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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is 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.

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

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NOW—BETTER OPERATING PROCEDURES

The Federal Communications Commission decision to reinstate incentives in our licensing structure, coupled with a sensible set of examination questions, will lead to an improvement in the average technical base of the fraternity. As we accept and meet the challenge, one rung in the ladder of strengthening amateur radio will thus have been reached.

The next should be a concerted, all-out drive to improve our operating habits. Here, legislation can do little. Since those first rules were laid down on Mount Sinai, people have been dreaming up ways to violate them. Amateurs being people, we have something of the same problem on the air. Too many of us are careless in our conduct and our habits. Clicks on c.w., splatter on sidetone, tuning up on the band instead of into a dummy load, excessively-long CQs, deliberate interference, are all violations of rules. On-the-air parties, shady stories, snide remarks about mode of operation, class of license or other personal traits of brother hams, are out of order ethically. Even if 99 out of 100 hams are top-grade in operating conduct, the one bad actor can tear ham radio's image to shreds.

While incentive licensing was under discussion, many amateurs argued against the proposals by saying that more technical knowledge wouldn't necessarily upgrade operating habits. Though the remarks were out of context at the time, they are true enough. You can't legislate manners.

Holders (present and future) of Amateur Extra Class and Advanced Class are now especially on a spot—"the experts on display." They have demonstrated technical proficiency, and now must show themselves to be the all-around leaders of our fraternity, the elders setting an example. Everyone with an E or A beside his listing in the new Callbook is going to be in a goldfish bowl, with all eyes on him.

Many hams—on the east coast, at least—have heard a character who says "CQ Class A only, no lids, no kids" and so on; he displays the worst possible arrogance and disregard for others. Do younger or newer amateurs see him as a typical Advanced Class licensee? We fervently hope not, but it is up to each Advanced and Extra Class licensee to show himself to be a patient, courteous operator waiting his turn, tolerant of others, skillful in his use of the mike and key (and, we'd better add, the keyboard and camera).

Be careful not to assume that the problem is always with "the other guy." It wouldn't hurt any of us—regardless of license class—to review once again the principles of good operating. A good basic guide is the pamphlet Operating an Amateur Radio Station; it will be sent free on request. A much more comprehensive treatment, the Radio Amateur's Operating Manual, is $1 from Hq. or at your distributor.

Sloppy, discourteous and uncooperative conduct on the air can only lead amateur radio eventually to chaos. Such increased technical know-how as will come from incentive licensing should be matched with good practice, courtesy and proper ethics. Good conduct on the air requires traits which we must develop ourselves, out of personal pride and—even more important—a sense of responsibility toward the performance and image of amateur radio.

ARE YOU LICENSED?

- When joining the League or renewing your membership it is important that you show whether you have an amateur operator license. Please state your call and/or the class of operator license held, that we may verify your classification.
Our correspondence and personal contacts indicate a
prideful conclusion that FCC examination offices will
be swamped with applicants for the new higher-grade
tickets. On page 56 we recap some of the routine
procedures for those who haven't been near an FCC
point in years. The new License Manual has complete
dope, of course. Good luck!

After many years of being unwelcome tenants of the Post
Office building, plus additional scattered locations to
house a growing staff, the Federal Communications Commission
has finally moved into its own Washington headquarters—
1919 M Street, N.W. (20554). Amateur exams will also be
conducted at this new location.

A look at the newly-revised ARRL Map of the World strikingly
illuminates the extent to which both political boundaries
and call sign prefixes have been modified in the past few
years. Geography hasn't changed, so the old map is still
good for beam direction, but get a new one if you want
current country boundaries and prefixes. Still $2.

One slightly-frustrated League director complains of not
enough input of views, suggestions, gripes, etc., to guide
his representation of members as fully as desired. He
attends conventions, hamfests and club meetings and regu-
larly encounters hams with good ideas — or long-smouldering
complaints. He only wishes you folks would take the initia-
tive to drop him a line — or at least answer queries in
his bulletins — rather than wait for a chance in-person
meeting. The more your representative hears from you, the
better he is able to do his job. Club comments are par-
ticularly useful, since they express the net views of a
group.

The League's program for encouraging the growth of amateur
radio is proceeding apace in such countries as Morocco, The
Gambia, Sierra Leone, Liberia, Nigeria, Niger, Ghana, Kenya,
Malawi, Indonesia, Iran, Laos, and Malaysia. Items of
League technical literature, plus key and code oscillators,
have been supplied, as well as club station equipment in a
number of instances. Most of the training efforts are being
conducted by club groups, although in some instances the
activity is the result of the initiative of an individual.
Hq. staffer WIKE visited a number of the Western African
countries during September to review progress made to date
and to encourage further efforts. ARRL General Counsel
W3PS met with IARU society officials in Nairobi.

Giving substance to efforts to interest more persons in
amateur radio, Squires-Sanders has a campaign directed
primarily at CBers with the catchy slogan, "Skip is legal—
on the ham bands."

QST for
Transceiver With Transistors
[Almost]

BY VAROUJAN KARENTZ,* W1YLB

This project started off innocently and unintentionally, as most projects do when a choice part or component has been acquired. In this case, it was the donation of a 455-kc. mechanical filter by W1HTK, along with his "maybe you can use this somewhere" comment. Its subsequent incorporation into a transistorized (almost) transceiver evolved from some preliminary circuit experiments and then into a system concept which included the following objectives:

1. Compactness and portability for either fixed or mobile use.
2. Built-in a.c. or d.c. power supply.
3. Minimum battery drain when only receiving.
4. Operation on c.w., a.m., and s.s.b. (selectable sideband) with moderate output.
5. All-band (80 through 10) full frequency coverage.
6. Offset receiver tuning, audio-derived a.g.c., r.f. gain control, signal-strength and output-power indicator.
7. Construction with commercially available components wherever possible.
8. Stability adequate for s.s.b. and mobile use.
9. One-key band switching.

The overall design, however, was compromised because the selection of mixing frequencies was determined by the availability of crystals already on hand. These crystals were borrowed from the home station SB-300 receiver and resulted in using higher oscillator and mixing frequencies than preferred. An inspection of the transistorized SBE-34 transceiver also indicated many desirable circuit features, which were utilized wherever adaptable.

Early in the design, serious consideration was given to a 100-percent solid-state unit. After some experimentation which indicated substantial drive requirements in order to obtain a minimum respectable power output (15 watts), tubes were chosen for the final amplifier and driver. R.f. power transistors do exhibit excellent efficiency — (up to 70 percent) but the low power gain, 15 db. or less, requires relatively high r.f. input power. In addition, the problems of band switching the extra stages and their associated input/output coil taps did not look inviting. Neither did the price of 30-Mc. r.f. power transistors.

As the design developed and stages were bread-boarded, a despairing observation became evident. Specifically, the conventional "well-stocked junk box" was almost useless. The transition of construction techniques from tubes to transistors required the use of components and parts which were not ready to hand, particularly miniature low-voltage and low-wattage common components such as resistors and capacitors. Many of these items were either purchased new or removed from surplus transistorized equipment and printed circuit boards, in addition to an active advertising campaign among some W1 acquaintances.

With any new construction effort, various sizes and values of components are needed where substitution and experimentation are necessary. This added considerably to the total cost of the transceiver, since many of these components did not end up in the final unit.

Test equipment utilized included a v.o.m., v.t.v.m., audio signal generator, grid dip meter, regulated variable d.c. power supply, and a general coverage receiver. During the final alignment and performance checks, a high-frequency wide-band oscilloscope, frequency meter, and r.f. signal generator were used.

General Principles

The simplified block diagram, Fig. 1, indicates signal flow and the various stages comprising the unit. The sideband-generator concept used was originally described by W6TEU1 as a vacuum-tube exciter, and later a transistorized version was incorporated in the SBE-34. W6TEU's article provides an excellent description and alignment procedure. Basically, the 453-kc. carrier signal from Q6 is fed into the balanced modulator, where the carrier is nulled out, and the sidebands are then fed through an amplifier

---

* 43 Walnut St., Millis, Mass. 02054

and the 455-kc. mechanical filter, which strips off the lower sideband. Sideband selection is accomplished by doubling the carrier frequency and then either doubling or tripling again (in Q7) to arrive at 1812 kc. for lower sideband or 2718 kc. for upper sideband. The selected frequency is mixed in CR17, with the 453-kc. u.s.b. signal, resulting in a sum or difference suppressed-carrier frequency at all times of 2265 kc., upper or lower sideband. The s.s.b. 2265-kc. output of the s.s.b. mixer stage in the following high-frequency mixer stage, Q14, by the associated heterodyne crystal oscillator, Q16. Since the heterodyne oscillator frequency is always on the high side of the h.f. mixer input signal, a single v.f.o. dial calibration will suffice for all bands when the proper heterodyne-oscillator crystals are selected. With the v.f.o. dial calibrated from 0 to 500 kc. the operating frequency is directly read on the dial by adding the lowest frequency in megacycles, for the band in use, to the dial reading. The 10-meter band requires four 500-kc. segments to cover 28 to 28.6 Mc.

In the transmit mode the output from the high-frequency mixer, Q14, is fed to the 12BY7 Class A driver and from there to the 6J56 Class AB1 final linear amplifier. In the receive mode the signal from the antenna is coupled into the r.f. amplifier stage, Q17, and thence to the high-frequency mixer, after which it follows a reverse path back through the mixers to the diode balanced modulator, which acts as a detector. The detected signal is then amplified by the audio amplifier, Q8, and the audio output stages. At the same time, the audio output is gain-controlled by the a.g.c. amplifier, Q4, which controls the gain of the r.f. amplifier, Q17, and the 453-kc. amplifier, Q9.

Fig. 1 also indicates those stages which operate in either the receive or transmit modes. The amplifier/mechanical-filter, low-frequency mixer and high-frequency mixer perform bilaterally, and can be considered unidirectional in the selected mode, allowing signals to be passed in the desired direction. The injection oscillators Q6, Q7, Q12, Q14, and Q16 operate continuously. Other stages are biased off as required.

