication facilities afforded through amateur operations. The audiences both sides of each transmission via auditorium loudspeakers connected with receiving and transmitting apparatus operated before them. All transmissions were received. The actual demonstration continued for 16 minutes during which time 10 messages were received via seven stations. W9AXN ETE KJG MMV OKH QQQ RXSW SEL TBQ and TUL1 participated.

— W9KJG

The Cuyahoga County AREC held its second Hidden Transmitter Hunt on October 8th. The transmitters on each band — 10, 75 and 80 meters — were located in Washington Park. The emergency net operated on 3650 kc., controlled by the County Net Control located at Codley Farms. Approximately 225 amateurs used about 75 mobiles and 25 fixed stations to locate the hidden transmitter, which took about 35 minutes. The entire hunt was done with the cooperation of the Superintendent of Communications on the Cleveland Police Department and the Director of Civil Defense of the City of Cleveland.

Several letters have recently been received suggesting that we establish a frequency in each band which can be used for calling purposes to clear casual or random traffic of either a personal or emergency nature.

We think that this is a swell idea. In fact, we have thought so for quite some time. Back about the first of January, 1939, we decided that the National Emergency Net frequencies might be used for this purpose when no emergency existed, and this change was announced by a squib in Traffic Topics (February 1930 QST, page 56), and revised wording in the box which is printed in almost every issue of QST (page 37, same issue). This box has been running in QST since that time — in 16 issues, to be exact. It was last printed in December 1961 QST, page 75, and will also be in this issue if room can be found for it.

Okay, if it's a good idea, let's use it. The best way to do this is to avoid use of these frequencies except for calling and making contact. Of course this is easier said than done, since our bands are crowded, and we cannot afford to leave any channels unused; but when you are stuck with traffic which for some reason or other cannot be put on a regular traffic net, try a directional CQ on one of the listed National Calling and Emergency Frequencies. If, at other times, you yourself will monitor one or more of these frequencies, you may be able to do a service for someone else who similarly has traffic. But remember — emergencies have priority!

CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW/WSTQD will be made on February 15th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1855, 3555, 7130, 14,100, 28,000, 52,000 and 146,000 kc. WSTQD will transmit on 3534 kc. The next qualifying run from W9WOP only will be transmitted on Feb. 3rd at 2100 PST on 3590 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, 10 through 20 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 at 2130 EST. References to texts used on several of the transmissions are given below.

Date Subject of Practice Text from December QST
Feb. 4th: A Complete Portable 40-Meter C.W. Station, p. 11
Feb. 6th: Some Novel Ideas for Bandswitching Mobile Converters, p. 10
Feb. 12th: A Simplified Electronic Break-In System, p. 30
Feb. 14th: A Practical Design for Your First Modulator, p. 22
Feb. 18th: How To Build a Transmitter, p. 24
Feb. 22nd: A Practical and Economic Approach to Medium Power, p. 29
Feb. 26th: Compact Automatic Key Design, p. 42
Feb. 28th: Technical Topics, p. 46

WIAW OPERATING SCHEDULE

(All Times Given are Eastern Standard Time)

Operating-Visiting hours: Monday through Friday: 1500-0300 (following day) Saturday: 1900-0230 (Sunday) Sunday: 1500-2230

General Operation: Refer to page 75, October, 1951, QST (see also page 73, December, 1951 QST) for a chart showing W1AW general operation. This schedule is still in effect and is not reproduced herewith for space considerations. Mimeographed complete master schedules of all WIAW operation in EST, UST, MST, PST or GCT are available upon request.

On Saturdays and Sundays during which official ARRL activities are being conducted, WIAW will forego general-contact schedules in favor of participation in the activity concerned. Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules:

Frequencies: C.W. — 1855, 3555, 7130, 14,100, 52,000, 146,000 kc. 'Phone — 1855, 3590, 14,280, 52,000, 146,000 kc.

Times: Sunday through Tuesday, 2000 w.e., 2100 by 'phone. Monday through Saturday, 2300 by 'phone, 2400 by c.w. Code-Proficiency Programs are made on the above-listed c.w. frequencies, starting at 2300 daily. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7, 10, 12 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately ten minutes of practice is given at each speed. Next certificate qualifying run from W1AW and WSTQD is scheduled for January 17th from W9WOP, February 15th.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C.W. 'PHONE
7100 kc. (day) 3875 kc.
3550 kc. (night) 14,225 kc.
14050 kc. 28,610 kc.
28100 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.

The following are the National Calling and Emergency Frequencies for Canada: C.W. — 3535, 7050, 14000; 'phone — 3815, 14100 kc.

February 1952

67
MEET THE SCMs

Clarence L. Arundale, W6GBJ, acquired his first license back in 1922, and since that time has held the calls 9C9K and 9C9L besides his present call.

In addition to his duties as SCM of Missouri, he also is an active Official Relay Station, having held that appointment for the past twenty or more years. An enthusiastic participant in ARRL activities, he has served as a session-time winner for his section of both the ARRL QSO Party and the Sweepstakes.

He holds the calls KCC, WAS, WAC, OTC, DXCC (both prewar and postwar), and Public Service certificates. He has lived at 1670 East Grandview Avenue for over 30 years, and has been a member of the Missouri Amateur Radio Club of Springfield, Mo., for over 25 years.

A secondary hobby of SCM Arundale’s is photography and he enjoys watching baseball and basketball games. His employer is McQueary Bros. Drug Co., for whom he works as head bookkeeper and office manager.

SOUTH DAKOTA WEEK END

In order to assist amateurs who need a contact with South Dakota for WAS, South Dakota hams will conduct scheduled contacts, the latter has been called “W1ZM End” February 22nd and 23rd. Frequencies to be covered are 3965 and 3755 kHz, and the Novice band; 7080 and 7225 kHz; 14,100 and 14,250 kHz, and 28,050 and 28,900 kHz. All stations will monitor 5 kHz on each side of the calling frequencies February 22nd from 8:00 P.M. to February 23rd 2:30 A.M. CST; they will cover the 10- and 20-meter frequencies February 23rd from 11:00 A.M. to 4:00 P.M. CST, South Dakota stations will answer to calls of “CQ SB.”

BRIEFS

The Canadian Amateur Radio Operators’ Association has received inquiries concerning the continued issuance of the “Worked All VE” award. These are still being issued and cards, together with the 25-cent fee, should be sent to Mr. Elton Cully, W6AUV, Club Secretary, C.A.R.O.A., 167 Sherwood Ave., St. Catharines, Ontario. Complete details concerning the requirements for WAVE were published on page 34 of May, 1951, QST.

Since publication of the 17th ARRL DX Contest results in October QST, the following errors have come to our attention: W6BYH’s phone score of 2165 points (38 contacts, 19 multiplier) was omitted from the score tabulations; Lecum was the phone winner for the San Joaquin Valley section. The phone score of East Bay section contestant W6UYX was listed in the c.w. section, but should have appeared in the c.w. section as number two score, 72,285 points; W6UYX, by the way, won the Northern California DX Club of phone award for his performance in the 51 DX Contest. The score for Wyoming section c.w. winner W7PGS was erroneously listed as 13,980 points instead of 49,880. The 429-point phone score of Ohio contestant W6ZIM was inadvertently listed in the c.w. section, and his 32,943-point c.w. score was omitted. A typographical error made W6BB’s phone score third in Nebraska; high scorer in his section, Clyde actually made 6156 points. In both c.w. and phone tabulations, W6GUV’s scores were credited in error to W6GUF. To all concerned, our sincere apologies for the slips.

-Bratun: The 1026-point Class C Field Day score of W6NNX, listed on page 126 of December QST, was credited in error to W6NXX.3.

Chase players who work 75-meter ‘phone are sought by W4RZ. The Smithfield, North Carolina, Chase Club already has a number of player-stations combining the two fascinating hobbies. If interested, write John B. Townsend, W4RZ, Box 177, Smithfield, North Carolina.

WS8LJU was erroneously issued the call WS8LJU. Until the mistake was corrected, he had the rare distinction of being the only “two-letter” Novice on the air.

HIGH CLAIMED SCORES—1951 SWEEPSTAKES

The 18th ARRL Sweepstakes, held during the week ends of November 17th and 24th, was a bang-up affair that crammed the bands to overflowing with contest addicts SS’ing their way along and making contacts at a merry clip. No new records have come to our attention, but a large number of scores in the 100,000 to 120,000 class were turned in and the highest over-all c.w. score, usually chalked up by an eastern station, this time came from a West Coaster. The W6’s also retained the top positions they have been holding for many years in the phone section.

C.W.

<table>
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PHONE

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- W6GUV was 2nd with 255-62. W6WRI was 3rd with 255-62.

WS8LJU was 5th with 255-62. W6WRI was 3rd with 255-62.

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Station Activities

- All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, John H. DuBois, WB3XK — SEC, IES, RM — HP, Orchids to BTS for the outstanding job done as SCM during the past fifteen years. This, in addition to being active in all phases of the Amateur Service, is even more noteworthy. Thanks.

On-air Positions are open for EC in the following counties: Columbia, Lycoming, Montour, Northumberland, Pike, Snyder, Sullivan, Susquehanna, Tioga, and Wayne, and are coming. If you don’t know your local EC, contact the SEC, report your EC, and P.A. Emergency Net on 3016 kc., Mondays at 8:30 a.m. Those interested in joining the net should contact your local manager.

Traffic Net, 3016 kc. at 6:30 P.M. PJV reports that a Joint meeting of the Hazleton, Carle, North Easton, and Schuylkill Clubs were held in Weatherly on Nov. 3rd. The meeting was well attended by theCustomLabel.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, James W. John, W3OMN — On Nov. 20th the Chesapeake Amateur Radio Club heard BTO speak on "Two Meter Color Code Design and Construction." Also "Noise Figure Measurement and Comparison." On Dec. 4th DXW covered "Predicting Propagation Conditions." On Nov. 9th OMN had a talk on the Rock Creek Amateur Radio Association on antennas. The ARRL TVI film was shown at the Nov. 23rd meeting. The Capital Suburban Radio Club held its monthly meeting. A new network, known as "Ghost to Ghost," has developed for communication between the District of Columbia Area. More than forty certificates of Superlicence have been issued since Nov. 1st. All pertinent information and details are obtainable from NOL. KBE was subject to some malicious defacement when his skywriter was stolen in Owosgo, Co. Contact ZHU for details. The RAWNY Hamfest was well attended. An interesting talk with slides on TVI was given by IMC.

MID-ATLANTIC — SCM, C. R. French, W3SXY — SEC, UTHL, RM: RUF, NYS Net meets on 3015 kc. at 7 and 10:15 a.m. NYSST on 3925 kc. at 8 a.m. daily.

WASHINGTON, D. C. — SCM, E. T. Barlow, W3KCF, SEC, UTHL, RM: RUF, NYS Net on 3015 kc. at 7 and 10:15 a.m. NYSST on 3925 kc. at 8 a.m. daily.

Countv Emergency Network meets every Sunday at 9:00 P.M. on 147.15 Mc. and invites participation of all local 2-meter hams. ZT recently returned from a mobile vacation in California and West-Land and reports that his 650-75-meter DX running ten watts tops to his final. WOA has a mobile rig on 75 meters. GUC is working 80 meters with a RG-86 and really is getting on the air. It is difficult to fit his 2-meter mobile rig under the dash on his new Pontiac. SPV passed out copies of the other day in celebration of the birth of his first child. SPA news along, fellows, and I’ll be glad to include it in this column. Traffic: W2RG 118, KSBG 112, W2ASG 14, ZI 2.

WESTERN NEW YORK — SCM, Arthur F. Leboeuf, W2KVE — SEC, UTHL, RM: RUF, NYS Net meet on 3015 kc. at 7 and 10:15 a.m. NYSST on 3925 kc. at 8 a.m. daily.

February 1952
CENTRAL DIVISION

ILLINOIS—Acting SCM, H. F. Lund, W6EKL — SEC: QZ, RM: BUK, PAM: UQT. New club officers: DeKab: KCM, pres.; DIO, vice-pres.; HMM, tresp.; Springs: KEB, sec.; MEA, exec. custodian. The Quad City Club has new quarters at the Moline Airport. USK works 20-meter mobile exclusively. QM belonging to the 10-meter Class ticket. KDR is de-TVing the rig with a "dipper." The son-in-law of LQN is WQONTT, and AGN have new QTHs with TBS. The Chigago Area Council group is hard at work on the e.d. program with more mobiles needed. BA, JAC, JSQ, KICB worked on practice air raid. JGJ is converting dehינטר machine to Sw. rig. OXZ is new president of the Quad City Club. NTR is new president of the Chicago Area. BUK has returned to 7 Mc. operating 7 watts to a 6A6Q VFO. W6NQOW freshly made 14.4 Mc. with 150 watts. Mobiles are BWN, EGK, GKH, KRT, LEP, VZQ, and WFL. WRE reports he heard on 144 Mc. by a VE3. ZBN has a new QTH in Chicago. All members of the BFFQ family of Elgin are now home; father, OWD; mother, WN9 OTQ; daughter June, WNOFJM; and John, MEM. LQN's 10-year-old niece is now a ham, and is awarded her ticket. AND, JSP, and IVU all had birthdays the same week, so the YL of IUO gave them a birthday dinner. A fellow in the HXK family of Hoffman Estates just made 352G. USK is now using the air from Springfield using 20 feet of wire in the basement for an antenna. New OES is MB1 of Colita. Clare is now on 50, 144, and 440 Mc. Please see the election dates on your appointments and send 'em in for endorsement. The North Shore Emergency Net has moved to 26 Mc. W6KQF is new manager for the Illinois valley. ZK7 cured his TVI when his final plate transformer went up in smoke. OLU now lives in KWAFC, CZ7 completed repair on KIY. K9FAE makes BPL this month. Traffic: (Nov.) K9FAE 689, W9YX 157, MEM 105, SXL 75, CSA 72, KQL 10, YST 10, K9FAE 389, YS 10, YXN 10, K9YX 226, HR 67, DO 55, QBI 17, YTV 10, IAY 4, LAX 5, DOR 2. (Sept.) W9DLH 1234, YX 134, CSA 109, K9YX 104, BUK 70, DOG 93, YTV 10, LHN 7, FR 4, DOR 2, IAY 2.

INDIANA—SCM, Clifford C. McGuerry, W9DGA — SCM, Collins M. Mauck — A new club bulletin, ORZ as ex-21XO at Anderson. New OSC are AZJ, F2W, VNF, GMM, KBY, and GSY. New OSC is CWW. New OSC are QLK, RZS, and CMM. NTR is now at St. Louis. L‰LLE-timing is now on University. 21XO for an absence of 27 years. UAA is building a new transmitter for 28, 50, and 144 Mc. BKP has new 300-watt transmitter on 28 Mc. Phone, K9JG. UIA is building a new receiver for 28 Mc. TT has crystals available for the RFN frequencies. New RFN members are W2LTE, W2JDI, and K9KAA. Electrician K9YX is building a 28-Mc. meter vertical. RZS made a nice score in the phone SS. NJR is building a 10-meter mobile. AZJ worked GNF1 on 50. K9YX is working a new SSB transceiver and adding a new family. A new break-in system, K9RZ received his Advanced Class license. K9RZ is now also a continuous contact with BJK and FMI for 225 miles from Chicago to Fort Wayne. RJP has a new antenna on the roof of the Red Cross Building. W9YX is now on 138 Mc. with a 20-meter WAZ. W9YX has just called SCM and now has a 4-p.m. net. MSA has a new all-band transmitter. DUK operates on the Novice frequencies. The Fort Wayne Radio Club plans 10-meter club operation from 1700 by the Fort Wayne Police Department. PGM, N9Y, and NWA are Asst. ECs for ZMM, of Wayne County. JJX is on 7-Mc. with a new 27-meter WAS. JJX is calling SCM for RFN Novice net. MZE operates K5FBB while in the Air Force. Net Control Stations for IFN are T9O, FMI, FZW, BNF, F5L, and YNN. New Novice license classes in Indiana are PPD, QAV, OWZ, and FPO. ZBK lost his 10-meter beam to the wind, QLW saw MKZ carrying his frequency, and new call has been assigned. W6LQH, K9BR, has a new 10-meter beam. Traffic: (Nov.) W9XIU 131, GECQ 309, TT 378, N9Z 299, LKX 233, TG 10S, DGA 105, K9BR 109, FRR, HAIN, the district secretary, has passed his Novice exam and is awaiting his call. MZZ has new call for a QRP Novice in KQA. Traffic: (Oct.) W9YX 157, MZZ 95, AAX 43, KUN 31, JSH 20, KWL 19, LEY 11, UHN 10, K6Q 4, (Oct) W6YTR 6.