Microphone Amplifier

The mike preamplifier, Q1, and amplifier, Q2, are conventional common-emitter amplifiers. Q1 is designed for low-impedance input, isolated and bypassed for r.f. by the RC combination of the 4700-ohm resistor and 470-pf. capacitor Fig. 2. The audio stages were built on a 3½ × 1½-inch epoxy board, allowing ample room for addition of a speech compressor at a later date. The two stages of audio provide ample audio gain for this use. These two stages provide sufficient gain (in excess of one volt output) even when a high-impedance -54-dbm.-output microphone is used. With this mismatch the amplifier dynamic gain is reduced, the microphone is heavily loaded, and some low frequencies are attenuated. However, audio response is adequate.
since the microphone in use has a roll-off characteristic in the opposite direction. A matching input transformer (100,000 to 2000 ohms) could be used for a better match. The output would then be proportionally increased, and possibly $Q_2$ would not be necessary since only 0.2 to 0.3 volt of audio is needed to drive the balanced modulator. It should be noted that to reduce hum and feedback, $Q_1$ and $Q_2$ are decoupled from the 11.5-volt bus through a 150-ohm resistor and a 100-pf bypass capacitor.

Balanced Modulator

The diode ring-type balanced modulator, Fig. 2, provides approximately 35 db. of carrier suppression as measured with an r.f. probe and v.f.m.m. For tune/c.w. operation a small d.c. voltage is allowed to upset the balanced modulator through the carrier insert control, $R_2$, when the function switch, $S_9$, (Fig. 4), is in the tune or c.w. position. The amount of voltage or carrier insertion is adjusted by this rear-panel 10K control pot. For c.w. operation a key is inserted into the normally-closed jack, $J_2$, interrupting the d.e. path except in the key-down position. The c.w. note is remarkably smooth. This is partially attributable to the filter network composed of the 56K resistor and the two 0.1-pf capacitors. During c.w. operation the mike gain control should, of course, be fully counterclockwise. Amplitude modulation is possible by setting the amount of carrier insertion to the safe $A_1$ plate-dissipation operating point of the 61B6 final amplifier and adjusting the mike gain for proper modulation.

As in most balanced modulators, some interaction exists between the carrier null pot, the tuning of transformer $T_1$, and the 7-5-pf trimmer capacitor, $C_a$. Adjustments to each alternately are necessary to obtain maximum carrier null.

Amplifier, Filter and Low-Frequency Mixer

The 453-kc. common-emitter amplifiers, $Q_5$ and $Q_9$, are controlled by the 11.5-volt d.c. or ground bus as selected by control relay, $K_1$, (Fig. 4), as are also the low-frequency mixers, $Q_{10}$ and $Q_{11}$, and high-frequency mixers, $Q_{14}$ and $Q_{15}$ (Fig. 3). In the transmit mode the bias resistors for $Q_8$, $Q_{10}$ and $Q_{14}$ are grounded, completing the bias voltage-divider network path and allowing the transistors to conduct. In the receive mode the same bias resistors receive a positive voltage (base and emitter at same potential), effectively cutting these transistors off. In either case, the exact reverse biasing method is used for $Q_9$, $Q_{11}$ and $Q_{15}$, enabling conduction of the stages in the desired transmit or receive direction. The two capacitors in series across the input to the mechanical filter resonate the filter to 455 kc. and provide a better impedance match to the base of $Q_5$.

The 3.1-kc. bandwidth filter has a substantial insertion loss—almost 15 db. With 2.5 volts of r.f. at the collector of $Q_5$, centered in the middle of the pass band, the output from the filter at the terminals is 0.5 volt. Limited information was available on the actual slope and attenuation characteristics of the filter in use. If the newest type 2.1-kc. Collins experimenters' filter is used the insertion loss should not be as severe, on the assumption that the newer filters have improved characteristics. A different carrier-oscillator crystal frequency would have to be used to place the carrier at the proper point on the filter slope.
Fig. 2—Circuit of the sideband generator, audio amplifier, a.g.c. amplifier and S-meter amplifier. Unless otherwise specified, fixed resistors are 1/4-watt composition; capacitors with polarity indicated are electrolytic, fixed capacitors are ceramic except those marked SM (silver mica).

AR1—100-mw. audio amplifier (Lafayette 99-9042); orange switch leads and red battery lead not used; assembly insulated from chassis.

C1, C2—3-30-pf. mica trimmer (Arco 403 or equivalent).

C3—7.45-pf. ceramic trimmer.

L1—455-kc. mechanical filter (Collins F455-C-31, 3.1 kc. bandwidth, used).

J1—2-circuit phone jack.

J2—Closed-circuit phone jack (must be insulated from chassis).

Li-Lu, inc.—See Table I.

LS—3-inch speaker, 8-ohm voice coil.

Ml—0-1 milliammeter, edge mounting (Calrad EW2-S or equivalent).

R1-R6, inc.—Linear controls, 1/4 or 1/2 watt composition.

Sp—D.p.s.t. slide switch.

Sp—See Fig. 4.

T1—455-kc. transistor i.f. transformer (Miller 2042).

T2—Transistor broadcast oscillator transformer padded to 900 kc. (Vidaire 455 OA or equivalent).
A.G.C. RECT. & AMP.

S-METER CIRCUIT

MIXER

453 KC.

L.F. AMP.

453 KC.

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μf); OTHERS ARE IN PICOFARADS (pf. OR nF); RESISTANCES ARE IN OHMS; X = 1000

T3—Transistor interstage audio transformer, 10,000 to 2000 ohms (Lafayette TR-96, center tap not used).

Y1—453 kc. (Surplus FT-241A, Channel 43).

Z1—Miniature 455-ka. L.F. transformer (see text).

DIODES AND TRANSISTORS

CR1—Germanium; 1N34A, 1N67A, 1N68, or similar, matched for forward resistance.

CR1—Germanium, see text

CR2—Inc.—Silicon; 1N914, 1N484, 1N645, or similar.

Q5, Q6—2N508 (p-n-p).

Q2—2N396 (p-n-p).

Q5—2N697, 2N440A, 2N1893, 2N1613, HEP-50 (n-p-n).

Q6—2N1613, 2N697, HEP-50 (n-p-n).

Q7—2N396A, 2N425, 2N1305 (p-n-p).

Q7, Q8, Q9—2N396A, 2N425, HEP-51, 2N1305 (p-n-p).
Fig. 3—Circuit of the low- and high-frequency mixers, heterodyne oscillator, v.f.o., driver and final amplifier, receiving s.f. amplifier and 100-kc. calibrator. Fixed capacitors marked SM are silver mica; others are ceramic. Unless otherwise indicated, fixed resistors are 1/4-watt composition.

C₁₁—3-section variable; 6-20 pf, per section (Miller 1460).
C₅—NPO ceramic trimmer, 3-12 pf (Centralab 822-FZ or equivalent).
C₇, C₉, C₁₀—8-60 pf, mica trimmer (Arco 404 or equivalent).
C₈—2-20 pf, mica trimmer (Arco 402 or equivalent).
C₁₁—5-45 pf, air paddler with rear shaft extension, ganged with R₉.
C₁₂—2-section superhet-type variable, 365 and 135 pf (Lafayette 32G1101 or equivalent).
C₁₃—65-340 pf, mica trimmer (Arco 303 or equivalent) modified by adding 1/8-inch shaft for panel control.
C₁₄—1-8 pf, piston trimmer, plastic (Erie 532-000-8R or equivalent).

L₁₅-L₁₇, Inc.—See Table I.
L₁₈—11 turns No. 16, air-wound, 1/4 in. dia., 8 turns per inch (B & W 3018 or equivalent).
L₁₉—14 turns No. 20, air-wound, 1 in. dia., 16 turns per inch, tapped 4th turn from ground end (B & W 3015 or equivalent).
M₁₂—0-1 milliammeter (Calrad EW-2 or equivalent); indicates 200 ma, full-scale in circuit shown.
R₁₉-R₆₀, Inc.—Linear-taper control, 1/4 or 1/2 watt.
R₁₀—7.5 ohms, 10 watts, (TV ballast type, Hamilton-Hall FR-7.5).
S₂—Ceramic rotary, 5 sections, 1 pole per section, 11 positions (8 used) (Centralab PS-21 sections with indexes; see text).
S₃—S.p.s.t. slide switch.
S₄—S.p.d.t. slide switch.
\[ Y_{10} = 100 \text{ kc.} \]
\[ 2 \text{ turns No. 16 spaced to occupy length of 100-ohm} \]
\[ 2 \text{-watt composition resistor.} \]

**DIODES AND TRANSISTORS**

- CR₁: 10-volt zener, 1/2 watt (1N739 or similar).
- CR₄, CR₅, CR₆, inc.—Silicon (1N484, 1N645, or similar).
- CR₇, CR₈—Silicon, matched forward resistances (1N4348, 1N484, 1N645 or similar).

- CR₁₀, CR₁₁—Voltage-variable capacitor (1N955, TRW V47 or V947, or similar).
- Q₁₀, Q₁₁, Q₁₂, Q₁₃—PNP r.f. type (2N2905A, 2N2672, 2N1132, 2N711, HEP-51* or similar).
- Q₁₂, Q₁₃—PNP, r.f. type (2N706, 2N708, 2N918 or similar).
- Q₁₆, Q₁₇—PNP, r.f. type (2N708, 2N918, HEP-50 or similar).

* HEP-51 not optimum for Q₁₇.
Table I  
All coils listed below are close-wound on slug-tuned forms using enameled wire. Taps, when required, are counted off from the ground end of the coil. Shunt capacitors should be silver mica.

<table>
<thead>
<tr>
<th>Coil</th>
<th>Form Dia. in.</th>
<th>Wire Size</th>
<th>No. of Turns</th>
<th>Tap Turns</th>
<th>Shunt Cap. pf.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_1$</td>
<td>$\frac{3}{16}$</td>
<td>33</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_2$</td>
<td>$\frac{3}{16}$</td>
<td>33</td>
<td>65</td>
<td></td>
<td></td>
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<tr>
<td>$L_3$</td>
<td>$\frac{3}{16}$</td>
<td>33</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_4$</td>
<td>$\frac{3}{16}$</td>
<td>33</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_5$</td>
<td>$\frac{3}{8}$</td>
<td>26</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_6$, $L_7$</td>
<td>$\frac{3}{16}$</td>
<td>20</td>
<td>24</td>
<td>1-turn link</td>
<td></td>
</tr>
<tr>
<td>$L_8$</td>
<td>$\frac{1}{4}$</td>
<td>21</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_9$</td>
<td>$\frac{3}{16}$</td>
<td>33</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{10}$, $L_{15}$</td>
<td>$\frac{3}{16}$</td>
<td>26</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{11}$</td>
<td>$\frac{3}{16}$</td>
<td>24</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{12}$, $L_{17}$</td>
<td>$\frac{3}{16}$</td>
<td>24</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{13}$, $L_{18}$</td>
<td>$\frac{3}{16}$</td>
<td>24</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{14}$</td>
<td>$\frac{3}{16}$</td>
<td>33</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{15}$</td>
<td>$\frac{3}{16}$</td>
<td>24</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{16}$</td>
<td>$\frac{3}{16}$</td>
<td>24</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{17}$</td>
<td>$\frac{3}{16}$</td>
<td>20</td>
<td>40</td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>$L_{18}$</td>
<td>$\frac{3}{16}$</td>
<td>20</td>
<td>22</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>$L_{19}$</td>
<td>$\frac{1}{4}$</td>
<td>22</td>
<td>14</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>$L_{20}$</td>
<td>$\frac{1}{4}$</td>
<td>22</td>
<td>12</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>$L_{21}$</td>
<td>$\frac{1}{4}$</td>
<td>22</td>
<td>17</td>
<td></td>
<td>29</td>
</tr>
</tbody>
</table>

A 453-ke. tuned trap (miniature 455-ke. transistor f.f. transformer), $Z_1$, is in series with the collector of $Q_7$ and coil $L_4$. Apparently a small amount of fundamental signal (453 ke.) from the crystal oscillator was not adequately rejected in the frequency-doubler transformer $T_3$ or by the higher-frequency tuned circuits $L_1$ and $L_5$. Prior to inserting the trap this 453-ke. leak fed back through the filter out of phase with the suppressed-carrier signal and caused difficulty in balancing out the carrier on upper sideband. A double-tuned circuit substituted for $T_2$, or possibly a different physical layout, would eliminate the need for this series trap.

It is necessary that double-tuned circuits be used wherever indicated in the schematic, to provide the selectivity necessary for rejecting harmonics and unwanted mixing frequencies and provide a clean signal for the following stages. The doubler diode, $C R_{16}$, and mixer diode, $C R_{17}$, were selected for optimum signal output, as were their associated bias resistors. A number of different diodes tried worked, but it was noticed that because of various characteristics a particular diode performed better. Both types finally used were unmarked germanium surplus.

The output (or input as may be the case) coil, $L_8$ (Fig. 3), of the low-frequency mixer stage is tuned and tracks with one section of the three-gang v.f.o. tuning capacitor. This provides uniform frequency response, along with rejection of unwanted frequencies, to its associated coil, $L_7$. The mica trimmer of the variable-capacitor section is adjusted to obtain the padding necessary to tune $L_8$ through a 500-ke. range.

### Audio Circuits

Audio amplifier $Q_9$, Fig. 2, obtains the received signal from the ring modulator, now acting as a detector. Its output is fed into the audio-derived A.G.C. amplifier, $Q_4$, and the prepackaged 100-mw. audio output amplifier. The 0.02-pf. capacitor and 12K resistor across the primary of $T_3$ improves the frequency response and provides a more constant load for $Q_3$. The output audio amplifier is designed for a common positive battery supply, and therefore the amplifier printed circuit board has to be insulated from the transceiver chassis and decoupled from the 11.5-volt supply. Correspondingly, the voice coil of the speaker must be returned to the proper terminals on the p.c. board. $Q_3$ is not biased off in transmit since the audio output amplifier is cut off completely. One hundred milliwatts of audio output with a miniature 3-inch speaker certainly does not appear very convincing to the high-fidelity minded, but the result is gratifying. A 4-inch speaker with a large magnet gave significantly improved output and response, but space limitations dictated the use of the smaller speaker.

### A.G.C./Meter

The audio signal to the a.g.c. amplifier, $Q_4$, is rectified by $C R_{17}$ and applied as a negative-going voltage to $Q_4$'s base. A fast attack and slow release characteristic is obtained by the combination of the base bias resistors and the 50-pf. capacitor. A.g.c. action reduces the gain of the r.f. amplifier, $Q_1$, and the 453-ke. amplifier, $Q_9$, by decreasing their base-to-emitter voltage, which in turn reduces collector current. With no
incoming signal \( Q_4 \) is conducting heavily and the potential at the junction of the 1000-ohm a.g.c. load resistor and the a.g.c. bus is less than 11.5 volts. As an incoming signal is applied to its base, \( Q_4 \) conducts proportionally less and the a.g.c. bus potential increases, thereby raising the base voltage of \( Q_17 \) and \( Q_9 \). The 6800-ohm resistor in series with the collector of \( Q_4 \) limits the a.g.c. action until an incoming signal exceeds the audio level where output variations are detectable. The gain of the a.g.c. amplifier is adjustable by a rear-panel control, \( R_b \). A.g.c. can be defeated completely by switch \( S_4 \), which effectively shunts \( Q_4 \) and places the a.g.c. bus potential at approximately 9 volts.

The S-meter circuitry is unusual in that it provides approximately logarithmic compression by nonlinear action. As the a.g.c. voltage applied to the base of \( Q_5 \) increases, the collector current decreases and the potential across each silicon diode \( CR_{25}, CR_{45}, CR_{23} \) rises, exceeding the conduction point (0.5 volt average) of each diode successively as determined by its series resistor. Current is now shunted through each diode, limiting the current through the meter, \( M_1 \). The 1500-ohm resistor and \( CR_{24} \) establish full scale or 30 db, as indicated on the meter. As the incoming a.g.c. voltage decreases, \( Q_5 \) conducts more heavily, the potential across \( CR_{25} \) becomes less and it stops conducting, followed by \( CR_{24} \) and \( CR_{23} \) in that order, thus reducing the compression. With the 3300-ohm resistor in series with the meter, compression does not begin until a reading of 89 is indicated, hence approximately 30 db. of logarithmic compression is achieved. This action is dependent, of course, upon the non-linear a.g.c. characteristics and r.f./i.f. gain variations from band to band — the primary downfall of all S-meter circuitry. The values of the voltage divider resistors in the emitter circuit of \( Q_5 \) are selected experimentally so that when \( R_b \) is properly adjusted \( M_1 \) will be zeroed. A separate pot in the emitter circuit of \( Q_5 \) could be substituted and would provide ease of adjustment. \( CR_{25} \) acts as a diode switch to cut off \( Q_5 \) in transmit. This zeroes \( M_1 \) and allows it to function as a relative-output meter from the circuitry associated with the final amplifier tank.

**Variable-Frequency Oscillator**

The v.f.o. construction departs from the tried and true philosophy of rigid and heavy construction, yet retains good thermal and mechanical stability. The entire v.f.o., with the exception of \( C_4 \) and the calibrate and offset circuitry, was mounted on a copper-clad 1/4" by 3-inch epoxy board. \( Q_{12}, Q_{13} \) and \( L_3 \) are contained in a shielded enclosure. The oscillator, \( Q_{12} \), is in a common-emitter Colpitts configuration, with an associated emitter follower, \( Q_{13} \), used for isolation. The collector voltage for \( Q_{12} \) and \( Q_{13} \) is regulated by a Zener diode, \( CR_{11} \). One volt of r.f. output is available at the emitter of \( Q_{13} \). Two sections of the variable capacitor, \( C_4 \), are paralleled in order to make the v.f.o. cover from 6130 to 6630 kc.; the adjustments available by the slug in \( L_4 \) and trimmer capacitor \( C_6 \) enable the frequency range and tracking to be set.

The v.f.o. circuit incorporates dial-calibration and receiver-offset features. \( CR_{13} \) is a silicon diode which exhibits a slight capacitance variation when reversed biased, and is placed in series with a 5-pf. capacitor across the v.f.o. coil. By varying the bias voltage the frequency of the oscillator can be changed independently of \( C_4 \) by about 15 kc. The calibrating pot \( R_b \), initially sets the v.f.o. frequency to correspond with the dial (digital counter) reading. \( R_b \) always functions in transmit, but in receive it functions only when the offset switch, \( S_5 \), is in the off position. If it is desired to change the v.f.o. frequency while in the receive mode, the offset pot, \( R_b \), is switched into the circuit. This control will vary the received frequency approximately 4 kc. either side of the dial reading while the transmitting frequency always remains where it was set by the dial. The diode switch, \( CR_{19} \), and the position of the offset switch determine when the offset control is in the circuit. When \( S_5 \) is in its off position, \( CR_{20} \) does not conduct during receive but \( CR_{19} \) does conduct, keeping the calibrate pot in the circuit. On transmit, \( CR_{20} \) always conducts regardless of the switch position. \( CR_{19} \) and \( CR_{20} \) must be evenly matched in forward resistance since unequal voltage drops would change the voltage on \( CR_{19} \) when switching from transmit to receive, thereby causing a frequency shift.