Dakota Division

NORTH DAKOTA — SCM, Everett E. Hill, W6VFP — ORR was on the Voice of Americas Amateur Program, which was beamed all over the world. CGM reports 9 hams now in Mayville, with W6RBF a new call there and 6 more Novices in training. PGO is on 3.5 Mc, with 100 watts. FRP is on 28-Mc. phone. NAD now is back in Dickinson. PGO reports New England Boy Scout Troop and Scoutmasters all working on Novice classes. RLF has a new license program. Wilson has formed a ham club. DM is Advanced Class and is on 3.8 Mc, from Grand Forks. KMT is portable from Jamestown. G0A5O is new traffic net. K9FAF, Fargo, has formed a ham club to put HSC on the air. The Red River Amateur Radio Club, Fargo, has a new clubroom and is making civil defense and emergency building. I wish to thank all for their congratulations and willingness to cooperate; I will be looking forward to a large number of applications for operating permits. Traffic: W6RBF 16.

SOUTH DAKOTA — SCM, J. W. Sikorski, WBBRN — A new Prairie Island Amateur Club is forming, and the 2nd Tuesday of each month. IZA has a new Viking. WUD has a YL, addition to the family; CXM has a Jr. operator; and SDE has a new YL. The South Dakota 100-meter Net meets Mon., Wed., and Fri. at 8 p.m. CSTD on 1905 kc. and the CSW net has shifted from 3720 to 3600 kc. New club members of SFRAC are YIL, tresp.; RSN, vice-prec. and secy.; and WRE, tresp. The Black Hills ARC installed IWE, prec.; JSL, vice-prec.; CTT, secy.; FJZ, tresp.; and GHP, vice-prec. The SDB is complete. G0A5O and DIY are building a new receiver. The 1st, each Saturday morning, is now on 10 Mc. WUS is now in Sioux Falls after signing up a club last week. WUS has a new 21-foot tower, and DIY and DIY are completing 2-meter rigs — the first such activity in town. WUS is now located in Tea. Traffic: W8DGN 9, W8DGN 7, WA0WZ 6, WA0WZ 3, WA0WZ 2, W8DGN 6, K9RP 5.

MINNESOTA — SCM, Charles M. Bove, W8MNC — SCM, Jean Walter, 8XEY, SEC: BOL, RMP. R7Q times now is Net Control of the Tenth Regional Net. WEH now is on 3.5 Mc, with 28 Mc. and 28 Mc. phone. The South Dakota 100-meter Net meets Mon., Wed., and Fri. at 8 p.m. CSTD on 1905 kc. and the CSW net has shifted from 3720 to 3600 kc. New club members of SFRAC are YIL, tresp.; RSN, vice-prec. and secy.; and WRE, tresp. The Black Hills ARC installed IWE, prec.; JSL, vice-prec.; CTT, secy.; FJZ, tresp.; and GHP, vice-prec. The SDB is complete. G0A5O and DIY are building a new receiver. The 1st, each Saturday morning, is now on 10 Mc. WUS is now in Sioux Falls after signing up a club last week. WUS has a new 21-foot tower, and DIY and DIY are completing 2-meter rigs — the first such activity in town. WUS is now located in Tea. Traffic: W8DGN 9, W8DGN 7, WA0WZ 6, WA0WZ 7, WA0WZ 3, WA0WZ 2, W8DGN 6, K9RP 5.

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One phase of receiver operation that has been brought out by Civil Defense is the desirability of having provision for squelch on receivers used for stand-by purposes. With the receiver tuned to the spot-frequency of a C.D. net and running continuously for monitoring that frequency, the noise background of the receiver can be quite annoying. If a squelch circuit is added, this noise background can be reduced to a point where the no-signal background is not objectionable, but a signal opens up the receiver to full output. The conventional circuit can be made to quiet the receiver completely but it is probably more desirable to leave a little background noise so that an operator can tell that the receiver is still functioning by merely listening carefully. This eliminates the possibility of the receiver going dead without the operator being aware of it.

A simple squelch circuit that serves the purpose is shown in the above sketch. This squelch has been used in a six-meter C.D. receiver which is to be described later in OST.

This circuit is an easy one to add to a receiver that has already been built and is in use, as it requires a minimum of change in the receiver. This circuit was tried out by adding it to a National NC-183. The first audio tube, a pentode, was removed and a 12AX7 double triode tube installed in its place. The use of a very high mu triode resulted in no noticeable loss of audio gain. The .01 capacitor is a ceramic disc mounted on the socket. The one megohm potentiometer could be a fixed resistor in locations that are not too noisy.

The .01 capacitor connects the grid and plate of the squelch tube together for audio frequencies making the tube virtually a diode. It can be looked at as a highly degenerative triode amplifier. This means that the plate resistance of this tube becomes very low — in the order of a cathode follower. The .1 mfd. capacitor places this low impedance of only a few hundred ohms across the .5 megohm gain control, shunting this control drastically. When sufficient AVC voltage is applied to the grid of the squelch tube, it is cut off and its impedance becomes extremely high, removing any shunting impedance from the gain control and opening the audio amplifier up to full gain.

Between 20 and 25 decibels reduction in background noise was obtained with the NC-183 which is sufficient for most purposes. It is important that the .1 mfd. capacitor be connected to a point of very low audio voltage to prevent distortion due to too much audio on the squelch grid. The advantage of this circuit is its simplicity, small number of parts and space required, and the ease with which it can be added to most any receiver.

Dave Smith, W1HOH
Designed for PROFESSIONALS

ELDICO TRANSMITTER KIT TR-75TV

Eldico's TR-75TV is a 60 watt all-band cw transmitter sensibly priced, solidly designed. When the last connection is soldered, when you press your key for the first time, here is a rig that will work and work well on all bands. The TR-75TV is air-proved by hundreds in use, giving world-wide performance.

Best of all, Eldico TR-75TV is not "just a rig for the novice" that is soon outgrown. It is a standard 60 watt transmitter. Because it meets the requirements of the experienced ham, while incorporating the basic simplicity so necessary for the novice, the TR-75TV is a logical purchase for amateurs desiring medium power.

Our Apology...

This advertisement originally appeared in Nov. QST—at which time we and our distributors had what we thought were ample stocks of the TR-75TV Xmr Kits.

Your reception to this "Value" and your desire to secure this outstanding transmitter exhausted our supply, leaving us flooded with orders, telegrams, phone calls, etc.

Two shifts are now working on all the Eldico Products so that all of your orders to our Distributors will be filled.

We thank you for your patience, with you happy operating with Eldico—but offer this note of caution: "We'll do our best to supply—but the Eldico line of Products will be in limited supply for the Duration."

Don Merten, W2UOL

Signals of Distinction

WRITE FOR YOUR FREE CATALOG 51

44-31 DOUGLASTON PARKWAY, DOUGLASTON, L. I., N. Y. • BAyside 9-8688
- IDEAL for the NOVICE

In addition to its many features, the TR-75TV has special design precautions to insure minimum interference to television. Special shielding and by-passing makes this transmitter ideal for fringe area operation or use in highly congested areas.

Look at these outstanding features of the TR-75TV:

- Simple enough for the beginner to assemble, sturdy enough for years of trouble-free operation.
- Uses the time-proven crystal oscillator final amplifier combination.
- Circuit permits use of 80-meter or 40-meter crystals to cover all bands.
- Plug-in coils eliminate trick circuits.
- Husky power supply employing a 5U4G rectifier delivers 500 volts d.c. to the final.
- Pi-network output simplifies loading of transmitter with all types of antennas; ideal for multi-band operation.
- All stages are metered using a meter which can be switched to oscillator plate, final grid and final plate.
- A terminal strip is provided to connect a modulator if radiophone operation is desired at a later date. Eldico's MD-40/M-40P Class B 6L6 modulator is designed expressly as a companion unit.

Over-all size with cover 17" x 10" x 9". Complete kit (less crystal) .. not another bolt or wire to purchase, including a smartly styled shielded cabinet to minimize television interference. For 110-120 v, 50-60 cycles.

TR-75TV, complete kit with instructions .......... $59.95

EVERY ELDICO PRODUCT IS NOW AVAILABLE ON AMATEUR PRIORITY M-85

MD-40, MD-40P, MD-100 Modulators: The MD-40 delivers 40 watts of A.M. phone using 6L6 in class AB2. MD-40P is identical with self contained power supply. MD-100 delivers 100 watts of A.M. phone using 807's in AB2 with power supply. Each kit complete with components, tubes, crystal microphone, etc.

MD-40—$34.95 MD-40P—$44.95 MD-100—$49.95

Grid Dipper and Antennascope: Two instruments no ham shack should be without. For complete details see our advertisement in December QST. Available both in kit or wired and tested. GDO Complete kit with instructions $29.50, GDO wired and tested ............. $43.00

Antennascope: Complete kit with instructions $24.95. Wired and tested .......... $29.95

2-Meter Mobile Receiver and Transmitter: Designed for mobile or fixed station operation. Ideal for amateur, Civilian Defense or CAP usage. Receiver complete superhet tuning 144 to 150 mc, with sensitivity of better than 1 uv for 6 db signal to noise ratio. Transmitter is crystal controlled 144 to 150 mc. 6AQ5's crystal and doubler stages driving 2E26 final up to 22 watts input. 6C4 speech amplifier for carbon microphone input. 6F6's modulators. Modulated pi network output for ease of coupling to any type of antenna. 2-Meter Receiver. Complete kit with instructions $59.95. Wired and tested .......... $94.95

2-Meter Transmitter. Complete kit with instructions .......... $49.95. Wired and tested .......... $74.95

Power Supplies for above. AC—$30.00, 6VDC ......... $45.00

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Harvey-Wells Electronics, Inc.
Southbridge, Massachusetts
Export Dept. 13 East 40th Street, New York
RECENTLY, we received a request from a fellow amateur for the solution of an interesting DC filter problem which involved cramming several Mfd's of filter capacity into a space already overcrowded with transformers, chokes and other components. His problem, and its subsequent solution, might prove helpful to other amateurs confronted with a similar dilemma. So we are passing along the story for what it might be worth.

Here was his problem: he had designed a 2-stage transmitter consisting of a harmonic oscillator and final amplifier, which required 2 complete DC power supplies, one delivering 700 volts for the plates . . . the other, 300 negative volts for bias and blocked-grid keying potential. His plans included making this rig completely self-contained with power supplies and RF stages mounted compactly on a single small chassis.

His problem arose when he discovered that it was impossible for him to arrange the other components of his transmitter to provide sufficient mounting area for the DC filter capacitance needed. The best he could do was an area roughly 2" square by approximately 3" in height in which to mount 4 Mfd's at 700 volts, and 8 Mfd's at 300 volts.

In pondering his problem, we thumbed through the latest Mallory Catalog looking for a capacitor which might fit his requirement. Frankly a solution didn't appear until we reached page 6. There we found the Mallory RM-265, a triple "c" separate section electrolytic. This capacitor looked as if it might have possibilities. Sure enough, it did the job!

The RM-265 is an electrolytic capacitor consisting of 3 separate 8 Mfd sections rated at 450 volts DC and is mounted in a single aluminum container measuring 1 3/8" in diameter and 4 1/4" in height. For this application, 2 of the 8 Mfd sections were connected in series to provide 1 Mfd of filtering at better than 700 volts, while the remaining 8 Mfd section was used as the bias supply filter.

The basic essentials of the power supplies he used are shown in the schematic diagram. Note in particular the 50,000 ohm 2 watt carbon resistors across the seriesed sections of the capacitor. These resistors are employed as voltage equalizers and should not be omitted.

This is one of many examples of how the complete line of Mallory quality parts can help you solve unusual problems. It would pay you to become familiar with the Mallory Catalog. It contains a wealth of special capacitors, controls, resistors and vibrators for unusual applications such as this one. Your authorized Mallory distributor will gladly supply you with a copy.
PLATE TRANSFORMERS
Pri. 115/230 Volts, 50/60 Cycles. Here they are—the top-performing plate transformers and matching filter reactors. They're conservatively designed, with ample insulation throughout. They operate at a temperature rise of 40°F to 50°C at full load, 60 cycles, under OCS duty. Under ICAS conditions, the duty cycle is 15 minutes on and 15 minutes off, with same temperature rise applying as under OCS duty.

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*Both secondaries may be rectified simultaneously

FILTER REACTORS

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<tr>
<th>Catalog No.</th>
<th>Inductance in H.</th>
<th>Resistance in Ohms</th>
<th>Max. D-C Ma.</th>
<th>Insulation Volts RMS</th>
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<td>60</td>
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<td>R-63</td>
<td>6</td>
<td>35</td>
<td>35</td>
<td>7,500</td>
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(Continued on page 79)
They're "anchors to the airwaves", these JK crystals which pinpoint the RIGHT frequencies. Like much of today's fine equipment, this Collins communications receiver prefers the JK H-9.

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So new their possibilities remain comparatively unexplored, JK ultrasonic transducers have become the youngest pioneers in laboratory research. They are supplied in any cut desired.

A MODERN THERMOMETER FOR OIL FIELDS

Deep in the oil fields, the JK ultrasonic transducer has found another dramatic application. It is used to measure temperatures far into the depths of the ground. When the signal changes frequency below the ground, the temperature is thus recorded. WHATEVER the crystal requirement, James Knights labs can furnish the crystal to do the job.
been heard regarding the new OSl Manager, LJS, FID, the teen-age who had claimed that, with the youngsters growing up, the teen-age net is dying, or rather, fading away. Only two bulletins were received this month. From the Corecouncil of the CARR we learn that the club officials for this year are WAB, PrR; WRL, Vice-prR; AFF, SeR; and ABO, tmtR, that the club Christmas Party was held Dec. 16. S.A. and ABE is "going to town" in Franklin County. The Shack Gossip of the Toledo group informs us that several of the young have been bitten by the 160-meter mobile bug; that AAB is attending school in Georgia; and that GRD is now on 2 meters. Reflections CWA officials are AS, PrR; BBX, Vice-prR; and FSR, SeR, and L.A. RCS announces that the winners of the recent 10-meter ground-wave contest were AJW, FCX, and WML among the locals, with KXO and KCI dead-ending for first and second place. Finishing third among the out-of-county stations. Reports still are arriving rather late so let's try to get them in the next issue. Traffic: W6XAEU to 1B 290. AAI to YCP 61, WE 49, AL 33, DXO 25, EUN 22, QIE 27, BF 10, PUN 14, BPH 12, AJW 10, RN 10, WAB 10, DMR 16, LPH 5, PFU J, BUM 3, ET 1, FIX 1.