V.f.o. stability was achieved by an effective, but not yet well recognized, simple method. Very briefly, transistor junction heating, from whatever source, varies the transistor characteristics — significantly, its capacitance — resulting in frequency drift. This junction heating in an oscillator is also a function of the feedback voltage, which determines to some extent the collector current. By using a high-Q tuned circuit (as in any oscillator) and selecting the correct amount of feedback voltage or collector current, a set of operating conditions can be established which will minimize oscillator drift (other than that caused by external temperature changes). In this case, a fixed regulated voltage (10-volt Zener diode regulator) was selected and various values of feedback capacitance were tried experimentally until the drift of the oscillator was recognized as going positive; then the values were changed to find the point where drift was going negative. The capacitance values indicated in Fig. 3 are those which fell in between. The alternative method would be to select the optimum value of the feedback capacitor to maintain maximum \( Q \) and then adjust the collector voltage in varying increments (noting voltage values) until the drift rate changes from negative to positive. At the zero-drift point a Zener diode (or combination of them) can be substituted to maintain the collector voltage at that point. It should be noted that this is not temperature compensation in the normal sense.
Fig. 4—Power and bias supplies, and control circuits. Unless otherwise specified, fixed resistors are 1/2 watt. Capacitors with polarity indicated are electrolytic; others are paper.

CR1, CR3—Silicon, 800 p.i.v., 500 ma.
CR2—Silicon, 800 p.i.v., 100 ma.
CR4—Ceramic, 50 p.i.v., 5 amp.
CR5—Zener, 6.5 volts, 0.75 watt.
CR6—Zener, 5.0 volts, 0.75 watt.
CR7—Silicon, 25 p.i.v., 500 ma.
R1—Filament lamp, 6–8 volts, for meter and dial illumination (Lafayette 99 C 6262).
J3—Chassis-mounting 15-contact male conn. (Chinch-Jones P-315-AB).
P1, P2—Cable-mounting 15-contact female connector (Chinch-Jones S-315-CCT).
Q1, Q2—2N441, 2N442, HEP231, or equivalent (p-n-p).
Q3, Q4—2N697, 2N1613, 2N1893, or equivalent (n-p-n).
Q5, Q8—2N441, 2N442, HEP231, or equivalent (p-n-p).
S1—3-position rotary, 5-amp. contact rating (one section, S1b, Fig. 2, is used for a.g.c. switching; S1a is used for power switching. These functions are combined to conserve panel space.)
S2—Miniature ceramic rotary, 2 sections, 2 poles per section, 5 positions, non-shorting (Centralab PS-111).

Sr—S.p.s.t. toggle (on R1).
T1—Transistor converter/a.c.; primaries, 12.6 volts d.c. and 115 volts a.c.; secondaries 280 volts d.c., at 150 ma., 12.6 volts a.c.; 3 amp. (Thordarson TR-294 or Stancor P-8195).

Note: Heat sink is Motorola type MS-15 modified to take two TO-36 transistors.

* CR6 and CR9 in series for 11.5-volt output.
i.e., it is not applicable to thermal changes in external components.

The v.f.o. drive uses a Jackson dual-ratio vernier control to allow either fast or slow tuning. The digital counter and associated gears were obtained from various surplus sources, including some local W1's who dug real deep to the very bottoms of their junk boxes. A lucky combination of ratios was made up to obtain exactly the required 0 to 5000 counter reading from minimum mesh to full mesh of C14. A circular direct-driven dial is much simpler and of course would not require any gearing. For information, with the gearing available the last year ended up at the digital counter with a one-to-one ratio. This was necessary in order to have the digital counter read correctly by turning in the reverse direction to the tuning capacitor; with the heterodyne crystal oscillator on the high side of the mixer frequency, the v.f.o. frequency decreases as the signal frequency increases.

**Heterodyne Oscillator**

Link coupling is used from the heterodyne crystal oscillator, Q10, to the emitters of the high-frequency mixers, Q14 and Q15. Although a different crystal is used to cover each of the four segments of the 10-meter band, L2 in the parallel 33-pf capacitor allows oscillation to take place with any one of the four. Trimmer capacitors resonate the coils for each of the lower bands. On 80 and 40 meters, an additional fixed capacitance is shunted across the trimmer.

**Varicap Tuning**

Among the problems of tunable circuit design are those of matching to the input of transistors and the extra switching required to connect each tuned circuit's low-impedance tap to the transistor. A compromise was reached by eliminating the extra switching in the r.f. amplifier and h.f. mixer stages while still retaining an acceptable impedance match. Both the r.f. amplifier, Q17, and high-frequency mixer, Q15, utilize a voltage-variable capacitor diode (CR21 and CR22) for tuning the band in use. These diodes (Varicaps), specifically designed for relatively high-Q r.f. applications, are used in a series-parallel combination with fixed voltage-divider capacitors for impedance matching. The two Varicaps are remotely controlled by a common front-panel pot, R5. R6 is ganged to the 12BY7 driver tank-circuit capacitor, C11, and thus is used for single-control preselector tuning in receive and driver output tuning in transmit. Trimmer capacitor C19 in the base of Q15 is a padding adjustment for CR22 to keep the capacitance range consistent with the frequency band it covers. In circuits of this type where r.f. voltage is applied, the d.c. bias across the Varicap must be greater than the developed r.f. voltage since it is possible that the capacitance of the Varicap can be changed by the r.f. voltage if it exceeds the d.c. bias level. This normally undesirable situation is put to good use, when Q14 is conducting, to provide some degree of low-level a.c. action. The d.c. bias is reduced slightly, with the L/C ratios adjusted to maintain resonance at the desired frequency. When the r.f. voltage amplitude increases with speech and exceeds the threshold d.c. bias, the change in Varicap capacitance detunes the circuit and the output proportionally levels off.

**Rf. Amplifier and 100-kc. Calibrator**

Q17 is a common-base amplifier for maximum voltage gain and high-impedance output; the latter is desirable for minimizing loading of the high-frequency mixer and driver input stage. Protection is provided from transmitted r.f. by two silicon diodes, CR23 and CR24, which conduct to ground when the r.f. voltage is greater than 0.5 volt at the front end. The antenna is tapped down for impedance matching by the capacitor voltage divider mentioned previously, and the circuit is tuned by CR22. R.f. gain is controlled right at the receiver front end, ahead of the amplifier, and a strong signal at the antenna that could cause overloading can be effectively attenuated by this control. As Q17 is always operating at maximum gain, no compromise is made on a.g.c. characteristics, as usually is necessary in normal r.f. gain control circuits.

By tying one end of the r.f. gain-control pot, R9, to the output of the 100-kc. crystal calibrator, variable-amplitude calibration injection is available. When the calibrator is turned on by S3 and R9 is rotated toward the calibrator end, signals coming from the antenna are attenuated. Eliminating incoming signals and atmospheric background noise makes the 100-kc. markers easily identifiable across any band.

**Driver and Final Amplifier**

The 12BY7 class A driver is completely cut off in receive by applying ~ 80 volts through R9 (Fig. 4) and the grid resistor. In transmit the grid resistor is allowed to complete its normal path to ground. Up to 3.5 volts peak r.f. is available at the grid of this stage on 10 meters. All the driver output coils, L19 to L22, are swamped with resistors (not shown in the schematic) to provide a constant load and to prevent self-oscillation. The values of these resistors were not critical, and they were experimentally selected to allow sufficient drive to the final amplifier, yet maintain stability. There is no more enough drive on all bands and heavy swamping was necessary, particularly across the 80- and 40-meter coils, to prevent grid current flow in the final amplifier. As information, the values used were: L19 and L20: 4700 ohms; L21, 6800 ohms; L22 and L23, 10,000 ohms; all 1/2 watt. Optimum values should be determined experimentally.

A multiband tuner is used in the final tank circuit. It resonates in 80-, 20-, 40-, 15-, 10-meter sequence from maximum to minimum capacitance.

C13, the output loading capacitor, is adjusted conventionally for loading the amplifier into the antenna.

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Relative power-output indication is obtained by rectifying a portion of the r.f. output by $CR_9$ and applying it to the combination output/S-meter. Relative reading on the meter can be adjusted by $C_{14}$. Since the meter circuitry is at a positive potential the diode rectifier path for this circuit must be returned to the 11.5-volt bus rather than to ground. The 0-1 milliammeter $M_2$, is connected as a voltmeter to indicate 200 ma. full scale. Final-amplifier resting plate current is adjusted to 25 ma. On Transmit by the bias pot, $R_{12}$ (Fig. 4); on Receive the resting current decreases to 15 ma. because the 100K resistor in the grid circuit of the 12BY7 is lifted from ground and increases the bias voltage. Plate current in the tune/c.w. position with the amplifier loaded is 150 ma.

**Power Supply and Regulator**

High voltage is obtained from a dual-purpose power supply. The power supply transformer, $T_4$, is a readily available item and is especially designed for either 115 volts a.c. or 12 volts d.c. input. The secondary, which is rated at 280 volts, 150 ma., is used with a voltage-doubling rectifier-filter which raises the B+ voltage to 600 volts, and also supplies a 300-volt output for the driver B+ and the screen of the final. The supply has been loaded to a full 200 ma. continuously without any evidence of excessive heat. Negative voltage for the final amplifier and the driver grids is obtained by a shunt rectifier directly off the secondary a.c. winding.

In a.c. operation full-wave bridge rectification is used from the 12-volt a.c. winding to provide d.c. voltage for the transistors. This voltage is filtered and then regulated to 11.5 volts by $Q_{10}$. $CR_8$ and $CR_9$ are Zener diodes which establish the reference level for the 11.5 volt regulated bus. This figure was chosen in order to allow for possible voltage drop in supply leads from a 12-volt battery when d.c. power supply is used. A 10- or 11-volt Zener probably could be substituted with no change in overall operation, but in that case the optimum values for bias resistors for the various stages might be different from those given and should be determined experimentally.

With 12 volts d.c. input, $CR_{15}$ acts as a one way current valve, preventing 12 volts d.c. from being applied back through the d.c.-to-d.c. converter. This is necessary in order to allow the receiver to be turned on by switch $S_7$, on $R_9$, and yet not allow the filaments or other circuits to draw current when the “receiver only” mode is selected. Total current drain in the “receiver only” mode is 140 ma. Half of this current is used by the four illuminating lamps for the dial and meters.