HUDSON DIVISION

EASTERN NEW YORK — SCM. George W. Sleeper, W2CWL, SEC; ILI. This is my last report of section activities. The need for a good rest and the increased amount of traveling incident to my regular occupation has made it necessary for me to give up all ham activity for at least this winter and all of next summer. I take this opportunity to convey to the section the best wishes of the members. Much has been accomplished. AARRR is membership, increasing clubs are growing, and ARRL is at all-time high. The cooperation I have always received from each member is indicative of the strength and activity of the section. That cooperation has brought much more than anyone could have hoped for. I know it is needless for me to say that it was with the utmost regret that my resignation was submitted. I have always been proud to be a member of our section, and even prouder to have had the privilege of serving as your SEC for 2 years and a half. I am taking my vacation with the comforting knowledge that the section will continue to grow and become even stronger. The interest of the individual plus the talent of the leadership appointees, assures me that I am leaving the section in capable hands. Thanks to each of you for the help you have given me.

I'm looking forward to my reactivation during the fall of 1952. Endorsement: AWP, GY, QTH, FHS, LAX, IRC, IFP, WBD, PTH, SNN, and AAO as ECs: TWC as R.M.; ERO and BRS as ORS; Traffic: W2BNO 564, PHS 203, TWC 88, ABO 78, HR 39, ORS 28, BR 1.

NEW YORK CITY AND LONG ISLAND — SCM. George V. Cooke, Jr., W2OBU — Assist. SCM, Harry Dan- nea, 2TW, SEC; SYW, RM; TUK, PAM; YBT. The Brooklyn ARRL nets show a average attendance of 95 per cent of all registered stations participating in the outstanding activity and effort FIP, CLQ, BIV, PYX, YHS, ZLK, JCD, TBI, WDI, and WDP received their section Net certificates. Closer cooperation with ARRL officials in Suffolk is noted with Brookhaven, Smithtown, Huntington, and Islip town organizers and station operators at strategic points. The AARRR members, in Nassau County, the C.D. Plan has been compiled and presented to the County C.D. for approval. The new club is shown by increased memberships and the organization of alternate stations for control on a local basis in a number of localities. KYG has been appointed EC in Queens and OG Alternate EC. In the Queens 2-Meter Net those having perfect attendance for the month were as follows: AVI, DGF, KVG, OG, and QTH, DVE, and OIO operate FAF/2 at Franklin Hospital, KRC, OG, DVE, and OIO operate FAF at Red Cross Rest Centers. WDP has been appointed Suffolk Alternate EC. EBZ and BN are operating on Liberty ship and the station now serves. The lure of the sea is calling BOC. GPK became the 100th member of the 100-member club, the IDN, RAE, and RAE/2, and 981M joined up. In the 240-Mc band PAA, KRM, and PTO, along with CRP, are active on schedules in and around the Copiague Area. KRC, Tech, Class licenses received his OES appointment. The Smithtown CD Radio Club and the Purple Bees are two newly-organized clubs in the section, the desserts of his cruise to Portugal, France, Greece, and Italy, where he met IVL, The NYC-ILI Phone Net, with YBT and PAM, operates at 900. The ARRL, with 15 regular members and ship stations in all parts of the section. Traffic, discussions of major topics, and net operation are the indicators for increased pleasure. And now is living in Philadelphia. UTB has moved to Seattle. JHF's little 2-meter rig is a neat package and would serve well in AREC planning. LIC reports the AREC organization of N.Y., reports many cases of TVI cleared and agreements made with manufacturers for full cooperation in future cases. The Tu-Boro Club is making the Auto
Irving Vermilya, W1ZE, an amateur radio operator since 1901, is witnessing the outstanding longevity of Eimac tubes. After more than a decade and a half of dependable service, two of his 300T's are still going strong—operating far beyond their guarantees.

Today Eimac offers a complete line of transmitting power tubes designed by the world's finest tube engineers to last longer and keep your rig on the air at least expense.

Get the Eimac-published booklet, "The Care and Feeding of Tetrodes." It's loaded with valuable information, costs 25c. At your distributor's—or write:

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September 20, 1952

Eitel-McCullough, Inc.
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Gentlemen:

In 1935 I purchased three Eimac 300T's (I believe you now call them 400T) tubes. Last night, after 16 years of almost continuous service (transmitter was on 700 and used by the government during World War II), the first of these tubes gave up the ghost...the filament touched the grid. The other two are still going strong in my cool kilowatt rig. I believe this is the way to use tubes—let 'em loaf along.

At my age—8l—I am a little reluctant to buy something that is going to last me another twenty years...but my last activities would no longer be a pleasure without Eimac tubes. Would you please send me information on your modern version of the old 300T? I understand the new tubes will work right in the old sockets...without credit card...installation and give still better service; and at the same time send me information on your tetrodes as I may want to modernize my rig while I have the opportunity.

Sincerely yours,

Irving Vermilya

W1ZE
2 New Mallard Products! 

Now available at your jobber — two new MALLARD products designed for more enjoyable, more dependable mobile operation!

New MALLARD VFO

Designed primarily for mobile use — ideal for QSOs too! Provides accurate calibration in kHz. Ample band spread. Glare-free illuminated dial. Power supply available as optional equipment. Supplies sufficient power for converter.

For more mobile QSO’s — easier QSY while “in motion”, get the new MALLARD VFO! Amateur Net. $59.95

New Mobile Transmitter

High efficiency, top quality components, skilled engineering — these characteristics best describe the new MALLARD MOBILE TRANSMITTER!

SPECIFICATIONS:

* 30 watts on 75, 20 and 10 meter bands.
* 2 xtal sockets with selector switch.
* Hi-level AM modulation.
* Built-in squelch, clipper.
* Plug-in coils for highest efficiency.
* Antenna relay for push-to-talk.

Low impedance coax output.

NEW MALLARD MOBILE TRANSMITTER, with tubes and coils for one band, less, more and power supply. Amateur Net. $119.95

Single Band Converter

Choice of mobile hams, everywhere, because of extra sensitivity — rock-like stability under adverse conditions of mobile operation. Available in three models for 75, 20, and 10 meter bands.

FEATURES:

* Accurately calibrated nylon gear-drive dial with glare-free illumination.
* Adjustable coils. Low drain tubes. Easy installation.

Models 75N, 20N, 10N, MALLARD CONVERTER, Amateur Net. $39.95

Mallard HI-Q Loading Coils


HI-Q Loading Coil for 75 meter band. Two plug-in coils for greatest efficiency. Plexiglas housing and Inoxel-treater copper wire to resist moisture and fungus and maintain high Q. Easily installed, adjusted to exact inductance. Amateur Net $7.95.

Adaptors available for installing HI-Q Coils on non-standard mounts.

Prices subject to change without notice.

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License Plate Bill and requested the FRLRC to start the bill rolling. The Council's position is strong and more members are welcome. The net needs on 145.62 Mc. Mondays at 2100 with KVG as the NCS. The Northern Traffic Net sends thru KIN (KIN 13-23), and QST on 1930, with TUR the RM, in steadily increasing its activity with higher traffic totals and members and desires more coverage in the Rivers regions. Kurayama will operate the Slow Speed Training Net (NLT), please write or send a message to TUR requesting operating time and frequency.

P.S. — Breakfast: BC asks net members to be operating on 20,620 and 145.350 Mc. at 2100 in the Bronx. QOW has been appointed OTS. YSH and PAA are newly appointed OES. Traffic Net retrieves YSH as W5KBT.

NORTHERN NEW JERSEY — SCM, Thomas J. Ryan, jr., W2NKE — A committee of amateurs from all over the State has been formed to handle the branch of setting up a new QST to be presented to the New Jersey Legislature when next they convene, to request our calls letters on license plates. The general chairman of the committee is John McSteath, N1I, 1011 Avenue C, Bayonne. If you have a personal contact which you feel would be beneficial to the cause, please contact N1I. Four groups are working with N1I, MUP is Bill Reifley chairman, assisted by UWJ, GOJ, and CDQ. Publicity is being handled by W2DQ. W2NKE is concerned with contacts in Trenton and II IN is gathering information from each of the local NCS, which must issue call-certificates. N1I is the general secretary of the entire committee. You will be able to keep in touch with the progress of the Bill by listening to the official Broadcast Stations in N.J., and SANT (Newark) following stations will transmit news, written by ZBY, on the following bands: 75-meter ‘phone — LOP, CWX, 80-meter c.w. — WNAAZP, NBY, OUN, 10-meter ‘phone — WNZZTP, DTY, 10-meter ‘phone — CDQ, KLA, CDQ and ABX; 2 meters — EUF. The first of the committee meetings was held in the Bayonne Red Cross. Information on this subject has been sent to the State which is considering new calling plans. Publicity will be the section has been the new forms distributed by the Office of Civil Defense. The importance of these forms cannot be over-emphasized. The most important reason for their existence is to have each of the thirteen Area Amateur Radio Chairmen know what facilities are available for communication. You are encouraged to radio all areas of the State is broken down in the following manner: The State is divided into four Districts, the Districts into three Areas, the Areas into Zones. An example of this would be that in your city is part of the county group. On that important that it is unusual to have the Office of Civil Defense know which is the set-up in each city, for coordination purposes. It is hoped that the people in the band, or helping us correct faulty procedure. I refer to the official Observers. OUS, CDQ, and EUF send cards to offenders on each of our bands. We can use more OUS. How about applying for an appointment? OXL moved to Westfield, N1Y got his 28-w.p.m. Code. Police recently called Z2 at 2200 watts. N3LO has a 3700 kg, nightly at 7, is gathering a large listening audience. New GSE officers are K2HTX, pres.; DME vice-pres.; LAM secretary; YLD, treasurer. W6S asks for listeners on 3070 kw. at 6:30 and 8:30 p.m. Maybe you can help deliver some of the enormous amount of G. Journal of the Traffic Net (TCPN) is an enclosed grade C Exam. Traffic (Nov.) W2CSS 257, LMB 198, WCT 224, ANA 49, EAL 43, ZEP 36, OXC 29, OUS 23, CDQ 8, AWY 6, N1Y 4, CDQ 2, (Oct.) 12LL 125, EAS 74, I7K 5.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, W50P — From the reports received this month it seems that the only activity in Iowa is by the TCLC or "Phone Club." The report on the 160-Meter Net was given by DIB. The Net meets on 980 kw. at 1600 w.p.m. seven days a week. The Net is in good shape, W5K3 and W5R3 are active, and the NCSs in the state have contacts in Kansas, Minnesota, Nebraska, and Illinois. It is interesting to note that mobile operation seems to be getting more popular. The TC-11 is in use and is a popular device. QRG is making up a monthly traffic report for TCLC, breaking down its traffic and QG. I3A and A4N are maintaining traffic tables in their nets. The New TV station in Burlington, part-time is being used by TCLC. A4N is experimenting in the use of QSA, which is not approved by Agate, OAH. NWX reports the activity of the Ames club on a simulated emergency Oct. 14th. Those taking part were OXC, DDV, DDV, and NCSs. NWX also assisted in that on Oct. QSA 185, YTA 83, BDR 76, NYX 44, DCF 25, DDV 6. (Oct.) W5NWW 94.

(Continued on page 21)
YOUR BEST SOURCE FOR ELECTRONIC COMPONENTS

Your Centralab Distributor (there's one near you) carries America's most complete line of controls, switches, ceramic capacitors and printed electronic circuits.

CERAMIC CAPACITORS with a wide range of ratings and in miniature sizes meet the exacting requirements of radio and television circuits. They offer high accuracy, low power factor, space saving and the most desirable temperature and humidity characteristics. This means freedom from service trouble not possible with older style condensers of moisture absorbing paper construction, or mica construction.

TUBULAR TC HI-KAPS temperature compensating ceramic capacitors. TCZ units show no capacity change over wide range of temperature; TCN's vary capacitance according to temperature.

NEW BLUE SHAFT VOLUME CONTROLS available in all generally required sizes ... plain and switch types. Factory-assembled and tested ... ready to install.

EYELET-MOUNTED FEED-THROUGH CERAMIC CAPACITORS are exceptionally small. Capacities range from 25 to 4000 muf. Voltage rating, 500 V.D.C.W.

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POWER SWITCHES are specially designed for transmitter, power supply convertors and other medium duty power applications. Efficient up to 20 megacycles.

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Serves You Money

KANSAS — SCM. Earl N. Johnston, W8HCY — Our RM, FDJ, sends a splendid report of Q5S and Q5S SS activities which show 167 stations reported in with the 23 drill of OCT 28. N7Y had a perfect attendance, and H&Y 118, YFE 16, FER 15, S6K 12, BLI 12, AHW 12, ZUA 8, and K5 I 8. Eighty-four messages were handled. CRKRC members of Salinas furnish four mobiles for the Police Department on Halloween to help police the town. YJ7 moved to a new QTH in Salina and is operating there on 7 Mc. When the home for antenna on 7 Mc. WNOREX is being worked by W8PQG, first Novice in Salina. WMY has new end-fed Zapp on 7 Mc., is building a new rig, and is preparing for the shack. PKD is building new 8-meter rig, WPL is new 7-meter station in Chanute with 807 clam-shell modulation. W8DOBT just got his Class B license. DRB is getting back on the air with a pair of 814s, DNX, of Abilene, moved the shack to the second floor since the flood and is getting 75-meter mobile on the air. BEV, of Atchison, reports a new club there known as the Radio Amateurs of Atchison, with IWS, pres.; R4G, vice-pres.; and BEV, sec.-treas., meetings are held at the Maur Hill School every 1st and 3rd Sundays at 2 p.m. DRB, of Olathe, reports a new radio club there in the making. KRVCS, of Topeka, had a chili Sunrise meeting there, and the DKRCS, of Kansas City, has a brand-new QTH and is rebuilding its barn on the air with 400 watts in the final with 304Ls for modulators. HOC now has new band-switching rig running a 400-watt 4E27a entirely de-tuned. Traffic: W8MUY 94, N1Y 72, Y9QO 66, FJU 60, BET 32, K5O 30, WGO 30, FJU 30, B8LZ 29, LXX 11, AHW 10, ICY 10, SGK 9, LIX 9.

MISSOURI — SCM. Clarence L. Arrindale, W8GJB — VRF, the Missouri SEC, attended the Missouri Military Communications Advisory Council's Annual Meeting Oct. 30th at Jefferson City. Harry Duncan, of the Missouri State Patrol, is appointed communications coordinator for the State. HARC coordinator for the Red Cross Building on Nov. 15th. At this meeting the following officers were elected for the new year: VRF, pres.; USB, vice-pres.; EVP, treas., and W8R, sec. W8HCS, W8Z, and W8Z are mobile stations to man the check-point for the Heart of the Ozark Motorcycle Club's annual "Turkey Run." FBN/8 operated at motorcycle headquarters. W8VAB was new station operating at home, with the following mobiles at the check-point: DRA, YH, DRA, and D8K. The course was very rugged and only 10 of the 12 starting motorcycle riders finished the run. The Motorcycle Club was highly pleased with the first annual check-point report to headquarters. EMP, a new ham in the Kansas City Area, is on the air with a Viking 1, K1K, and W8R, and the SS Contest over worked and barely whined when the TVI, ARH, worked CR8BC to add a new country to his list. WAP has moved to Harrisonville and is back on the air with rebuilt rigs. UFW, GAR, and K8W have nice traffic reports this month. QXO's wife underwent an operation. BAF has a pair of 855As running a kW, on 75-meter 'phone. The XTA of JQB and PUA are in the hospital, QUA and Show-me Nears can use more stations in their respective nets. NDS now has a Collins receiver. Traffic: W8QZK 74, G1P 290, GAR 146, HH 127, K5V 113, B3R 32, ERE 22, CKO 20, OUD 16, N8H 11, QMF 8, KIK 2, P7G 2. 