The d.c.-to-d.c. converter portion of the power supply circuitry is that recommended by the transformer manufacturer, with the exception that higher-power transistors ($Q_{00}$ and $Q_{01}$) are used. Both transistors are mounted on a finned heat sink attached to the top of $T_4$. The end bells of $T_4$ were removed to save space and enable $T_4$ to be mounted horizontally on the chassis.

**Construction Notes**

The balanced modulator, its associated crystal oscillator and doubler/tripler, the mechanical filter/453-k.c. amplifiers, and low-frequency mixers were constructed on a 6⅛ by 3-inch copper-clad epoxy board. Another copper-clad board, 8½ by 3¼ inches, was utilized for the
heterodyne oscillator, r.f. amplifier, high-frequency mixer, and the v.f.o. tuning capacitor. The a.g.c. amplifier, 8-meter amplifier, d.c. regulator, and 100-kc. oscillator were located on the two boards where it was found convenient, since their associated circuitry was not critical with placement. Each stage was constructed and tested individually before going on to the next stage. The v.f.o. used the same construction, and likewise was tested and corrected for stability as previously described.

Most of the components were mounted above the boards and their leads interconnected either by direct wiring or through terminals beneath the board. For most components the copper-clad board was drilled to accept the wire size of each lead, and then countersunk by hand with a larger size drill just deep enough to remove the copper foil around the hole, to prevent shorting. Ground connections were soldered directly to the copper surface. The boards were mounted to the 11 by 9-inch cutout chassis after most of the individual stage construction and testing had been finished.

The metal boxes and shields (other than for the v.f.o.) visible in the photographs were used as a precautionary measure rather than from necessity. However, it was considered good practice, and no doubt has contributed to good stability. With the close spacing of components and wiring, care was taken in placement of the various r.f. stages to minimize undesired coupling.

The band switch, Sa, is actually three separate ceramic rotary assemblies ganged together. The first section, using a single wafer, is mounted on a bracket placing the wafer 2 inches behind the panel. A two-wafer assembly, for the preselctor, is similarly mounted in line with the first so that its front wafer is 4 inches away from the single wafer; the shafts of the two switches are ganged with metal tubing and set screws. The third assembly also has two wafers, separated 3 inches from the second section; this assembly (in the heterodyne oscillator circuit) is similarly ganged to the second switch.

Only those transistor types that were available for use and were either directly substituted or found suitable for operation, after appropriate base-bias adjustments were made, are indicated in the diagrams. The variety of transistors used indicates that many other types of small-signal high-frequency transistors can be effectively used. Whatever the types chosen, the base-bias resistors should be adjusted individually for best performance, even for transistors nominally of the same type, since the operating characteristics do vary somewhat from one unit to another. The utilization of transistor sockets greatly simplified circuit testing. For mobile operation, soldered-in transistors would probably be desirable, but good-quality sockets have proven most reliable under severe vibration.

Conventional precautions were taken concerning transistor handling, heat, applying voltages, polarity, and so on, during the construction and testing. Even with these normal precautions 8 transistors were destroyed by sheer negligence, because of a variety of circumstances — including accidentally applying the full r.f. output of the linear directly to the emitter of the receiving r.f. amplifier.

As a side note, after all of the transistor circuitry was completed and working it was noticed that the copper-clad boards had begun to tarnish heavily. An attempt was made to remove the tarnish with alcohol and a detergent. This proved catastrophic. Whatever the chemical reaction that took place, within days corrosion crept over the boards and under components until it appeared that the entire transceiver would have to be scrapped. As a last resort, the entire transceiver was immersed in a tub of soap and water, carefully washed, scrubbed and then rinsed. Then the chassis was placed in a 250-degree oven to bake out. The copper-clad boards with the components were later sprayed with clear Krylon. Corrosion is no longer evident, and the equipment has been very reliable since.

Overall performance of the transceiver has been very good. It has been operated on all bands and modes, with gratifying reports. Single-tone power output into a Byrd wattmeter indicates 52 watts minimum output on 80 through 15 meters and 45 watts on 10 meters. Receiver sensitivity, while not accurately measured, compares favorably with that of the home-station receiver, and the set has been used as a "second receiver" for DX chasing. A few birdsies are evident in the receiver, but only two of these are bothersome, falling in the phone portion of the 15- and 10-meter bands. All others are of very low amplitude and barely discernible. An exceptionally strong adjacent-channel local station will produce cross-modulation, but this can be controlled to a certain degree by the r.f. gain control, and the effect is not serious unless the desired station is very weak. No doubt an FET r.f. amplifier would solve this situation, and it is planned eventually to replace the existing r.f. amplifier. The low current drain in the "receive only" mode is a decided advantage, since automobile battery drain can be considered negligible. There was no need for any special noise suppression for mobile operation, thanks to the substantial amount of filtering used in the d.c. regulator input circuit.

The significant problem of acquiring miniature components that were suitable for use requires acknowledgement to those who materially assisted both in searching and in donating to me many items. Therefore, my thanks to W1EEE, W1VBI, W1MOJ, and W1HTK. Extra thanks go to W1MOJ for his efforts in fabrication of the aluminum chassis, front panel and cabinet.

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**SWITCH TO SAFETY!**

December 1967
ONE of the first problems a novice or newcomer runs into in ham radio is that of grounding. Should a receiver or transmitter have a ground connection for better operation? Can they be operated without a ground, and if so, do they work just as well? What about getting lightning protection for the equipment by grounding?

In dealing with electrical circuits, it is very important that we have a common reference point. The best reference point would be one that is least likely to change and is common to every circuit. There cannot be much doubt that the only reference point that fits these requirements is the earth itself. No matter what we do to the earth (at least so far), it is impossible to change its electrical potential. Because of this fact, the earth is used as a basic reference point in dealing with electrical or radio circuits. The electrical symbol for an earth connection is shown at Fig. 1A.

When we connect something to earth, and say that the "something" is at ground potential, we mean there is no voltage difference between the two. In wiring electrical gear or radio equipment there is usually a common connection point — our reference point — and this is usually referred to as "chassis ground" or the "ground bus." The chassis ground could be connected directly to earth ground and there would be no difference in potential. The circuit symbol for a chassis ground connection is shown in Fig. 1B.

Many newcomers to reading circuit diagrams think that there is some special lead or connection to tie all of the chassis ground connections together, but it is simply the chassis itself, if the chassis is metal, or a ground bus or lead if the chassis is made of nonconducting material.

Also, many novices assume that the chassis of a receiver or transmitter must be connected to earth ground in order for the equipment to work properly. This is an incorrect assumption. As we can see, if both the piece of gear and the earth are at the same potential, it doesn't make any difference whether they are connected together or not. They can be, but they don't have to be.

However, there is another reason for connecting all the chassis in your station to a good earth ground, and it is a very important reason: safety. While it isn't a common occurrence, it is always possible for a component to fail in a piece of equipment, with the result that the chassis may be at a different potential from the earth, or different from the potential of another chassis in the station. If you should touch both chassis at the same time or touch something connected to earth and the chassis with the voltage difference on it, you'll get an electrical shock, and this can be very dangerous.

![Diagram of a man and a Mike](image)

**Fig. 1** — The symbol at A is the one used to indicate a common or chassis ground. At B is the symbol indicating a connection to an earth ground.

By having all the chassis in the station connected to ground, a component failure will cause the fuse in the faulty equipment to blow — assuming, of course, that the equipment was fused, and it should be.

If it isn't fused, more than likely something would heat up to the point where you would notice the failure and turn off the power. But most important, you wouldn't get a shock by touching the faulty equipment.

**Earth-Ground Connections**

Naturally, the first question asked would be, "What is a good earth-ground connection?" For years, the word among hams was that water pipes make good earth-ground connections. While a water pipe can be an excellent ground,
any fairly recent plumbing installation should be carefully checked. In the author's case, a deep well is used to supply water. All of the plumbing in the house is copper tubing, but where the well piping enters the house through the basement wall plastic tubing is used. And plastic "just ain't" a good conductor. In many of the newer housing developments plastic type pipes or couplings are used, so an amateur planning to use a water pipe ground would do well to check that metal piping is used all the way to where it enters the earth. Make sure that metal connectors or unions are used. If the piping is metal and is complete to the earth, the piping makes an excellent ground connection point.

The power companies always use a "neutral" or ground connection when they bring the a.c. lines into a dwelling. You will always find a connection to earth ground at the power service entrance. In locations where water pipes are available, the power company makes its ground connections to the water lines. In installations where no water lines are available the ground electrode is usually a ½-inch diameter rod, 8 feet long, and made from a nonferrous metal, usually copper. You can make your earth-ground connection to this same point.

The National Electrical Code lists several types of grounding electrodes that can be used to obtain an approved earth ground. The electrode can be a driven pipe, driven rod, or a buried plate. A driven pipe should be at least ¾ inch in diameter, 8 feet long, and have the outer surface galvanized or otherwise metal-coated to reduce corrosion. Buried plates must be at least 1 foot square so as to present at least 2 square feet of surface to the earth. Copper roof flashing would make a good electrode. Such electrodes should be buried at least 4 feet deep.

The Code recommends grounding-conductor leads of No. 6 wire, either stranded or solid, insulated or uninsulated. Any electrical contractor or supply house stocks both electrodes and conductors. We don't recommend using TV-type ground rods simply because these usually are steel rods with a thin copper coating which tends to rust off a few days after the rod is installed. Use approved type of equipment; it will pay off in the long run.

In the author's station, which is located in the basement, a ground electrode was driven into the earth just outside the basement wall. A lead was brought in from the electrode and connected to a length of ¼-inch diameter copper tubing which was mounted along the rear of the operating desk. All the equipment in the station is connected to the tubing. In addition, a connection was made from the tubing to the neutral side of the a.c. line to make sure that the newly installed ground was at the same potential as the a.c. ground. The two grounds are about 50 feet apart, and it could be possible to have enough resistance in the earth between them to have a slight potential difference. If possible, when installing a separate ground electrode connect it to the a.c. ground to avoid any potential differences that may exist.