NEBRASKA — SCM. Guy B. Bailey, W8KIP — Your SCM received a nice letter from AIN, who is with the Marines in Korea. UVU is doing a swell job as the new NCS at 75-meter net. Eighty-eight net members are on the air on an average net roll, with a daily average of 30 reporting. Let's all pitch in and keep the ship afloat. IVW, in Auburn, OK, in Saratoga, and A8I, in Holdrege, are new 75-meter net members. K8N reports the e.w. net going nicely with the following members: AHR, FDJ, FJU, Q8, LXX, JJ1, K8D, K8W, L8G, and Z8F. Buzz is scouting for new members on the e.w. net. FOB, K8, and IXL are liaison stations on the e.w. net. Q8 is reduced power. He now has Lysco 600 with 35 watts and gets out FB with no TVI on any band. F8V, K8N, and J8L are liaison stations on the new e.w. net to TEN and CAG. J8L reports SSN is coming along but needs more members. This is a fine opportunity for Novices and also for you old 'phone men to get that long-forgotten flak back. HL, TQ7 still is making BPL. Every month with his oversea trade routes, the fringes area and still is trying to get it out of his rig, but must be doing a good job with all that traffic. WN8FGK is a new reporter from Gerst. Thanks, Mike, keep it coming. A new Novice in Omaha, EGM, is getting on with an HT-17. EUT reports that EXU lost his antenna in the recent snow-storm, CB1 is back on his feet and is running a kW, to keep 75 meters stirred up out in the west end. GTC is putting up 10- and 20-meter interlaced beam. Traffic: O7QD 1519, F8GQD 1800, EK52 130, P2A 72, KJF 41, LXX 19, E9C 15, EFG 2. (Oct.) W8QZK 1809, F8ZQ 27. (Sept.) W8QZK 2193.

NEW ENGLAND DIVISION

CONNECTICUT — Acting SCM. Roger C. Amundsen, W8UHT — SJ70 makes BPL both for the second month. AW and NJM made it for October. STU is a new OP. TRF, LWW, Q8J, F8P, F8G, LXX, TXJ, 13F, G8V; K8T, and IP, and SUZ all received new EC certificates. W2VMX.

(Continued on page 84)
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operator at W1AW, rates Class IV OO. EPW and Z2G are busy with CAP. MHT is mobile on 28 Mc. OM-1 timer CDR is back on as JU. The CABA Banquet held Nov. 9th was well attended with 2J0J2 scoring with his humourous and enlightening talk. RLM, PRT, and CCI were among the visitors. JQK was meek at the AIRS of New York meeting held Nov. 23rd. RLS checks in to GMT. NCM is active after a double fracture of the spine. RTB does a swell job as editor of YLDR. Harmonics. Q5D has moved to Chicago. OAX is cooking on mobile and DX. RUM is busy on TLAP. BDI says the CW party was a hum-dinger. NC, with CJ4M and LF, attended the PDCA High School College near Washington, D.C. But they run the race and hang at the same time. DAV is back on and soon will be effective again. NKM has resumed as SG. No word from the Connecticut activity in the last few scores. LIE has cured his TVI and reports new activity in the Stamford Area. It is not too early to plan to attend the New England Division Convention to be held in Springfield on June 14th. Here is one more reminder to check the date of your license expiration. While you do that, keep your appointment certificate under your pillow. As you will need it if you do not, drop me a line. The Danbury bang put up a c.d. demonstration. Mobile Nov. 30th. If you have any idea, FJQ improves. JGQ is just around the corner and that is a thing to be planning right now. KYF says he is building a kW. LWMQ has been busy on LKIP in the eastern end of the state. Waiting for the reports received and hope next month there are more. Traffic: W1RO 540, ATC 243, LV 159, HTF 180, HUM 165, KYQ 129, AY 129, BU 124, FY 64, FJQ 49, CTI 26, RFL 21, GVW 19, HW 18, RRE 8, (Oct.) W2HUM 58, KV 12, MAINE — SCM, Oratio R. Bracken, W1PTQ, — SEC: IGW, RAJ, LKIP, Net frequencies and time: Pine Tree Net — 2599 kc. at 1900 Mon. through Fri. Sea Gull Net — 2560 kc. at 1730 Mon. through Fri. Ocean Net — 2519 kc. every Sun. 1015 to 1100 on 3095 kc. TO as NCS, also every Tuesday at 1930 on 3561 kc. FRS 1 as NCS, TBE or 1 as MT. Malden are at Braddock, Fl., to whom we have reports that Malden has been notified that he has passed his Conditional Class exam, so look out, gang. TAI is making buttering a fine signal on 25-Mc pound waves in a high wind. RUZ now has a 30-ft tower with beam which the boys on the Absolut Net put up for him recently. Among those around at the beam-end of the tower were ARV, CDK, DTH, TKE, and Son Vincent who has just passed his Novice Class license, BAP, TFL, KJC, and TYY. BTL, BUK, formerly of Old Town and now at Freight, expects to be back on the air soon. MIR is teaching school in Lawrence and is putting out a very nice signal. An SVQ certificate was issued to NQ, SUK now as ORS. A meeting of a proposed radio club for Aroostook County was held at Sullivan's. Those attending were OEG, JQG, HUL, FYJ, FDJ, CMN, TMY, LVR, ALJ, Clarence Benjamin, and Vernon Burgess, Traffic: WILKF 125, PTL 74, OLAG 52, OGA 30, OJS 29, OJS 28, OJS 27, SEJ 23, TO 33, ERG 14, SNJ 14, HUL 13, KEB 13, AWN 10, FAX 9, HNT 8, QER 5, KDE 6, RSC 5, W5CJ 1/2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, Jr., W1ALP — New appointments: IF as EC for Peabody; MX as ORS, OPS, and ORS. Appointments endorsed: As EG — MZ, Hingham; MAN, Marblehead; AR, Belmont; KWW, Weymouth; DFS, Somerville; LIP, Needham; PKW, Reading; CIL, Shrewsbury; GJZ, Woburn; BWII, Atchboro; LJT, Brockton; IP7, Shirley; SH, Dedham; HYG, Dighton. As ORS: BHX, JPD, AAR, MUR, and QJG. As ORS: MEG and AAR. As ORS: BXX, MEG, WJ, QIC and AAR. As ORS 3.5 Mc.; JCK. As ORS: JLT, JWM, of Brockton, passed his Novice Class exam. UDG, BDF, PH, and WNTJ, on 3.5 Mc. AJL is on 3.9 Mc. UIR, PZA, and KD are on 144 Mc. MCC is in West Africa. NWL is on 7 Mc. UDR is on 3.5 kc. QGU is a new call. G15 in St. John's is on 144 Mc. G15 is on 144 Mc. VGT is now in Renov. VUE is on 1.8, 28, and 144 Mc. KLJ was heard on 28 Mc. New Bedford, gets into the Boston area on 144 Mc. KMW is on 1.8-144 Mc. JOV has another call. TKC, C&M, and VJ are on 28 Mc. USA is Jack Lyons in Union. M.T.T. Radio Society, puts out a monthly bulletin. Sparks and Area, WN1UK is Luther Davis, sr., in Newton. A new club, the Arlington Amateur Radio Club, has just been organized. Charter members are OEB, pres.; CTW, vice-pres.; LLY, secy.-treas.; BAG, treasurer, and GEO. KWN, NBI, FWQ, and THO. Meetings are held on Tues., at the homes of the members. THO is on 50 Mc. IPZ is in Region 9 on 29 Mc. The Brockton Radio Club hold a swap and auction. The Eastern Mass. Club has a talk on training with Bob Mathis. Telephone Co. on microwaves used on TV. Also a meeting was held at W2BTV with a talk by 2RY. The Quan- nropawt Radio Assn., held a meeting, and a Phonograph was presented by someone. The South Shore Club has an auction with an AXY doing his stuff. The T-9 Radio Club had a Christmas party at ISK's QTH. The Braintree Radio Club held its...
Wincharger Corporation
Sioux City,
Iowa

Dear Sirs:

Enclosed find a snapshot of a 10 Meter 3 EL closed spaced beam of home construction mounted on one of your 10 foot towers.

This tower was originally used as a support for a Wind Generator some years ago. Having served its purpose at that job, I was able to purchase it and put it to use as the picture shows.

It has been mounted as you see it for three years and during that time it has withstood all winds that we get out here on the extreme tip of Long Island.

Its most severe test being the storm of November 25, 1950, when winds reaching over 100 miles an hour were experienced and this storm lasted for 24 hours.

The 100 mile rate per hour was endured for the last 45 minutes of the storm, preceding that, winds from 60 to 85 miles were endured for 23 hours. Not even a guy wire damaged or broken!

In mounting this tower on the roof, no nails, bolts or lag screws were driven in the roof. If I may suggest, I would stress this advantage in the advertising of this tower.

In the process of adjusting the beam array, I, with a fellow ham have climbed all over the tower itself before it was really secure by the guy wires.

I have been noticing your ad’s in various radio periodicals so I took the privilege to drop you a line regarding my tower and beam set up, of which I am very proud.

The tower, at its bottom horizontal braces also supports a prop pitch motor for rotating.

Thought you might be interested in this setup so couldn’t resist writing.

Yours Truly,

William Hamner

85
monthly meeting. RDF has been on for 2 months with
n.a.s.c., and has worked 69 stations, 23 states and VE3.
JBO's rig is a crystal filter p.p. 807w with 90 watts. EMG
made BPL with lots of traffic from Germany and Canada.
MX has skeds with LU2DN, 8ULJ, DJICX, UX5CN, and
SQZC. TIN is in Georgia. AAL is on 7 Mc. PKW reports
that the Rendell C.D. Net is on the 15th of the month at
10-30 p.m. on 28.6 Mc. QON is on 3.5, 3.9, and 28 Mc.
6YL7/1/MM on 28 Mc., came into the Port of Boston and
worked 20 stations in no time flat. TYR is
president of the Windy Net on 28 Mc. TAA has a new tower,
KGG, OMK, and BKP lost beams in a storm. KWD has the
Wardour Net on 28 and 144 Mc. at 7:30 p.m. Tuesday.
HYG gets on 3.9 Mc. a little. RP has now QTH in Walhath.
JQ5 is on 28- and 14-Mc. c.w. New Novices in Haverhill
are UBU, UP0, TUI, UHE, and UHR. RJY and DOX are
now mobile. The Gypsy Radio Club held a simulated discurs
with the Red Cross with OL and REI mobile and
TOY, STA, SNZQ, IQR, QZS, CCQ, CTH, and
Ray Bergeron on fixed stations, BWI is on c.w., 3.5 and
3.9 Mc., and has portable self-powered rig and a receiver on
44.76 Mc. for State Police. MAN has the following work-
out with him on c.d. work; NEW, NLU, OLC, OPI, JIX,
OPX, PRX, RNM, ALO, and ALT, AWA, our P.AM for
60 Mc., reports the following stations on: DJ, NWL, CK,
LIV, ATP, BPF, LSN, LJ, FGZ, CLS, FFL, and GJO.
DIH has 2 waitos, EAE is on 28 Mc., Welsley Radio
Society, newly-affiliated, has a monthly bulletin, D RVA's
Dake, TYR is editor. NWO worked FY7B on
14 Mc. New Novices are SHL, DJ2TH, SAR, and
and Joe Schermernorn. UG has a new steel tower with a
beam for 11 and 23 Mc. PJW is on 28-Mc. c.w. WNITUG
is operating after Class B. The New emergency group is
becoming interested in 50 Mc. FUR plan 329 for 144 Mc.
SXD will have 522 for 829 output. HZ7, Class A, has sked
with VE1JAMS on 3.6 Mc. BGN has no new c.w. or
TV houls. BHD renewed OBS and EC appointments.
The Everett Amateur Radio Assn., station, TIN, is on
28 Mc. Fridays at 7 p.m. 29,560 kw. and completely.
Novice classes. UMM is the call of one of the Mugford
twins, The South Shore Club had a civil defense night with
c.p.a. c.d. picture and talk by Mr. Coferrerd of Borden.
MMF is mobile on 28 Mc. NYH, of Canaan, Conn., wants
7-Mc. sked. Tecxides. (Nov.) W1EMG 584, 583, JCE
106, LJ 142, UBF 105, TIFF 47, W1H 70, W1U 21,
DM2 39, PKW 12, AVY 7, NBS 6, DHX 4, CTB 3,
QON 2, DWO 2, AIP 1, M1 1. (Oct.) W11FS 54, QON.
WESTERN MASSACHUSETTS—SCM, Victor W.
Paunoff. W1EOD — SEC: JYL, PAM: RDR, RM: BYR.
WMN meets I'don., Wed., and Fri. at 7 and 10 p.m. on
3725 kw. welcome the slow-speed net meets at 7:45 a.m.
and 10:30 a.m. at 3725 kw. 12'a sked will hear from and about the
new ham in our section. A hearty welcome to TZA and tiwi
1, TVJ, UBD, and UEO, at our regular meeting when
22, Region 9 ABC now has 40 members and is seeking
ARRL affiliation. COI would like to have his rhombic
rotatable so that he could work Europe. BDV is helping to
share the load on WN9 NCS and last RN Rep.
W1N1UBD is congratulated on regular W9M attendance by
BYR. He tells about some more of you ever trying the
ham side of your GTI on a recent train trip to Washington.
We had both been sold the same seat on the Pullman.
RHU is busy preparing Geiger Counter for 1951 Science Talent
Search. Good luck to you, Larry. JYH and RDR visited
Worcester County RC, MUN has 20-meter beam back up,
SLA and RDR now hold Class A tickets, NZD, SHL, and
IBI, and SUD attended Auction Nite at the Framingham
Club, NZD brought back more than he took. Thanks to the
unknown contributor for information about the "Gypsy
Vine Net." Region 2 CD boys are sending their traffic
totals via radiogram through the net channels. It is sug-
gested that NCS of the other regions collect the traffic
totals from the gang in their nets and forward them to me.
Traffic handled in c.d. and other training nets all count and
certainly is evidence of our operation in the "Public In-
terest." Tecxides. (Nov.) W1BY 68, GJZ 29, QIN 26,
RLU 25, RDR 23, BDF 21, IIP 1, MD 1, (Oct.) W11FS 54.
PK1 8, RRX 7, W1N1UBD 7, W1CKF 4. (Oct.) W1H 47.
NEW HAMPSHIRE—SCM. Norman A. Chapman.
W1JNC — RM: CRW. The N. H. Net meets on 3885 kw.
at 1000, Monday through Friday. Novice reported: UGP,
UGS, UCT, UHT, UJL, and UNY. New General Class:
UEC. The following appointments have been
encouraged: Official Relay Stations: ANS, CVX, and IJB.
Official Phone Station: GUM. Emergency Coordinator:
SAL. QUS has been appointed an Official Observer.
Class I. PBE now is employed at WRXL. PBF reports QSLs
still pouring in from F8AHH contacts. You can find the follow-
ing on the University of N. H. campus: SHL, THD, PBF,
RUX and W9SA UBH, UZ1, UGU, QDU, and UJH.
Will see you at the N. H. QSO Party. Tecxides. W1JNC 48,
FOQ 28, Q8K 26, PBF 2.
RHODE ISLAND—SCM. Roy B. Fuller. W1CJH
— SEC: MLJ, RM: BTV, PAM: BF3. RIN meets Mon-
through Fri. at 1900 on 3540 kw. The Southern R. I. Emer-
gency Net meets Sunday at 1600. Favey is active during the
Nov. 4th c.d. test. AOP, BGA, CFY, OJE, RII, and PWS all participated. At Newport County
Radio Club, Gilloran discussed long-range v.h.f. communi-
(Continued on page 88)
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player (thru preamp) or tuner: wide choice of output
impedances. One-year unconditional guarantee

Technical Specs: Response: + 1 db, 20-20,000 cps, at 10-watt
level. Harmonic distortion, less than 2% at 20 watts; less
than 4% LM at 18 watts. Hum and Noise: 60 db below 20
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impedance for crystal cutters. Tubes: 6SN7, 8SL7, 6SC7,
2-6L6G; has 5U4G rectifier. Controls: Combined volume,
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Case: 14½” wide, 8½” high, 11½” deep; two-tone gray
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netic cartridges. Separate high- and
low-level output jacks, for connection to any
amplifier. Has twin AC power outlets for
amplifier and phono motor.

Technical Specs: Sensitivity: AM, 5 micro-
volts; FM, 10 microvolts with 180 kc
bandwidth at 6 db down. Controls: On-Off
Volume, FM-AM-Phono bandswitch, and
Tuning. Tubes: 2-6BA6, 2-6BQ6, 6SC7,
6SH7, 6AL5, 6C4, 6SQ7, 6SL7, 5Y3GT
rectifier and 6U5 tuning eye. Supplied
complete: Separate built-in antennas for
FM and AM (provision for external an-
tennas if desired); tubes, hardware, instruc-
tions. Size: 13½ x 8½ x 9”. For 110-120
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(Continued on page 94)
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Putting another one on, Shurek, the Novices are coming so thick and fast your SCA has quit trying to keep up with them all. Hi, WN4TYP has a new antenna up and is doing fine in Charlotte, if you wish to see a good crop of C.W. men out...out of them, CCC and SAB recently moved to Charlotte. Welcome, Boys. The number of traffic reports was very surprising this month. Congrats, Traffic: W4ERL, JFJ 82, IMH 63, JPY 02, RHR 30, REZ 20, BDU 25, OTE 17, EFF 9, ILJ 8, BB4 6, DLX 4, LWU 4.

MARTHA CAROLINA - SCM, Donald Hunter Wood, W4ANK - WN4UPF is a new Ham in Hartsville who operates from the U of S, C. and wants South Carolina contacts. DCE in Class I-O and ORS. The following Contest scores are reported: OGG 50,000, DCE 47,010, HCO has new 75-watt on 80-meter c.w. Ex-QSY now is 3Y5 and operates 75-meter phone. CRV is also in the service and stationed at Donaldson ABF, S.C., C.FH1, YQS, GWI, and KNK met for breakfast Dec. 2nd to plan a breakfast and breakfast monthly in the Charleston area. Those interested, contact YQS. The SCM desires applications for ORS and OPS appointments, especially from non members, WBO, radiotelegraph address and ex address are on the SCM. Traffic: W4ANK 251, FFB 32, FM 11, DCE 2.

IN THE AIR - SCM, LL. Ed. Landerauer, W4PF - SEC: NAD, MWH, LA, NAD, FZA, hard-plugging RM's, QDX, a former RM, has been snatched by Uncle Sam for other duties in a West Coast QTH. Other recent casualties by the same route were LN1, NU1, LAP, CVO, KBAD, NRO, and KFM. The SS contest enjoyed heavy participation from this section, with KFC leading the flock of W44. WN4TFR, the off-spring of IA, passed the General Class test and is holding his breath until that coveted ticket arrives. Congratulations, Phil, see you on the nets. Operating on home-made equipment from EBH while assembling new rig. He returns after a 14-year lapse as SKU. SL, has just joined the RCA-F Pentagon for VN-NCS work on Thurs., while QO70, for that MD area, is a KOCAM rig. RFX worked 10 states with single 6L6 driver and hears the distressing news that the Novice to submit an activity report to the SCM. This was also a QTH in Wilmington using 8B call sign. STM is an additional outlet to ESS, Many pleasant comments from people reaching us on the newly interesting Virginia Section Bulletin, very enjoyable comment and compiled by KFC from good copy sent in by the gang. Keep it coming how to get it together. Thanks to BD1FU for his net on the back for VFN found in the last issue. LNU's overseas QTH is Weidner Air Field, Tripoli, at CNEPB on 5.3 and 14.2C. Bill Stirl, ex-LAP, can be heard as DL4JN and may surprise a QN one of these days. TLR is the call of the new RFC Cross station at Richmond; some other penetration. GM, SOK, EA, RM, SOK, AQS, GOX, QX, OS, OP, QX, NV, and QDX, and others. The SCM, KBO, KWS, TX, and BDK, as Class I-O, SZY (ex-OERU), BQFQ and FMK visited KFC who incidentally worked his 80th country on 3.5 Ma. Traffic: W48OU, 405, PWX 201, MWT 129, FV 105, FV 58, NAD 34, QDX 83, KFC 47, NPA 16, PAX 28, NV 38, IA 32, KWS 20, IYJ 11, LR 8, KX 7, W4TSF 7.

WEST VIRGINIA SCM, Donald B. Morris, W4XJY - YPR maintains liaison between 800,000-home phone at Mercer Vocational Club station, GKD, will cover the Blue Coal Slope, ATU continues long-haul traffic work. Congrats to Al Reek, 3EGG, formerly 8EGE, new Atlantic Division Director, GCT, DFC, and are the new ORD, 3700 kHz. Mariner reports good results with his "N". Here are the results in the November HRO-50. The Huntington Radio Club is organizing the Atlantic Division program, VFO is in all NEW. New hams are HNC, NAQ, and DHC. The new DXCC, A1R and BOK and LBI and 36FS, PZT has new coffee-caf VFO which sounds like crystal. The following stations reported in the c.w. report: KOC, QEZ, GCT, GEP, YPR, BQFQ, GWK, EZR, EJU, EWM, PZT, EPK, BDF, GPY, 6KTA for the month of November. WVRF has a new bition with more room for antennae. All members of the MARA code class passed the amateur test in Washington and are awaiting licenses. SGO, now 3800, is located in Cheltenham, Md. New Novice station should 3, W4CDW to some West Virginia ham soon. Traffic: W4RAU, 292, MCR 84, YPR 50, DFC 17, GCT 13, GEP 9, BW 3.

ROCKY MOUNTAIN

COLORADO - SCM, M. W. Mitchell, W4BQZ - The El Paso Radio Club of Colorado Springs now is affiliated with ARRRL. JMB is president and LZY secretary. PVE, with his crew of KHQ, EQQ, DYS, BUK, NDM, KY 8, MR, and LZY, is an 8500 cycle per minute man. Now KOM 1930 Mon. through Fri. 035600, AXK is on 160 meters. Lamar hams took part in the c.w. drill, JVR, with 20 wats and "C" tech, works all kinds of DX. DXYS is OQIK...OQIK...OQIK...OQIK...OQIK on 35600 cycle with bulletins at 0000. STS has new Viking, with no kink, due out 12B. DD is back on 75 meters. IC worked 65 stations in the 72 hrs, his new automatic keyer and Monitor which he built up are working. The Colorado Springs Club put on a transmitter hunt but the boys had trouble finding it because of reflection from the mountains. KHQ (Unfinished on page 88)

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Q-2
is having speaking amplifier troubles and is going to rebuild it again. Yours truly put up a 10-meter folded dipole in the attic which works out PB. The reports are to my response for CW with more reports have been very heartening, with 4 letters and 9 cards received this month. The Greely Club put up another one of its very fine antenna hinges recently, bringing the number of more than 100 registered. A very interesting demonstration of v.h.f.-controlled traffic lights was made and enjoyed by all. We wish to thank KHQ, KXX, KZQ, KXV, KVQ, and SKQ for the news letters this month. Traffic: WD2JO 699, KHQ 10M, FOX 177, MOM 37, SGX 15, DYS 7, OVF 6.

UFAX — SCM. Leonard F. Zimmerman, W7SP — N2U was elected president, PFR vice president, and OSL secretary-treasurer for 1952 of the Utah Amateur Radio Club. 72D/7 has moved to Sunday and is a new member of the MARS s.w. net. 2DX, 10-meter mobile NOS, is set up at a new QTH, 567 10th Ave., Salt Lake City. 2DG and 2DZ come to WNTQDF who, we believe, is the No. 1 Novice license for Utah. KXX reports his new 304-1 TL rig is working FB and the TV receiver still works whom is hit by the air. The UARC 10-Meter Mobile Emergency Net has received spot frequency crystals and NPMK has fixed up four talkies-talkies for use in conjunction with the emergency set-up. The Ogden Amateur Radio Operators Club initiated the Christmas season with a dinner dance held on Dec. 7th.

WYOMING — SCM. A. D. Gaddis, W7IN1 — EC: LTK, PAM; KVP, HVX is in the hospital for a long rest. CBL is helping AMU to recuperate. ABO commutes from Gebo to Worland. HFV and MOD are operating I1W hunting and hammin'. PKX is keeping Sheridan on 3.8 Mhz. JRG is moving to Billings, MBL is on 3.5 Mc. 2DZ is working on 160-meter rack. LVU is constructing mobile rig. NOU still needs a new receiver. F1O, KVP, GOH, OMS, PKX, Aa, ATB, HFV, NHC, PQX, NOU, HPR, NHR, and HN1 report on the NE net 9:00 A.M., Sundays. 3020 kc. AEC needs expert help to exterminate bees. Any ideas from the side-lines? Traffic: W7OSH 2.

SOUTHEASTERN DIVISION

ALABAMA — Acting SCM. William H. McGown, jr., WARTI — SEC: ISD. Appointments: EBD as PAM of AENR. LEN has resigned as SCM and is moving to Indiana. We certainly hate to see Lewis leave and wish him lots of success in his new position. The Anniston Club gave a dinner for LEN at the Noble-Purefoy in Anniston on Nov. 26th. Those attending were (BEP, CYD, LEN and his XYL, PER and his XYL, HA, BA, and BCU, all of Anniston, and EBD, CHG, and RTI of Birmingham. Members of the Alabama Phone Net presented LEN with a fountain pen. AENP and AENR were alerted and both did a swell job after the tragic train wreck at Woodstock, Ala., on Nov. 26th. KTV did an exceptional job handling traffic and gathering information during the emergency. FGT and HEP served faithfully as NCS of AENP. OLG was NCS of AENR, with SDX, ECI, and GET relaying from mobiles RTF, KNW, EBD, NQX, FSW, and RTI, all at the scene of the wreck about thirty miles from Bingo- mingham. FFB kept the two sets in contact. Sheriff Holt A. McDowell, of Jefferson County, commissioned eleven members of AENR as deputy sheriffs. PF from the famous Craig Air Force Base, paid a visit to FGT at Selma. AEP and ATF, of Montgomery, operate 150 meters almost every afternoon and would like to see more activity on this meter. Traffic: W4KXK 102, EIIZ 95, BFM 87, SUF 5.

EASTERN FLORIDA — SCM. John W. Hollister, jr., WAFWZ — The Novices are retreating in their schilling and several of the OTs have been heard in there with them on 3.7-3.75 Mc. getting acquainted. My list of Flor- ida WNs includes TWV, TRP, TRQ, TVO, TBR, TWV, TYL, TFP, TOP, TRR, TEC, and TO0. Thanks to W2G for the calls of those I had missed on QSOs. WNS TKD and TWD are right open with the desire to form a WN traffic net and all we need is more with the same desire to get a section net going with pretty certificates and all. W9s JCD, in Jacksonville, and AYX in Clearwater, have made some very complimentary remarks about the WNs they have worked. Well, the winter nights are new again and by the time this appears much new Christmas gear will have been broken in. Attendance with the K of Ks has materially picked up with the spirited old-fashioined in full competition for the top brackets in the roll call. Those moving away from their old QTHs (include EEP, at Jacksonville; PNS, at Clewiston; and OQX, at Pensacola) The SS Contest pulled in some new contestants. Reporting were PJU and WN4TKD. Many others were heard. Here are some new mobiles in PBB, PJU, and 4OTG. There are now 12 mobiles there on 28 Mc. IM, at Ft. Lauderdale, and IEH, at Miami, urge closer cooperation among the various EECs, and are publishing bulletins, naturally. IM has 17 AEC members. IEH is getting reorganized in Dade. LXi is new president of the Dade Club, which is putting on some lively programs. Miami Daily News runs ham news bi-monthly! OZC is Assistant EC for Dade, SEA, at Madeira Beach specialized in holiday greetings to GIS. EC at North Miami took the Knights of the Kilokey program by having Robert

(Continued on page 100)
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Sims, who double for Forest Tucker during the filming of "Crosseyed" in central Florida. Traffic: W4PIU 503, FCL 214, LST 20, KWM 22, WB 31, FZ 6, IM 6, AYX 3, PNS 2.

WESTERN FLORIDA — SCZC, Edword J. Collins, W3S/W4EQ — SEC: POF, FEC; PLE, DAO has turned to the air. NHQ is building high power. QRQ is dusting off the rig. LUP is moving the rig into a new studio. PFA has been promised QRL nets in a few days. K3N, a station licensed to 38 MHz, MOX has been receiving traffic at 37.7 MHz. TKM seems to be going strong at 38 MHz. PTK is also active at 37.7 MHz, and XYL is visiting us. K3ZL is building 812. KXZL is on again after a long absence. VKR keeps up the action, keeping the QRL going. MS is still putting out mobile signals. OKW is doing a fine job. I would appreciate hearing from more of the gang.

Traffic: W4IQW 61, NOX 29, MS 3.

GEORGIA — SCQ, James P. Born, Jr., W4ZD — The new officers of the Confederate Signal Corps of Atlanta are KFC, pres.; QRI, exec.; BYQ, secy.; GIL, treas.; and EN, ad. The Savannah Radio Club elected the following officers for 1952: KGP, pres.; JJW, vice-pres.; JxN, secy.-treas.; and BVE, ad. Congratulations to the following Georgia clubs which recently affiliated with the League: The Macon Radio Club of Macon, the Camp Gordon Radio Club of Augusta, Confederate Signal Corps of Atlanta, and the Georgia Rhodochrosite Club, a radio and ham radio club, now operating out of the old station building in Atlanta. Our sympathies are with BOC and HOC, whose station building has been destroyed by fire. We can't all afford to lose our communications, so keep them up.

Northern California — SCN, Bob Jackson, K62BQ — Operates 50 kHz, 100 kHz, and 200 kHz, using a 1000 vat transmitter and a 4000 vat amplifier with a 200 watt output. The station is being operated from a small shack in the mountains near the Mexican border. The shack is heated by a small oil stove and is equipped with a small living room, kitchen, and bedroom.

NEW YORK — SCV, Charles E. Voss, W6HVL — The new officers of the New York Radio Club are K4P, pres.; K6Q, exec.; BYQ, secy.; GIL, treas.; and EN, ad. The New York Radio Club has changed its name to the New York Radio Club of New York City. The club has a new executive committee and a new board of directors. The club is now operating from a new station in the city of New York.