**Grounds and Apartment Buildings**

Concrete or stone apartment buildings can present a problem in obtaining an earth-ground. Concrete and stone are not conductors. Water pipes may provide a ground but this isn't always a sure thing, as pointed out earlier.

(Continued on page 168)
Break-In Keying Without Relays

BY MICHAEL L. STEINE,* WA2EYZ

This circuit will key the transmitter (if it uses grid-block keying) and simultaneously key the receiver muting line so that incoming signals can be heard between dots and dashes. The transistors and diodes cost about $8.

I have long been interested in achieving an efficient and inexpensive keying and break-in system which would not utilize relays. Relays have several disadvantages, especially at high speeds. Even good ones are relatively slow-acting, and the contacts may bounce. The coils must be energized from rather high-current supplies, and when the key contacts begin to get dirty the relay becomes erratic. On the other hand, transistors have none of these disadvantages. Besides, they're cheaper.

The circuit shown in Fig. 1 is designed to be operated in conjunction with an electronic t.r. switch or separate receiving antenna, to protect the receiver front end. The main function of the device is to decrease the receiver sensitivity while keying the transmitter. It will work only with grid-block keying, such as is used, for example, in the Heath Apache. The receiver should have a common cathode string connected to the r.f. gain control and opened by a stand-by switch, as in the Hallcrafters SX-100.

Transistors Q2 and Q3 form an astable multivibrator which produces a square wave (approximately) at around 5000 c.p.s. The oscillator runs continuously. Its output is directly coupled through R4 to the base of Q2. With the key up, the emitter of Q2 is held positive with respect to its base and no current flows in the collector circuit. At the same time, current flows through R4 into the base of Q3, saturating the transistor and causing the cathode string of the receiver to see a short to ground.

When the key is down, the voltage is removed from the base of Q5, and since no current is

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Fig. 1—Circuit of the relayless break-in keyer. Resistances are in ohms (K = 1000); except as indicated, fixed resistors are \(\frac{1}{2}\) watt. Except for C1, which is electrolytic, capacitors are paper or mylar. Component numbers not listed below are for text reference.

CR1, CR2—Silicon, 50–100 p.r.v. (1N537, etc.).
Q1, Q2, Q3—RCA 40264 (breakdown voltage 150).
Q4—A.f. transistor, 2N2270 or equivalent.

R4—10,000-ohm control, linear taper.
T1—Transistor output, 100 ohms c.t. to 10 ohms c.t., primary center tap not used (Stancor TA-2).

26 QST
Fig. 2.—A version using a p-n-p transistor to key the transmitter. The application of this circuit is limited at present by the availability of transistors having adequate voltage ratings for use at Q1. Values given below are representative, but should be modified to suit transistors actually used. (Transistors used by the author were Q1, 2N418/Bendix and Q2, TR-23/International Rectifier.)

C1—22 μf, 35 volts.
R1—50 ohms, ½ watt.
R2—1000 ohms, 2 watts.
R3, R5—240 ohms, ½ watt.
R4—2000 ohms, ½ watt.
R6—470 ohms, ½ watt.
R7—2500-ohm control, linear taper.

flowing through the base circuit the transistor opens. With Q2 open the receiver cathode string runs to ground through R5 and R6. R6 controls the sensitivity of the receiver when the key is down. Meanwhile, Q1’s emitter becomes grounded when the key is down, and the transistor acts as an amplifier for the output of the multivibrator. Transformer T1 in the collector circuit of Q1 steps the audio voltage down and operates into a full-wave rectifier consisting of CR1 and CR2. This transformer is used to isolate the base-emitter circuit of Q1 from ground. Capacitor C2 helps to change the square wave into something more like a sine wave. C1, C2, R1 and R2 make up a network which produces a filtered d.c. input for controlling Q1, but which has a short-enough time constant so that keying is not affected. With Q1’s base-saturated the transmitter blocking bias is dropped to zero and the transmitter is keyed.

Nothing in the unit is critical, and it should work no matter what size package you squeeze it into. Mine was built on perforated boards in two sections, one for the multivibrator and one for the rest of the circuit. The two boards are mounted in a good-sized Minibox, with the sensitivity control and a key jack on one end of the box. The circuit does not include a power supply because I utilize a master supply. A simple supply may be constructed from a 12-volt filament transformer, a full-wave bridge rectifier, and a capacitor-input filter. This will provide around 16-18 volts. The circuit requires a maximum of 50 ma.

In operation, the device will key as fast as you’re able, and time delays are no problem. There are only two disadvantages to the circuit: There is a slight reduction in receiver sensitivity due to some resistance remaining when Q2 is operating, and there is a popping sound from the speaker. If the latter proves to be severe, two silicon diodes connected limiter-fashion (polarity of one reversed with respect to the other) across the speaker coil will eliminate most of the sound.

A P-N-P Model

It was mentioned above that a principal function of T1 is to isolate the base and emitter of Q1 from ground; this is necessary because Q1 is an n-p-n transistor and must key a negative voltage with the grid-block system. The multivibrator, audio amplifier and rectifier-filter can be eliminated if a high-voltage p-n-p transistor can be substituted for the n-p-n, since this part of the circuit exists solely to make the necessary base-emitter isolation possible.

In early experiments, a p-n-p transistor actually was used in the circuit of Fig. 2, and although its maximum collector-voltage rating was exceeded, it operated satisfactorily. However, at present there are no inexpensive p-n-p units on the market having collector-voltage ratings high enough to take care of average grid-block requirements (100 volts or more, in most cases). If the transmitter’s blocking-voltage as measured with a v.t.v.m. across the open key does not exceed the collector-voltage rating of an available p-n-p transistor, Fig. 2 represents a considerable simplification with the same overall performance as Fig. 1.

In this circuit, Q2 has the same function as Q6 in Fig. 1. With the key open, forward bias is applied to Q2’s base through R4R5, causing the transistor to saturate and grounding the receiver cathodes. At the same time, R1R2 maintains the emitter of Q1 at a slightly more negative voltage than that at its base, and Q1 is nonconducting. When the key is closed, Q1 conducts and keys the transmitter, while Q2 is cut off and the receiver gain is controlled by R5R7.

In using this circuit the important thing to remember is to adjust the voltage divider R5R4 so that Q2 will keep going without burning up its base, and to keep Q1 turned off by making its base (key open) slightly positive with respect to its emitter. Also, if the power-supply voltage is in the wrong range the transmitter may be turned on even though the key is up. Values will depend on the particular transistors used.
Two serious problems in the operation of a t.r. switch are reduction in signal input to the receiver when the transmitter is tuned to resonance (suck out), and harmonic generation causing TVI. This article is designed to give the reader a brief rundown of t.r. switch designs along with some modifications of a popular commercially available t.r. switch which overcome the problems.

The basic designs of a t.r. switch are shown in Fig. 1. These are:

A) Cathode follower mounted at or near the transmitter output connector.
B) Transformer-coupled unit mounted at or near the antenna jack of the transmitter.
C) Cathode-follower or (D) transformer-coupled unit mounted close to the transmitter final tank circuit and connected to the input side of the pi network.

A cathode follower used as in (A) offers less than unity transfer of voltage to the receiver and therefore is not desirable except in the interests of economy and simplicity.\(^1\) Transformer coupling as in (B) in some cases will give gain in the form of preamplification, but the circuit is still subject to the suck-out problem mentioned above. A t.r. switch mounted in the tank circuit of the transmitter and coupled to the input side of the pi network (C and D) will, in most cases, eliminate “suck-out” problems, and a peak in receiver gain will be observed when the transmitter is tuned to resonance. A considerable additional amount of gain can be realized through the use of a transformer-coupled unit (D) mounted at this point.

From the installation point of view, mounting

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\(^1\) This assumes, of course, that impedance transformation is not an objective. The assumption is usually justified, since the line impedance and receiver input impedance (with current equipment) be the same in most applications. — Editor.

Fig. 1 — Elementary TR switch circuits.
the unit in the tank circuit becomes rather difficult in present-day compact transmitters—not to mention warranty problems. For these and other reasons, a transformer-coupled switch connected directly to the transmission line seems most generally useful. The t.r. switch used by the writer is a Barker & Williamson Model 381B, a two-tube unit capable of giving substantial gain if the coils are resonated on each band by a variable capacitor. The modified circuit is shown in Fig. 2. Standard TVI “debugging” procedures have been used—complete shielding, filtering of the a.c. line cord, and use of a low-pass filter in the transmission line between the switch and antenna. Results have been 100 per cent successful.

Those who already have the 381B will find that the modification is really quite simple, as shown by the following procedure (similar modifications could be applied to other units)3.

1) Remove the chassis from the cover by taking off the front panel, and drill a hole in the panel to accommodate the variable capacitor (C3) to be installed. This hole should be the same distance from the side and bottom of the panel as is the band-switch hole.

2) Mount the capacitor on the panel with the stator plates toward the bottom.

3) Reinstall the front panel on the chassis and make sure that the movable plates, when rotated, do not touch Z3 and Z4 (a.c. line filter coils).

4) Solder a heavy bus bar from the stator connection on C3 to the “half moon” ring on the terminal strip as shown in Fig. 3.

5) Run a heavy bus bar from the rotor connection of C3 to the ground lug next to the capacitor. Be sure not to short any a.c. components.

6) Remove all the mica capacitors connected across the coils on the band switch.

7) Connect C1 (56-pf. mica) across the 80-meter coil, and connect C2 (43-pf. mica) across the 10-meter coil. Leave the 20- through 10-meter coils without capacitors.

8) Remove the mounting nut on the tuning capacitor just installed and dismount the panel from the chassis. With the capacitor supported by its leads, slide the unit into the cabinet and reinstall the front panel.

The t.r. switch should be placed near the rear of the transmitter and connected as usual. When changing bands, select the proper band with the band switch and tune for maximum gain in

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3 The earlier B&W 381 (not the B model) is basically the same except that the band switch is on the opposite end of the cabinet. The variable capacitor should be mounted as shown in Fig. 3 (on the opposite end panel from the coax connectors). The wiring of the 381 requires two other changes to make it agree with the 381B schematic. The lead from the common end of the band-switched coils to B+ must be disconnected at the B+ end and reconected to Pin 9 of the 108TA. The lead from the center tap of the band switch to Pin 9 of the 108TA must be disconnected from Pin 9 and connected to B+.
the receiver with $C_3$. Tune the transmitter
normally.

A few simple operations can add to the
appearance for those who are interested. The
printing under the tuning capacitor knob can be
removed by judicious use of a rubber ink eraser,
using care to prevent removing gray paint.
Standard decals can then be placed in the correct
position and the panel sprayed with a light coat
of clear Krylon. These changes should be made
before the panel is mounted.

To summarize, the advantages of using this
type of electronic t.r. switch are numerous —
elimination of mechanical noise from a relay and
the inconvenience of turning a switch, instant
break-in, and a constant antenna load on the
transmitter. This last eliminates the possibility
of "no-load" conditions before the relay actually
activates, or because of relay failure (very impor-
tant when using an expensive tube in the final
amplifier).

Another advantage is the increase in overall
receiver gain; however, a really good communi-
cations receiver will not benefit from this nearly
as much as a lower-performance receiver will.
Just to be fair, there are also a few disadvantages:
There is an extra knob to adjust when operating,
and the cost of the t.r. switch is higher than the
cost of a coax relay.

The problem of deciding whether or not the
advantages outweigh the disadvantages is left
with the reader. For the author — they do!

I would like to acknowledge the efforts of
Francis K. Campbell, W51GJ, for his original
idea and correspondence, without which this
article would not have been possible.

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**AMATEUR RADIO AS A CAREER**

We have a permanent position vacant on the
ARRL Hq. staff, as an assistant secretary. If
you're a young amateur with a couple of years of
hamming behind you, here's your chance to
make amateur radio your career.

Duties include composing answers to regula-
tory, legal and general radio questions received
in letters from members; conducting tours of
headquarters for visitors, doing promotion and
publicity work; handling international corre-
spondence and other routine administrative
chores. Later on, there would probably be some
travel, to conventions and club meetings.

There is no formal education requirement, but
a good working knowledge of English usage,
grammar and spelling is important. Fluency in a
foreign language is a definite asset.

The candidate should have a neat appearance
and friendly personality. Experience as an officer
of a radio club, editor of a club paper, instructor
of a training course, or similar activity is helpful.

Because there is little parallel outside the
League to this position, we'll have to train our
man on the job. Thus we are especially interested
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Candidates for the post should write to Box 4,
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education, prior employment, military service,
marital status and amateur radio experience.
An "Obsolete" 50-Mc. Mobile Receiver

Part II of Two Parts

Transistor Receiver Ideas by the Carload

BY HENRY H. CROSS,* W1OOP

The W1OOP 50-Mc. mobile receiver, as it appears mounted in the car, ready for use.

Voltage, either direct from the diode detector, $CR_9$, or the rectified audio from the sideband rectifier, diodes $CR_{12}$ through $CR_{18}$, is applied to the n-p-n transistor a.g.c. amplifier, $Q_{14}$. The diode output is negative so there is a voltage divider from plus 9 volts to give the required forward bias. At or near the desired level the increasing negative voltage from the diode cuts down the collector current of the a.g.c. amplifier, reducing the forward bias applied to the controlled transistors, and thus their gain. Forward bias on the controlled stages is limited to about 1.3 volts by silicon diodes $CR_{10}$ and $CR_{11}$, which begin to conduct at a bit less than that. $Q_{14}$ has another collector load, the 2500-ohm control which feeds the squelch amplifier, $Q_{15}$. It is so arranged that the squelch may be completely cut off before there is any change in receiver gain. Though temperature effects do not cancel in any way, there has been no need to readjust other than the squelch control, when going from cold car to indoor operation.

When conducting, the squelch amplifier, $Q_{15}$, turns on another transistor, $Q_{13}$, which disables the first audio stage to silence the receiver. The action is excellent. The bypass capacitors on the arms of the a.g.c. controls were needed to keep audio out of the squelch amplifier chain. Without them the squelch was noisy in opening and closing, as on a fading signal or on intermittent sideband. (Unlike "75-meter types," 6-meter sidebanders occasionally pause for thought or breath, and the squelch gets a chance to work.)

Following the audio gain control, which is the load resistance for the diode detector, is the first audio amplifier $Q_{11}$, used in an active low-pass filter. The overall receiver bandwidth is 6000 cycles, so the recovered audio on a strong signal will all be below 3000 cycles. For best weak-signal a.m. reception, noise above 3000 cycles (generated by noise beating with noise, rather than with carrier) should be attenuated in the audio amplifier, as there is no intelligence above 3000 cycles to be lost. In sideband reception, with the h.f.o. at one side of the passband, there is a lot of noise and interference above 3000 cycles, and the usual S.S.B. signal has nothing useful above this frequency either. Filter elements are the base network of $Q_{11}$, and the 100-pf. capacitors in the feedback network of the output amplifier, Fig. 5. There is more high-frequency attenuation in the detector filtering.

The following audio amplifier could have been an ordinary transformer-coupled Class-B system, but the complementary silicon transistors, $Q_{16}$ through $Q_{20}$, were available, and I didn't have the transformers for a Class-B system on hand. Any of the ready-made audio units sold by Lafayette, Radio Shack, Allied and others would be usable.

Achieving Stability

Voltage on all stages except the audio is held to 9 volts rather closely, as input voltage varies. The simpler regulating arrangements are not good enough, and with them even using the car's turning signal has a weird effect on sideband reception. Using the MCL-1300 constant-current diode, $CR_{21}$, in place of the usual load resistor makes the ratio of input-voltage variation to regulated-voltage variation something like 1000 to 1, and this fixes things. The $R-C$ combination between the base of $Q_{22}$ and ground was added for high-frequency stability. The power transistor, $Q_{21}$, is not needed; a single 2N1711 could be used in place of the pass transistor and its driver, if the diode were changed to an MCL-1301 (1 ma.).

The first oscillator runs 10.7 Mc. below the signal frequency. It is just good enough. In addition to instability due to voltage variation, any transistor oscillator has drift due to temperature variation. Raising capacitance in the circuit may not fix this, as some of the effect may be caused by changing phase shift inside the transistor. The type finally chosen is notable for its combination of good high-frequency performance and good cooling. A 2N1744, first tried, had bad turn-on drift, probably because of high thermal

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resistance. Circuit capacitance is about the limit for the frequency. With higher capacitance the oscillator output drops off at the high end of the band. Watch the voltage swing and the back bias applied to the emitter-base junction. Some transistors have low $BV_{CEO}$, and there may be noise from leakage current, making for shaky c.w. notes.

**Adjustment**

Adjustment of a complex receiver such as this takes some ingenuity. My habit is to build up the front end and first mixer, and operate it as a converter, working into a communications receiver. It may not track at first, but it will be easy to tune up in the busy part of the band, and make it go. Use a coax patch cord connected to the receiver input, with the receiver set to about 10.7 Mc. The other end of the cable is equipped with a coupling capacitor and clips. Once the mixer is passing current it is possible to go to the other end of the filter and hear the mixer noise coming through, now that we know exactly where to look on the receiver dial. Peak the mixer collector circuit, $L_{14}$, in Fig. 2, for maximum noise, then move the patch cord to $L_{14}$ and tune the other 10.7-Mc. stages.

I use a BC-348, which has the advantage of covering 455 kc., so I can check the second mixer, oscillator and 455-ke. i.f. circuits in a similar manner. With this it is possible to find where the lump of noise representing the center frequency of the filter, subtracted from the 11.153-Mc. oscillator, really comes out. With the 348 centered on this the second i.f. can be peaked, changing values where necessary as we go.

There are four screwdriver controls in the receiver. The level out of the regulator is set to 9 volts by the 1000-ohm control when the regulator is pretested. The 100,000-ohm output control, Fig. 5, sets the output terminal of the amplifier, measured at the feed-through capacitor, at about half the lowest useful supply voltage, or around 6 volts in this case. The other two adjustments are to pick the level at which the a.g.c. amplifier begins to function. For initial adjustment, remove the a.g.c. amplifier, $Q_{14}$, from its socket and connect about 4700 ohms temporarily between the collector pin and ground. With some noise coming from the speaker, replace the transistor and turn the A.M. A.G.C. control to get about the same result. Then find a strong signal (your exciter, for example) and put an a.f. voltmeter across the diode load (the audio gain control). Turn the A.M. A.G.C. adjustment to maximize the meter reading, 5 or 6 volts. Then turn the other way to set this strong signal down to about 40 percent of the maximum. The limiter diode, $CR_7$, in Fig. 3, should not be connected when this is first being done.

The sideband a.g.c. adjustment is done with the b.f.o. disabled ($Q_{15}$ out of its socket). Feed a tone of around 1000 cycles to the input of the audio a.g.c. amplifier, $Q_{18}$, at a level high enough to make the voltage level out of the sideband a.g.c. rectifier almost as high as it will go. Set the a.g.c. adjustment so that the signal at the diode load
can be cut to about half the level that is delivered in the a.m. position. Next pull the second mixer, $Q_6$, put the b.f.o. transistor back in its socket, and check the level it delivers to the second detector. It can be anywhere from about equal to twice the a.m. carrier level. If it is too low the demodulation will not be good; if too high the last i.f. stage will overload.

When the receiver is going as a whole, you can touch up the a.s.b. control on the air. The a.m. control should be left as set according to the above procedure. Paint it with nail polish as a reminder.

Tracking the front end is mainly a matter of a signal generator and persistence. The coil inductances set the low end for gain, the 3-20 trimmers set the high end. Trimmers on the gang capacitor are set for about two-thirds maximum, the rear unit of each pair being mostly meshed and the forward unit only part way in. They also have maximum effect at the high end. When tracking seems good the mixer section may be trimmed at the high end and its associated
Fig. 5—Circuits of the output audio stages and regulated power supply used in the 50-Mc. mobile receiver.