SOUTHWESTERN DIVISION

LOS ANGELES — SCW, Samuel A. Greenlee, W6ERR — SEC: KSS, PAM; PB, RMA: DDE, FYW, LDR. Traffic nets operating within the division on Monday, February 8. Traffic nets operating within the division on Monday, February 8. Traffic nets operating within the division on Monday, February 8.

(Continued on page 108)
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(Continued on page 104)
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GARDINER & COMPANY

- West Gulf Division

NORTHERN TEXAS... SCM, William A. Green, W5KHK... Asst. SCM, Joe G. Buch, SCDU, SEC: JQD, BMX: LSN and CHF, SGT, TFC received 1000 miles on ARRL Mail Run 1964, and 1000 miles on ARRL Mail Run 1965.

WEST GULF DIVISION

OKLAHOMA... SCM, Frank E. Fisher, W9AHT/AST... EGC, AGM, RM: QGJ, AD: W9JAE, W9ATY, TFC received his General Class ticket 13 weeks after getting his Novice call. W9NEC is awaiting his General Class ticket and sends its first station activity report received from him here from a Novice, Thanks, Clarence. Keep up your reports, SIC swapped his Harvey-Wells for a Viking and moored power. The Canton Radio Club (Oklahoma) named a QTA as proxy and ROZ as veep, has started a program of special aid for the Novice and has invited the Boy Scouts of Canton to its class classes. SWJ sends in a traffic report of work on 7 Me. Wonder how many other stations handle traffic on 7 Me, and do not report their activities, AGM, our SCM has been appointed to the Advisory Council of the Oklahoma Civil Defense. Let's all get behind Claude in this important work and show the old group how well we can do it. EHC and R6M are publishing a monthly bulletin on ARRL which is appreciated by all. Well, fellows, this is the last report by AH7 as your SCM. Being faced with a change in jobs and possibly a new QTH I cannot continue... effect as SCM or as Vice-Director of the West Gulf Division and have resigned both jobs. GYC will take over as Acting SCM until a successor can be elected. It has been a real thrill and a pleasure to serve you and to work with you. I hope I shall be of service again in the future. From Effingham, TISB, W5GZK, MAA, OIQ 147, MAA 174, MGK 46, JIA 30, AH7 48, FOM 40, EHC 16, SWJ 16, CRQ 13, OWG 4, W9NEC 2.

SOUTHERN TEXAS... SCM, Dr. Charles Femelang, W5GJF... The DX Roundup meets on the last Monday of each month at 7:30 p.m. at the home of Bill Williams, Houston. Those present were IX, JWM, BDI, OIP, NMG, LXY, ADZ, OXJ, NXX, and JFF. The boys gather around, have dinner, and discuss DX in general. One does not necessarily need to be a DX man to enjoy this meeting. There are no dues. Call ADZ or IX for further details. ADZ is planning to clamp tube module a 261TL! Brad is on a 10-meter mobile, FY is doing an FB job as EC and also with TSGRC. EYV who is communications chief for TSGRC, has seen a new lay-out at home and every- one could wish for at TSG, Hq in Woodsideford, XFN wants to get the present QTH of DNN, He reports working 4PN on 50 Me. in November during the early evening. AGM and SU are partners in a large drugstore in Madisonville, Joe is looking for edoks with Houston, San Antonio, Waco, Austin, and Dallas. PDE is doing a nice job in operating, and we understand that he has a new 10-meter beam. TARC now is affiliated with ARRL, LMI, DQG, ESL, and QOQ taking advantage of 15-meter openings. Construction is keeping PNP busy. ITP reports great activity among Temple hams on transmitters hunts. MN works skeds with W5FZ at 07:00. PM TV may be obtained with his club badge on a business card. He has called the Red Cross to visit hospitals, etc., and get messages which he is handling. The West Gulf Division is an active and growing club. It is getting out the memorandum. Follows, your SCM is making a New Year's resolution to be more active in tracking down the hope you fellows don't seem to want in print. How about dropping me a line the 1st of each month and giving me the low-down on your friends and rivals. Let's all resolve (Continued on page 105)
NEWARK'S FM-AM RECEIVER
Hi-fi FM-AM chassis featuring push-pull audio output. FM circuit is drift-compensated. Has full range bass-treble tone control and phone jack with built-in preamp for magnetic pickup. Chassis is complete with 12" PM speaker, built-in AM and FM antennas, 12 tubes (including rectifier), all hardware, and escutcheon. Size, 13½ x 9½ x 9½. Wt., 20 lbs.
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Save on this lucky purchase that enables us to offer these fine, new record changers at less than manufacturer's cost! Made by General Instrument, these units automatically play all 3 sizes of records—7", 10", and 12". Motor provides 3 constant speeds—33½, 45 and 78 rpm. Tone arm uses crystal rectifier with single .002" needle to play both standard and microgroove records. Size: 12½ x 12 deep x 5½ high. Requires 115 volts. Wt., 12 lbs.
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Use this as the nucleus of your own projection TV system. Consists of Schmidt-type optical system and alignment assembly. Contains 3 optical elements: 6½ spherical mirror with 200 mm radius curvature, aspherical corrector lens 4½" in dia., and plane mirror to "fold" the light beam. All factory pre-adjusted. Paralax 8.6 linear magnification and numerical aperture of 10.62. Mounted in black cradle finish case, 13½ x 8½ x 8½". Overall size, 13¼ x 8½ x 8½". Wt., 24 lbs.
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While they last, Newark is offering these top-quality Pyranol-filled transmitting capacitors at less than manufacturer's cost! Consecutively rated at 1 mid, 5000 volts. Porcelain insulators, hermetically sealed in metal case. 5½ x 5½ x 5½. Complete with mounting brackets. All brand new units. Ships w., $7 lbs.
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Save on these top-quality output transformers—they're alone at the sensational low price of $2.50! Match push-pull parallel or push-pull 6L6, 6V6, 807, and other tubes to 4, 8, 16 ohm voice coils; also 60 and 230 ohm load. Range: 30 to 30,000 amp. For use in high-powered PA amplifiers 4000 ohms primary, P to P. Case, 4½ x 3½ x 3½. Wt., 2 lbs.
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SMASHING TRANSFORMER VALUES
Power Transformer, Pri., 110 or 220 volts AC. Has two CT secondaries: 140 volts at 50 ma for bias, and 2500 volts at 350 ma. Size, 6⅞ x 7½ x 8¾. Wt., 30 lbs.
54G104. SPECIAL PRICE $8.95
Filter Choke, 6.5 by 230 ma. 3000 volts insulation. Size, 5 x 7¼". Wt., 25 lbs.
54G102. SPECIAL PRICE $2.95
Filter Choke, 4.2 by 320 ma. 7200 volts insulation. Size, 4½ x 3½ x 3½. Wt., 9 lbs.
54G103. SPECIAL PRICE $2.49
54G111. SPECIAL PRICE $2.25
Interstage Transformer, Matches PP triodes to PP 2A3 or similar. Has split psi, and sec. windings. Fully shielded. Lugs on bottom. Size, 3 x 3¾¾" dia. Wt., 6 lbs.
54G112. SPECIAL PRICE $1.25

G. E. PYRANOL-FILLED TRANSMITTING CAPACITORS

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<td>.25</td>
<td>3000</td>
<td>1½ x 2½ x 3¼</td>
<td>Each .59</td>
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</table>

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105
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Send us your replacement needle assembly now — today. Let us retip it with the highest quality genuine diamond stylus — exactly the same kind that we make for leading radio stations the country over.

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ONTARIO DIVISION

ONTARIO — SCM, G. Eric Fenshaw, VE3A — CJ on a hunting trip, kept rules with TC, AYW, and DOZ. BY is the new call of DLO. Through the grape-vine we learn the annual dinners of the London and Ontario "Phone Clubs" were held recently with BOZ, AR, and W6EQV of the vertical. Ferguson Lake, N.W.T., is the new location of DEP, who did a fine job as OC. The Ontario Section C.W. Traffic Net, with twenty stations reporting, turned out a nice traffic total. DGA is on with a new final. DOZ enjoyed his Florida vacation. Despite illness and transplant trouble, ATR made a nice traffic total. Members of the Moffat Club and HARC provided communications in November Red Cross Simulated Evacuation, BTQ, OB, W6EQV, RIV, BPH, BFW, BOZ, KI, RM, AP, and 2SD, all members of the Ottawa Amateur Club, supplied communications link in motorcycle races. The Ottawa Observer reported a successful hamfest. The Ottawa annual banquet was termed the social event of the season. The Frontier Radio Assoc. Windsor, appreciates the best communication efforts being made in making its building available for meetings. The Quinte Radio Club enjoyed a splendid talk on mobile communications given by BTQ. Most of the above were assisted by this emergency-conscious club. Congrats to NW upon his installation as a Kiwanis president. With many VEs and XYLs in attendance, the Kitchener-Waterloo Amateur Club's social evening was a happy occasion. VJ is newly-appointed ORS. AHA reports the 28.250-kc. Emergency Net is going strong on 1414 with KG, AYA and 44. BUR moved to the open spaces. MW is assembling mobile and fixed 2-meter gear. Traffic: (Nov.) VESTX 11B, 117, 147, APR 88, WY 37, ZB 50, AHA 44, GI 41, AYW 34, JY 34, FQ 22, KM 18, TO 15, EAM 14, PH 14, SG 13, DIG 5, AY8 T. (Oct.) VE8IL 71, PH 36, AHA 89

(Continued on page 108)
VOLTAGE CONTROL PROBLEMS

POWERSTAT VARIABLE TRANSFORMERS are autotransformers of novel core design, with a movable brush tap which rotates to deliver a continuously adjustable output voltage from a.c. power lines. They are available as manually operated or motor-driven models. POWERSTATS feature excellent regulation, conservative ratings, standard mounting, smooth control and high efficiency. They are offered in 115, 230 and 460 volts; single and three phase; 50/60 and 400/600 cycle types in capacities of 405 VA to 100 KVA.

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<th>Type No.</th>
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**POLYSTYRENE ROD AND TUBING**

**ROD 12" LENGTHS**

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Primary 115V, 60 cycles

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- **P-3146** - 10V C.T. at 10 amp 3000V, Insulation...$5.88

**TUBING 12" LENGTHS**

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<td>.062</td>
<td>$.38</td>
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Both Rod and Tubing also available in 48" lengths to order.

LEEDS RADIO CO.
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QUEBEC DIVISION

QUEBEC—SCM, Gordon A. Lynn, VE2GL—AO sends a nice report of doings observed while on his travels throughout the Province. AEN suffered a severe accident and will be laid up for two or three months. MB was a visitor to Montreal recently. AO lunched with LJ, who is quite active on 75 meters. RO, a new captain in your fold, is back on 75 meters after a summer away. FM has changed QTH to Cape Rosenier and will be back on the air shortly. RV is very active on 75-meter phone and 40-meter phone from his new QTH in Quebec City. AJS has changed QTH to Lévis and is very busy on 75-meter phone. XP gave a very interesting talk on audio at the November meeting of MARC. AGG is building the 813 rig described in July 1951 QST after having seen the original during his vacation in the States. W1FX, LQ helped keep QM busy as reporting his project into 8SN and skeds WILM, JAM on 75-meter phone from Baie Comeau, AGA, at Valleyfield, also on 75-meter phone. NW is back on 75-meter phone from Toronto. MAB used his rig with 150 watts into 34-wave center-fed antennas with 200-ft. feeders. AMI has 10 set on 75-meter phone from new QTH in Montreal, CD is active on PNG, S7TS, and QEN and handles all traffic offering, SD holds up the Hull end of PNG, TA continues to sparkplug the QSN and is handling considerable traffic with the Pacific on 7 Mc maintaining skeds with KGB stations. XR has changed QTH to Dorval and is looking for a spot to hang his wire. Traffic: VE2CD 47, GI 42, SD 40, LO 25, AMB 28, AO 16, AGJ 12.

VANALTA DIVISION

ALBERTA—SCM, Sydney T. Jones, VE5M—HM reports a very interesting trip to eastern Canada and the United States. IW is holding the fort on VE5K while he enjoys a visit to Portland, OR. VE5K visited the big city and reported personally to the SCM on emergency activities in the district. LQ now has the necessary ideas for a frequency standard and should give HM a good run in the next Frequency Measuring Test. NA operates portable from trans- mission site. JP is building logarithmic compressor. EA is QSLing rebuilding the rig for installation in new car. MJ plans on rebuilding the frequency meter using HRO dial for meter accuracy. MB seems to have assumed his role and is relaying QSLs that come up that with HM. Don’t forget, gang, to report your activities to the SCM for inclusion in this column. Civil defense plans call for organization on our part. Let’s be ready. Register now with your local Emergency Coordinator and take an active part in this affair. PP has returned from a very successful trip to Europe, where he visited RSGB headquarters. VR plans on returning to the air waves very shortly. VS has been QRT for the past few months, a fire which any interested ham was invited to attend. This was a chance for rank and file hams to see how the BCARA functions. Following the formal affairs there was also an “Open Forum” discussion on AREC matters with the BAC, etc., present. The AREC Net now is BC-wide with an NCS for the BC, SW, and Vancouver Island sections all combined into a full network. No ragchews, but smart check-ins, are invited. After all, an AREC net is for emergency use and not for ragchews and “regeneration” cannot be helped if AREC is to function. ABA has skeds on e.w. with BF, SW is heard on the air in the net. WNS stations give considerable QRM on the AREC frequency of 3755 kc. AA and NH moved to Chilliwack. Contact is being maintained with Vancouver and Duncan by FT on 144 Mc. AQ and still is hunting for signal on his 2-meter converter. Secret of the month? How does he rotate his 2-meter beam? Cowichan Valley is looking to organize a club. DH and LP 7 still are active in Nanaimo. A new ham for the Kootenays is AH. Traffic: VE7QC 59, AOB 8.

YUKON—Following is a report of VES activities written up by John W. Smith, VE8RY. RD is a new call heard locally. Congratulations, Bill, on getting your call and getting on the air. BK has received WAC certificate. CR is busy building a new rig with 813 finals. KJ has obtained an SSB set and will be back on the band. CN is heard on 75-meter phone along with BN. RY and SW were the only two heard in the DX Contest. WJ, in Pt. Resolution, N.W.T., was worked on 7 Mc. PO, formerly VE8FA and now at Ft. Simpson, N.W.T., also is on 7 Mc. FT and SA also have been heard on the bands. WN has left for a new QTH in Quebec. Don’t forget, gang, to pass along all the dope on your station activities either to CO or RY for inclusion in this column.

PRAIRIE DIVISION

MANITOBA—SCM, A. W. Morley, VE8AM—New appointments include ER as OBS and GV as OBS and OPS. Ex-BS now is signing 7ASF and ex-HN now is WV. GV has new all-band. VE8AM is getting VES equipment. CH is heard mobile on 76 meters. EH returned from a visit to CM-Land. PA finally put the rig in a rack. BQ is (Continued on page 110)
Calling All Hams!

Johnson Viking Kit .................................. $209.50
Johnson Viking, Wired and Tested, less tubes, crystal or mike. .......... 259.50
Gonset Convertors, Model 3002 3-30 ................................ 44.75
Gonset Convertors, Model 3005 Tri-Band ................................ 47.60
Gonset Convertors, Model 2000 6 meter .................................. 44.75
Gonset Convertors, Model 3000 10-11 meter ................................ 44.75
Gonset Convertors, Model 3000 20 meter .................................. 44.75
Gonset Convertors, Model 3000 75 meter ................................ 44.75
Gonset, Model 3001 noise clipper ............................................. 9.25
Gonset, Model 3006 steering post bracket ........................ .......... 3.90

LYSCO MOBILE TRANSMASTERS

$29.95 ........................................................................................................ 44.75
$35.55 ........................................................................................................ 44.75

**BARGAIN SPECIALS**

- T-45 lip microphones. Ea. .................................................. $6.79
- J-38 transmitting keys. Ea. .................................................. $7.90
- Ceramic 5000 Volume Controls, 1/4 meg audio tapes. Ea. .......... 2.00
- The following Bud Radio items are either in shop-worn boxes, no boxes or discontinued items— ALL NNB.

<table>
<thead>
<tr>
<th>Model</th>
<th>Band</th>
<th>Tubes</th>
<th>With Tubes</th>
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<tr>
<td>A129</td>
<td>10 meter</td>
<td>3-6AQ5</td>
<td>A129T</td>
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<tr>
<td>B129</td>
<td>10 meter</td>
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<td>B175T</td>
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<tr>
<td>A140</td>
<td>160 meter</td>
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<tr>
<td>B140</td>
<td>160 meter</td>
<td>3-6V6GT</td>
<td>B140T</td>
</tr>
</tbody>
</table>

Lysco Model D11 grid dip master ................................................. $39.95

RECEIVERS

- National NC-183 with speaker ............................................. $295.00
- National NC-125 with speaker ............................................. 160.50
- National HFS with speaker and power supply ......................... 164.43
- Hallicrafters S-38B ............................................................... 49.50
- Hallicrafters SX-71 with speaker ......................................... 219.45
- Hallicrafters S-76 with speaker ........................................... 189.45
- Hallicrafters S-40B ............................................................... 99.95
- Hallicrafters S-53A ............................................................... 79.95
- Hallicrafters SX-62 with speaker ......................................... 309.45
- Collins 75A2 with speaker ................................................... 440.00
- Hammarlund HQ-129-X with speaker ................................... 214.00
- RME-50 with speaker ........................................................... 197.50

FORT ORANGE Radio Distributing Co. INC.

904 BROADWAY, ALBANY 4, N.Y., U.S.A.
AMATEUR HEADQUARTERS

Long Distance Phone: ALBANY 5-1594 . . . Cable Address: "UNCLE DAVE"

109
ELECTRONIC ENGINEERS

Permanent expansion program offers fine career opportunities with one of the leading companies in the industry.

Tung-Sol Electric Inc., Radio and Television tube manufacturers, is now interviewing qualified engineers for immediate job openings at excellent salaries with fine opportunities for advancement.

Experienced Engineers — If you have had experience in any phase of radio tube manufacturing including design, development, production, application or special problems involving glass technology, shrinkage control, etc., we would like to hear from you.

Trainees — We also have a limited number of openings in our training program for those men who hold a degree in electronics but have no experience in this field.

Write or apply in person to
Personnel Director

TUNG-SOL ELECTRIC INC.
200 Bloomfield Ave., Bloomfield, N. J.

MORE SIGNALS PER DOLLAR
From Money Invested in an Antenna

Self Supporting
STEEL TOWERS
For Rotary Beams, FM, TV

ATTRACTION—NO GUY WIRES!
- 4-Pole Construction for Greater Strength!
- Galvanized Steel—Will Last A Lifetime!
- SAFE—Ladder to Top Platform
- COMPLETE—Ready to Assemble
- Easy to Erect or Move
- Withstands Heaviest Winds

EASY MONTHLY PAYMENTS
Up to 12 Months to pay

Width at Base Equal
to 1/5 Height

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 22"-$45.75, 23"-$51.75, 33"-$135.75, 39"-$157.75, 44"-$178.75, 59"-$217.75. 61"-$329.75, 100"-$1050.00. Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change . . . so order now! Send check or money order . . . or write for free information.

CIVIL DEFENSE DIRECTORS:
A Vesto Tower provides an ideal support for your air raid warning sirens. Write for full details.

$217.75, 61"-$329.75, 100"-$1050.00. Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change . . . so order now! Send check or money order . . . or write for free information.

WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

VESTO CO., Inc.
20th and Clay
North Kansas City, Mo.

heard on 73-meter phone. DQ spent some time in the hospital in Winnipeg but now is recovered. Before going back north Harry visited friends in Winnipeg, Brandon, and Minnedosa. PC is recovering from a heart seizure. FG is new on 3.5- and 7-Mc., c.w. M.W. From Brandon, is now SCM at Ottawa. A celebration at LTH's birthday, was attended by the original members, who were celebrating his 100th birthday. It was a real QSO. In another section of this issue you will see an SCM election notice. Think it over, fellows, and be prepared to act accordingly as yours truly will not be in the running this time because of pressure of other things.

Traffic: (Nov.) V4AM 89, HQ 71, AL 27, JO 20, DQ 16, AL 14, QD 14, HT 11, CE 10, CI 7, HV 7, HS 6, LF 5, BD 3, GV 3. (Oct.) V4AM 46.

SASKATCHEWAN — SCM, Harold R. Horn, VESSHR — The past year has been one of progress for the section. Two membership drives for ARRL and the newly-formed SARL have been gratifying. SCM will be pleased to accept new memberships for either anytime. Help ARRL and SARL so they can help you. We have just finished our demonstration for civil defense and although conditions were much against us we had a successful trial showing that amateur radio operators have a place in all communications. Mr. Prose, Civil Defense Director, Saskatchewan, was well pleased with the efforts put forth from Fort Qu'Appelle and I wish to thank those participating for their help and cooperation, and also SCM for settling his equipment up on location at Fort Qu'Appelle. Thanks are extended to 4G1F for his valuable contribution explaining propagation of frequencies to the school. KG is back on 75 meters with a new Commander. BIH now is 4AL. JO is on 75-meter 'phone with an FM signal. RV is for the Cudworth Area and would like to hear from amateurs in that district. FY now is Squadron Controller, AFARS Saskatchewan Squadron. DIK, DIJW, and TD are new AFARS stations. My thanks to all for the cooperation received during the past year. Traffic: VESTE 59, YF 47, HR 12, FJ 11.

Old Boob is gone. Let's bow our heads.
He ignored this one essential.
He loved to run his kilowatt.
Above true ground potential.

Strays

"Life's Little Reverses" department:

When Bob Uchlein of Rutherford, N. J., was studying for his ham ticket his code instructor was Jim Burns, W2NWT. And when Bob finally got his own license which call did FCC issue him?
— Why W277W! —

W1TV and W1TVI both belong to the Malden (Mass.) Emergency Corps and the Malden Amateur Radio Association. They're good friends!
— W1IKG

When the membership of the Radio Association of Western New York received word that member Bert Jones, W2CU, had incapacitated himself by falling from a ladder while painting his house, they decided there was just one thing to do. Next Sunday twenty hams reported to the Jones' place and each carried a brush. Between the hours of 9 and 4 they painted the last of the house — all white, no trim.
Hi. The Lysco Novice CW Transmitter is a buy! 40 watts input, built-in antenna coupler, AC power supply. Wired and tested, with tubes: $109.95. Send for more details. Having trouble with QRM? Try Hallicrafters S-76 with its 50 Kc IF amplifier. I've tried it and it's swell! And don't overlook the Hi-Fi system for hams...offered for a limited time only at Bargain Price! Send your orders to me. CUL 73.

Duncan Scott, W2LAL

**HALLICRAFTERS**

**S-76 DOUBLE CONVERSION RECEIVER**

$169.50

ALL HALLICRAFTERS RECEIVERS IN STOCK

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>S-38B</td>
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<tr>
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<tr>
<td>SX-62</td>
<td>$299.50</td>
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<td>SX-71</td>
<td>$199.50</td>
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**R. L. DRAKE TVI FILTERS**

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<td>P12525</td>
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<tr>
<td>TV-72-50HP, 72 ohm</td>
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</tr>
<tr>
<td>P12600</td>
<td>$12.69</td>
</tr>
</tbody>
</table>

**NEW LYSKO**

**Model 650 NOVICE XMITTER**

$109.95

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 600, TVI suppresses Net</td>
<td>$149.95</td>
</tr>
<tr>
<td>Model 500S, With Clamp Modulator</td>
<td>$189.95</td>
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<tr>
<td>Model 50, Ant.</td>
<td>$4.50</td>
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**TEST INSTRUMENTS AND KITS**

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<th>Model</th>
<th>Price</th>
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<tr>
<td>Eico Model 525K AC-DC Multimeter Kit</td>
<td>$13.90</td>
</tr>
<tr>
<td>Model 526, same but factory wired</td>
<td>$16.90</td>
</tr>
<tr>
<td>Eico Model 221K Vacuum Tube Voltmeter Kit</td>
<td>$25.95</td>
</tr>
<tr>
<td>Model 221, same but factory wired</td>
<td>$49.95</td>
</tr>
<tr>
<td>Eico Model 425K 5&quot; Oscilloscope</td>
<td>$44.95</td>
</tr>
<tr>
<td>Model 425, same but factory wired</td>
<td>$79.95</td>
</tr>
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</table>

**NATIONAL**

**MULTI-BAND TANK ASSEMBLIES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB-40L</td>
<td>$12.90</td>
</tr>
<tr>
<td>Type MB-150, Tunes from 80 thru 10 meters</td>
<td>$21.56</td>
</tr>
</tbody>
</table>

**EXPERIMENTERS' MOTOR**

Compact Induction Type AC Motor. Operates from 20-25 volts, 60 cycles AC. Motor speed 500 RPM, with gear train driving ⅜” shaft at 24 RPM. Clutch disengages motor from gear train when power removed. For intermittent operation with termal cut-out, 2½ x ⅞ x 3½” overall, excluding ⅛” OD shaft extending 2½”. Clutch operates only when shaft is in horizontal plane. Four 9/32” mounting studs extend 9/16” from case. Shpg. wt. 2 lbs.

# 22723...SPECIAL $75

**LAFAYETTE RADIO**

New York 13, N. Y.
100 Sixth Avenue
Rector 2-8600

Boston 10, Mass.
110 Federal Street
Hubbard 2-7850

Newark 2, N. J.
24 Central Avenue
Market 2-1861

Bronx 58, N. Y.
542 E. Fordham Rd.
Fordham 7-8813

Free if you don't have our 1952 catalog yet, write today to Dept. VB Remember, we're pioneers in Hi-Fi. For the latest dope get our new Hi-Fi Guide. It's yours on request. We are Authorized Distributors of all the foremost makes, including Magnecorder, McIntosh, Jim Lansing, Partridge, and all Standard Radio, TV, Electronic and Sound Equip't.

Radio Wire Television Inc.

*Special Hi-Fi Sale Special for Hams! A Real High Fidelity "Package" at a lux. gain Price! For a Limited Time... Sale Ends March 1*

**HIFI SYSTEM 1A**

ESPEY 511-B AM-FM Chassis
WEBSTER 101-270 Changer
with GE triple-play Cart.
UNIVERSITY 6200 Speaker

COMPLETE 149.50 with plugs, cables, etc.
Painless Shielding
(Continued from page 10)
leads is down to the negligible point, even if the TV signal is very weak, the power coming from the output terminal naturally is not entirely free from harmonics. However, it is low enough so that in regions where the TV signal strength is enough to give a picture free from set noise, a coax-coupled antenna tuner should give enough suppression to prevent interference in channels harmonically related to the transmitting frequency. If the TV picture is very "snowy" a low-pass filter in the coax lead to the antenna coupler is likely to be necessary when the transmitting and TV receiving installations are close together.

Radio Control System
(Continued from page 18)
of signal? As shown, the control will remain in its last position when the signal is lost. This is not too serious for model boat operation, but it can be disastrous for aeroplanes. This situation can be alleviated by adding two bias cells to the discriminator, to provide a centering signal. This will decrease the sensitivity somewhat but not seriously. Depending upon the quench frequency of the detector, continued operation of the receiver will provide a signal that will bring the equipment close to center with no signal.
The speed of response with this system is remarkably good. It depends, of course, on the mechanical linkage between the motor and Rs in the receiver, but aeroplane surfaces can be made to respond from one extreme to the other in about one second. In a low-friiction system, it is possible for inertia to cause the motor to overshoot and even develop into an oscillator, but the addition of a slight amount of friction will overcome this.

Battery-Operated Portable
(Continued from page 88)
driver adjustments. The knobs at the lower right of the front-panel view are the doubler plate and final plate tuning adjustments. Some retuning of all circuits is usually required only when changing frequency by a considerable amount.
The writer has been amazed at the way this little rig performs. With the quarter-wave rod antenna a radius of some 10 miles can be covered from the home location, indoors on the second floor, while a simple folded dipole just above the roof produces a weak, though readable, signal at WSTF, Temple, Pa., some 50 miles distant. From the fifth floor of an office building in downtown Philadelphia, "Pixie," sitting by an open window and looking up into a stack of skyscrapers, provides excellent communication with 2BFX, Merchantville, N. J., several miles across the river. With a small portable beam antenna mounted on a cottage at Saunetown, R. I., last summer, several Cape Cod stations were worked at distances up to 50 miles.
THE
RADIO
AMATEUR'S
HANDBOOK

1952 EDITION
AVAILABLE NOW

PRICE $3.00 U.S.A. Proper
$3.50 U.S. Possessions and Canada. $4.00 Elsewhere
Buckram Bound Edition, $5.00 everywhere
All Prices Postpaid

PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE,
INCORPORATED, WEST HARTFORD, CONNECTICUT
Wiring a Transmitter
(Continued from page 88)
twine can be used for lacing the wires, or you can get fancy and acquire lace twine from a friendly telephone man or acquaintance who works in a radio factory. Regardless of what you use for the job, you will find that lacing the wires results in a considerable improvement in the appearance. We won’t guarantee that the piece of gear will work any better, but you won’t object to showing the wiring to your severest friends and best critics.

If you have come along with us this far, you have probably already anticipated our conclusion, but here it is, anyway. The key to good wiring is patience, a little forethought, and a clean hot iron.

Happenings of the Month
(Continued from page 86)
modification for change of address from a permanent location to a temporary location should immediately write FCC in Washington withdrawing the application; and that amateurs who have applied for modification for change of address from one temporary location to another temporary location should immediately apply for another modification back to a permanent address, with a note requesting cancellation of the earlier modification request; and that amateurs holding license at a temporary location should, when they next move, apply for modification to change address to their permanent residence.

Changes in the amateur rules are as follows:
Section 12.44 (b) is amended so that the first few words read:

A holder of a Conditional, Technician or Novice Class ...

Section 12.45 (b) amended to read:

Whenever the holder of a Conditional Class amateur operator license is required by the Commission to restrict the operation of his amateur station in accordance with the provisions of Sections 12.152, 12.153 and 12.154 of this part, the necessity for those restrictions shall be considered sufficient grounds to require the holder of the Conditional Class license to appear for the General Class examination.

Section 12.91 (a) is amended by striking the last two sentences (beginning “An amateur station operated . . . .”) and replacing them with:

Additional advance written notice shall also be given in accordance with the foregoing whenever such operation away from the fixed station location designated in the station license exceeds one month, and for each additional month of such operation.

Section 12.93 (b) is amended to read:
The license of an amateur station who changes residence temporarily but retains a permanent residence associated with the fixed station location designated in the station license and moves his amateur station to a temporary location associated with his temporary residence, or the licensee-trustee for an amateur radio society which changes the normal location of its amateur station to a different and temporary location may use the station at such temporary location under the following conditions:

(1) Advance notice in writing shall be given by the amateur station licensee or licensee-trustee to the Commission in Washington, D. C., and, for each month of such operation, to the Engineer in Charge of the radio inspection district

(Continued on page 116)
VARIABLE INDUCTANCE FOR TRANSMITTING APPLICATIONS

The JOHNSON 229-201 rotary inductor provides a new concept of flexibility in 100 watt transmitters. It may be used in a single ended amplifier to cover all amateur bands from 80 thru 10 meters. Used in antenna loading or phasing circuits, the 229-201 will furnish a relatively large value of continuously variable inductance.

An amplifier such as this, with pi-network output tuning and utilizing a JOHNSON 229-201 inductor, can be expected to couple into unbalanced loads from 50 to several hundred ohms throughout the range 3.5 to 30 mc. Overall plate circuit efficiency on the order of 70% may be expected.

Note 1: Auxiliary inductor consisting of 7½ turns #14 wire 1 inch diameter self supporting; for improved 10 meter performance.
Note 2: 4D32, 4-65A, 807 parallel 807, 2E26 etc.

Write for data sheet 710 containing inductance curve and typical operating values for the 229-201, one of many JOHNSON inductors supplied for commercial applications.

E. F. JOHNSON COMPANY

Announcing

The arrival of complete stocks of Hallicrafters, Johnson, Simpson, ICA, Bud, Lysco, Gonset, Master Mobile, National Co., Par-Metal, Stancor, Thordarson, Sangamo — — components and equipment — — as well as most every other quality amateur line.

Write Us Your Requirements

THE OVERBROOK COMPANY

Overbrook 81 Massachusetts
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 M.C.), $130.00

P-7253 spring base rear antenna $24.75

New Gon-set Tri-Band Spread Con- $47.60

verter...

3-30 famous Gon-set converter complete to connect to the P-69-13 or 18-ARS receiver. $44.75

P-327-E Fire wall load speaker $5.00

MOTOROLA P-69-13 or 18-ARS receiver with special noise limiter for use with any converter having 1440-3000 K.C. $60.00

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

Note: This Receiver and Transmitter is equipment which has been returned from the field, modified and rebuilt for Amateur Service.

For further information write:

MOTOROLA INC.
Amateur Sales Dept. QST — February
1327 W. Washington Blvd. Chicago 7, Illinois
Attention: Harry Harrison, W9LIX, Tel. Taylor 9-2200 Ext. 161

ASTATIC ACCOMPLISHES NEW HIGH SENSITIVITY IN A SINGLE BUTTON CARBON HAND MICROPHONE

THE MODEL 10M5

Here is the resistance to jolts and abuse, to high temperatures and humidity, of a carbon microphone, PLUS HIGHER SENSITIVITY. This and other refinements make the new Astatic 10M5 the ideal unit for a host of applications. Write today for complete details.

(Continued from page 44)

Television Interference, by Phil Rand, W1DBM, is now available in a revised second edition brought up to date to cover as completely as possible all aspects of the TVI problem. Over 20,000 copies of the first printing were distributed. Requests for the new expanded issue of the booklet should be mailed with 25 cents in coin to: Remington Rand, Inc., c/o Miss Anne Smith, 315 4th Avenue, New York 10, N. Y.

Wavelength Factor

(Continued on page 118)
Lick Your TVI!

Most cases of TVI caused by harmonics and spurious radiations can be reduced to a negligible minimum.

In planning a new rig, the best bet, of course, is to use precision-made B&W components—from oscillator to final including antenna coupler. Filtering and shielding recommendations in our "Filter Facts" booklet show what to do, how to do it.

Should your present rig be of fairly good design, a few minor changes as outlined in "Filter Facts" plus installation of B&W low-pass filters and Faraday shielded links will effectively throttle TVI. Many hams have proved it.

Send 15¢ today for a copy of "Filter Facts" giving details on how to lick your TVI and get silent rigs back on the air!

B&W Low-pass Filters, Models 52 and 75 Amateur net $27.00.

BARKER & WILLIAMSON, Inc.
237 Fairfield Ave.
Upper Darby, Pa.
**WANTED**

**RADIO COMMUNICATIONS**

THE United States Government has openings for radio operator-technicians who are interested in careers in radio communications and general electronics involving extensive overseas assignments.

Applicants should have the following technical qualifications: (A) Two years active radio experience in the design, construction, and maintenance of transmitting and receiving equipment and the ability to copy international code at fifteen words per minute, preferably on a typewriter. (B) Knowledge of radio wave propagation and practical design and construction of antennae.

The required personnel qualifications are as follows: (A) Age, over 21 and must be able to pass a thorough physical examination. (B) Indicate a willingness to serve overseas extensively and in any location required. Current starting salaries for non-supervisory radio operator-technicians range from $440 to $420 per annum. Salaries, leave, promotions, employer benefits, transportation and baggage allowances, cost of living differential allowances, etc., are in accordance with current government regulations.

Interested personnel are requested to write a brief application letter to Box 1136, Main Post Office, Washington, D.C. Considerable duplication of effort will be avoided if the following outline is adhered to:

1. Experience and training.
   a. Number of months radio training and type (college, service schools, technical and/or trade schools).
   b. Number of years radio experience and type (military, merchant marine, commercial, government).
   c. Amount of experience in telegraphy and amount in construction or maintenance.
   d. Present telegraph code speed.
   e. Present or past radio license, including amateur.

2. Marital status.

If your initial application appears promising, you will be sent full application forms upon which detailed information can be entered.

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**Mobile Installation**

(Continued from page 59)

Mobile stations. I would suggest that when they call "CQ mobile," they also state the frequency or frequencies on which they intend to listen and also that they select frequencies where there are openings.

The terrain here in Wisconsin is hilly and there are also many low, wet places. After numerous tests, we have come to the conclusion that best results are obtained from locations where the water table is close to the surface, even though these spots may not necessarily be at high elevation. We worked most of the stations for WAS as well as DX from comparatively low spots, offsetting the old idea that height is necessary for successful contacts. While we have noticed an improvement in signal reports over wet ground in this section, this condition may not hold true in other parts of the country.

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**YL News**

(Continued from page 60)

**YL-OM CONTEST**

Sponsored by the YLRL, this contest will begin at 6:00 P.M. EST, February 23rd, and will end at 3:00 A.M. EST, February 25th. Any or all bands, both 'phone and c.w., may be used—schedules, crossband, and c.w.-to-'phone operation permitted. On 'phone call "CQ YL/OM contest." On c.w. YLs call "CQ OM/YL" and OMs call "CQ YL/OM." Exchange QSO number and state, U.S. possession, VE district or country. It has been suggested that the YLs on c.w. operate near the net frequencies of 3610, 7040, and 7105 kc. in order that the OMs may find them easier. Scoring: Count one point for each station worked (YL to OM or OM to YL only). Multiply by the total number of different states, U.S. possessions, VE districts or countries (except W/VE) worked. Each station, state, country, etc., will count once only, regardless of frequency band or mode of operation. A cup donated by W8UDA, and now held by W1BFT, will be awarded to the highest OM scorer. A cup donated by W1BFT, and now held by W6YTM, will be awarded to the highest YL scorer. The cups are awarded on a yearly basis, with a three-time winner obtaining permanent possession. Certificates will be awarded to second- and third-place winners. Logs must be postmarked not later than March 2, 1953, and mailed to Kay Berlay, W3LSX, 2022 Columbus Road, N.W., Washington 9, D. C.

Aside to YLs: Strangely enough, you never need much coaxing for this party—so no sermon on contest spirit this time.
MAKE THIS YOUR HOME FOR IMPORTANT WORK UNDER IDEAL CONDITIONS

- TV RECEIVER DESIGN ENGINEERS
- ELECTRONICS ENGINEERS
- FIELD ENGINEERS
- TEST & INSPECTION ENGINEERS
- LAB. TECHNICIANS


YOU BENEFIT AT BENDIX RADIO:
from high wages, a modern, air-conditioned plant, paid vacations and holidays, group insurance and a good chance for advancement.

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TRANSMITTER WITH MOBILE CONNECTIONS AND A.C. POWER SUPPLY

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The 240 is a 40 watt Phone-CW rig for 160 to 10 meters, complete with: 15 x 14 x 8 cabinet, self contained A.C. power supply, MOBILE connections, meter, tubes, crystal and coils for 40 meters. Tubes: 6V6, 6F6, 207 final, 6K7 crystal mike amp., 6N7 phase inverter, 2 6L6's mod., 514G rect. Weight 30 lbs. TVI instructions included. 90-day guarantee. Price $79.95.

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Turn to position which gives you best control—Then see how your sending improves. See your dealer, or write for brochure. Try a Dow-Key on your rig 10 days—purchase price refunded if desired.

DOW-KEY CO., INC. WARREN, MINNESOTA
Canadian Distributors—Sporting Sales Ltd., 150 King St., Winnipeg, Canada.
Correspondence
(Continued from page 91)
ized bands. It is my opinion that as present all c.w. and 'phone amateur frequencies are overcrowded. The real solution to the problem is either the assignment of additional amateur frequencies or perhaps through technical improvements at either the transmitting or receiving end which result in an effective reduction in the bandwidth of amateur radio signals. Any attempt to change the c.w. or 'phone assignments within the present bands is simply a matter of robbing Peter to pay Paul.

—Lloyd D. Colvin, W4KB

113 Waterloo Road
Southport, England

Editor, QST:

I feel that, as an American amateur, I must comment on the editorial in the December issue of QST and also on Mr. William Szabo’s letter in the same issue.

In Great Britain and, I think, in all the countries of Europe in which amateur operation is officially permitted, no attempt is made by the various administrations to subdivide the amateur bands as regards to various types of equipment allowed. There is, however, a voluntary band plan in existence sponsored by the Radio Society of Great Britain which ordains that 7000 to 7050 kc. shall be for c.w. only and this plan is, in general, very well observed. However, 'phone operation does take place between 7050 and 7300 kc.

Aside from this, the Cairo Convention of 1938 ordains that outside the American Hemispheres, 7000 to 7200 kc. shall be amateur, with the remainder of the band occupied on a shared basis. At the time of day when European amateur 'phone stations are likely to be active in any quantity, there are many other more powerful stations active, namely the broadcasting stations. According to a list of broadcasting stations published in England by a firm of technical publishers, there are six broadcasting stations between 7000 and 7050 kc., thirty-three between 7050 and 7200 kc. and no less than sixty-eight broadcasting stations between 7200 and 7300 kc. Almost all of these stations are in the European area. I am not suggesting that all these stations are on at the same time, although it is difficult to believe that such is not the case when listening on the forty-meter band any afternoon or evening and attempting to work a few amateur stations, either 'phone or S. S. In fact, sixty meters is, under present-day conditions, impossible for 'phone contacts after dark and what c.w. can be worked must be in the gaps between competing propaganda stations between 7000 and 7050 kc.

As far as Europe is concerned, it is not the amateur who is causing QRM on forty meters. If and when sanity returns to the earth and the powers that be realize what a waste of the earth’s wealth of energy is the propaganda broadcasting station, we may have less phone QRM on forty meters, but not before.

—P. H. P. Carson, GEART

1338 Washetonaw
Ann Arbor, Mich.

Editor, QST:

This question of 40-meter 'phone is sure full of dynamite. Present 'phone frequencies on the 20- and 75-meter bands are jammed and the opening of 40 meters would do much to alleviate this situation. It would be especially valuable for the increasing number of 'phone nets. So many nets are now operating on 75 meters that the average ham has to be extremely careful in the early evening hours not to step on some net frequency.

Keep up the good work. QST remains the most complete and comprehensively written ham publication on the market.

—Jerome S. Miller, WNB1DP

1112 S. Wilmore Drive
Albuquerque, N. M.

Editor, QST:

Let's keep 40 meters c.w., at least in the U. S.

—Bruce Butler, WP6XN

Stanwood Road
Mt. Kisco, N. Y.

Editor, QST:

...desirable to authorize the use of the 7-Mc. band for type A-3 emission.

—Mr. & Mrs. James E. Taylor, WBO2Z, WB6YK

(Continued on page 122)
HERE IT IS!
ALL YOU NEED TO KNOW!
The KEY to a Ham Ticket . . .

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Electronic Equipment

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(2) Any part of this ad shall be a character, and as such character shall be recognized by any radio amateur, or experimenters, in their pursuit of the art.

(3) These ads shall be furnished in a free form, except as noted in paragraph (4) below.

(4) Subscriptions must in full accompany copy. No cash or check discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication.

(6) The regular rate of 75 per word will apply to advertising which, in our judgment, is obviously non-commercial in nature.

(7) The regular rate of 75 per word will apply to members of the American Radio Relay League. This advertising is subject to special rates, as noted in 4. "H" letters must accompany all advertising by hams, to show their membership of the American Radio Relay League.

(8) No rate list is applicable in quantity for profit, even if an individual or organization offer for exchange or advertising inquiry for special equipment, if by a member of the American Radio Relay League take the 75 rate. An attempt to sell in the ad may be the reason for ad's rate.

(9) Because of "QST" is more easily avoided, it is requested signature and address be printed plainly.

(10) A rate of 750 per thousand words, 100 per thousand words in the second month preceding publication.

(11) Safety of all advertising must be noted, as the quantity of words in any one issue or more than ad in one issue.

(12) Having made no investigation of the advertisers in the classified columns, we expressly disclaim responsibility of QST is unable to reach for its integrity or for the genuine character of the products or services advertised.

QUARTZ — Direct imports from Brazil of best quality pure quartz crystals are now in stock. Get your next crystal from us. Diamond Drill Carbon Co., 719 World Bldg., New York City.

WPL1G - All brands of QST and construction equipment bought and sold, W8BOO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

OSS17: 109, $1.15 up. Samples, 10c, refunded when ordering. Giflstrom, W5P0W, 1042 Pine Heights Ave., Baltimore, Md.

SUBSCRIPTIONS. Radio publications a specialty. Earl Mead, Huntsville, Montana, W7LCM.

W8LW-2, Mead, W8RKL, 1597 Central Avenue, Kansas City, Kansas.

6-Element 2-meter beams, Riverside Tool Co., Box 87, Riverside, Ill.

W8LW-3, Elmer Zehnder, transmitters, 2 meter, 2700, 2315, ARCS-3, ARC-13. We buy anything. What have you? Tom Allen, 503 Atlantic Ave., Brooklyn 17, N. Y.

QSL cards. Little Rock, Mississippi.

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33002, 33102, and 33202
Plus new 33302 for CR7

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to hundreds who
want maximum
selectivity
at minimum cost!

NC-125

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with the famed
select-o-ject
built in!

NOW AVAILABLE FOR
IMMEDIATE DELIVERY


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**Buffer**
- 2E26

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**Final**
- 813
- 811-A

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**Modulator (Class B)**
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Compare an RCA-813 with any other tube in its class. Here's what you will find:

**Economy**—You get more watts-per-dollar input. You also save on the initial cost of the power supply because the 813 operates at relatively low plate voltage.

**Power**—A single RCA-813 easily takes an input of 500 watts on cw and 400 watts on phone. And, because it operates efficiently over a wide range of plate voltages, you can conveniently reduce power for local QSO's.

**Performance**—Because of its high power gain, the RCA-813 beam power tube can be driven to full input at frequencies up to 30 Mc with a single RCA-2E26. High-level intermediate stages are not required...a big step toward the elimination of TVI!

In short, design that new, compact, efficient transmitter around a husky RCA-813 beam power tube.

Tubes for the Professional priced for the Amateur

The dependability of commercially proved RCA Tubes costs you no more. Buy genuine RCA Tubes and you buy the best. See your local RCA Tube Distributor.

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**ELECTRON TUBES**

HARRISON, N. J.