CR1—1N4002.
CR2—JA10M, 1N4719 or 1N563.
CR3—Constant-current diode (Motorola MCL300 or MCL1301).
CR4—Reference diode, 1N821 or 1N429.
CR5—1N914 or 1N457.
RFC4, RFC5—Ferrite bead, or 5 turns No. 20 enamel on 220-ohm 2-watt resistor.
RFC6—2.5-mH, hash choke, 0.1 ohm d.c. resistance, or Stancor TC-1 or Thordarson TR-153.
Q16—2N2925 or 2N910.
Q17—27638 or 27132.
Q18—2N3642 or 2N697.
Q19—2N3741.
Q20—2N3766.
Q21—40310 or 2N3766, mounted to chassis with mica washer.
Q22—2N2714 or 2N706.
Q23—2N2925

Chassis-mounted trimmer can be used to fudge the mid-band tuning. Trimmers on the oscillator section probably should be covered; it is easy to stick a screwdriver into the wrong hole and mess up the calibration.

The signal generator used need not be fancy, but one is helpful in putting the oscillator in the right spot. When the receiver is properly set up there are no spurious responses apparent. However, the receiver seems to work passably when the first oscillator is 5.35 Mc., off the signal frequency, instead of 10.7 Mc., below, or even when it is around 30 Mc. There is enough range in the slug so that this could and did happen. Some check on the actual oscillator frequency is thus desirable. As a further check, find the image. Make sure it is where it ought to be, at 20.3 Mc., when the receiver is tuned for a 50.7-Mc. signal. If your signal generator output is high enough there will be a spurious response at 45.35 Mc., but none at 56.05 Mc. There will be other responses at 69.3 and 90.7 Mc. All of these will be found more readily if the signals are fed into the receiver after the band-pass filter, capacitively coupled to the base of Q1.

If you don’t trust the calibration of your signal generator, and you have no way of checking the oscillator frequency otherwise, take the receiver near to the family TV set, and tune it to wipe out whatever local TV sound or picture channels that are available locally. A 40-Mc. oscillator signal can be spotted against Channel 5 sound at 40.87 to .89, for example.

Inclusion of a half megacycle below the band edge was to allow monitoring below 50, and also to give extra tuning range when the receiver is used for an f.m. with u.h.f. converters. It is helpful to be able to tune an f.m. range that does not have strong local 50-Mc. signals in it, and it isn’t always easy to get crystals that will make 432.0 or 1296.0 Mc. come out exactly where you want them to be.
Interference from broadcast stations can often disrupt ham radio reception. Many ham receivers succumb to overload and cross-modulation problems when subjected to strong adjacent-frequency signals. This article discusses some of the common problems of broadcast station interference. Examples of workable interference filters and traps are given, offering some simple cures for a common problem.

IF you live in or near a metropolitan area, chances are that this article was written for you. Most large cities have several a.m. broadcast stations, many of which run as much as 50,000 watts of power. These stations pose a significant threat to nearby receivers, particularly to those that are prone to cross-modulation and front-end overload. In some regions, the ham bands in the h.f. spectrum — when tuned in on even the best of receivers — are a mass of distorted "pop" music, garbled voices, and splatter. It should be pointed out at this juncture that the broadcast stations themselves seldom are at fault, (although in isolated instances they are capable of generating spurious output if operating in a faulty manner).

The heart of the trouble, unhappily, lies in the receiver's inability to accommodate strong off-channel signals. For that matter, the same receiver would have a like problem when tuned to the very band in which the strong signals were. So the problem, then, is basically one of receiver design. The condition is usually compounded by the use of transistors in the front end of a communications receiver.1

The cure for this form of interference is best effected by the installation of some type of trap, attenuator, or filter at the input terminals of the receiver. The choice of device for this purpose can best be made after evaluating the situation; it will depend on the number of interfering stations involved, their operating frequencies, and the magnitude of their respective signals at the receiving site.

**Selecting a Filter Type**

Step No. 1 in choosing the best filter for a specific case of interference is to determine the nature of the interfering signal. For example: In tuning across the 80-meter band most of the ham signals might be obscured by a broadcast-band signal that seems to be several hundred kilocycles wide, is quite strong, and sounds a trifle garbled. After listening to this signal at different points in the band it becomes apparent that only one broadcast station is being heard. This is a form of "blanketing" that can usually be cured by installing a wave trap at the input terminals of the ham receiver. The trap can be either a series- or parallel-tuned type, Fig. 1 (at B or C), which has been tuned to the frequency of the interfering station.

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1 Transistorized receivers are particularly subject to front-end overload and cross modulation. The range of linear operation with transistors is small when compared to vacuum tubes. Because of this, they cannot handle large input signals without going into the nonlinear operating region.
Fig. 1—Schematic diagrams of the traps and filters. Variable capacitors are rated in pf. All others are disk or tubular ceramic and are rated in μF. Resistance is in ohms; K = 1000. Inductors L1 and L3 are ferrite-bar broadcast radio antennas, providing excellent Q for optimum rejection with the traps. The taps on L1 and L3 are shorted to the end of the winding nearest to them as shown at B and C.

C₁—50 to 400-pf. adjustable padder (Miller 160-B suitable).
C₂—10 to 160-pf. adjustable padder (Miller 160-D suitable).
J₁-J₁₀, inc.—Phono jack.
L₁—240-μh. ferrite-strip antenna (Miller 2004 suitable).
L₂—700-μh. ferrite-strap antenna (Miller 2005 suitable.)
L₃, L₄—3.3 μh. (Miller 70F363A1 suitable).
L₅, L₆—33 μh. (Miller 70F335A1 suitable).
L₇, L₈—10 μh. (Miller 70F105A1 suitable).
L₉—4.7 μh. (Miller 70F476A1 suitable).
R₁—50,000-ohm audio-taper control.

frequency of the interfering broadcast station.

If, when tuning across the ham band, you discover that there are two broadcast stations being heard, two traps can be installed at the receiver's antenna input. One trap will have to be the series type, Fig. 1C, and the other trap must be a parallel-tuned type, Fig. 1B. One of the traps can be tuned for maximum rejection of one of the interfering stations and the remaining trap can be adjusted to the frequency of the second station being heard. If the traps have good Q, there will be no apparent loss in received signal on the ham bands.

If more than two broadcast stations are involved in the cross-modulation/overload problem, a more complex filter will be required. Such a problem exists at W1NF, the ARRL Eq. Operator's Club station in Newington, Connecticut. At least four strong local broadcast-band signals cause overload problems in some of our receivers. One of our antennas, because it is vertically polarized, is particularly receptive to the ground-wave signals from these stations, adding greatly to the problem. Although a transmatch is used between the receivers and the doubler antenna, and an antenna tuner is used between the vertical antenna and its feed line, these extra tuned circuits do not completely eliminate the broadcast stations from the receivers. A transmatch is a step in the right direction, however, because of the added frontend selectivity it gives the receiver. In some instances a transmatch may be all that is required to clean up a mild case of "BSI" (broadcast station interference).

Where many interfering signals are involved, a high-pass filter of the type shown in Fig. 1A at D is often effective. Unlike the tuned traps, that offer sharp rejection to just one frequency, the high-pass filter will attenuate all of the signals below a selected frequency. If such a filter is designed to cut off at 1600 kilocycles, those frequencies that lie below 1600 kilocycles will be rejected. The amount of rejection, in terms of decibels, will depend on the number of sections the filter has. The circuit at Fig. 1D represents a minimum number of sections (two) for a practical BSI filter. One advantage of such a filter is that the farther you go in the low-frequency direction from the cut-off frequency (f₉₉) of the filter, the greater the rejection. For this reason, a high-pass filter designed to reject the 550- to 1650-ke. range will also reject signals in the low-frequency region, say from 10 kilocycles through 550 kilocycles. Although overload from stations in the L.F. bands is rare, there have been cases where hams living near airport beacon stations, marine markers, or other L.F. transmitters, have been plagued by cross-modulation effects. The high-pass filter is useful when one
wishes to reject both the L.F. and broadcast band signals. If only an L.F. station is affecting the ham receiver, either through overload or by riding in by means of the antenna on the L.F. channel (some L.F. stations operate on or near the common L.F. of receivers — 455 ke., 465 ke., or similar) a simple wave trap tuned to the L.F. station’s frequency should suffice.

A BSI stop-band filter is shown in Fig. 1-1. It is formed by placing two m-derived pi sections in cascade. This band-rejection filter, as it is commonly called, is designed to offer sharp rejection to signals in the 500- to 1000-kc. range. The filter does not impair reception below or above the broadcast band but virtually wipes out BSI, even when the ham receiver is in the immediate vicinity of high-power broadcast stations. At W1NF, no interference could be detected when this filter was installed at the input of even the simplest of transistorized receivers. This type, although somewhat more expensive to build — approximately $5.00 — worked the best in our location. Both it and the high-pass filter of Fig. 1D are designed for use in low-impedance lines. They will give a good match to lines between 50 and 75 ohms. They are not designed for use in high-impedance lines such as one might encounter when using random-length single-wire antennas. A general treatment of filter design, including impedance calculation, is given in The Radio Amateur’s Handbook.²


Other Types of BSI

It is entirely possible that signals from broadcast stations may appear at different spots in your receiver’s tuning range even though you’ve installed a filter at the input terminals. The most common cause is harmonics either radiated by the broadcast station or generated by stray rectification. It is unlikely that harmonic energy from a properly-adjusted broadcast station will be picked up on your receiver — although a possible exception would be in instances where the ham receiver is very close to the broadcast station’s antenna system — because F.C.C. rules require excellent suppression of harmonic energy from commercial transmitters. But stray rectification is a common problem, and is often the most difficult to resolve. If there is a nonlinear device in the neighborhood, such as a corroded downspout, rusty TV tower, or even a bad solder joint in your own antenna system, you can get BSI. When this happens, the bad metallic joint acts as a rectifier and gives rise to harmonics of the strong local signal. Frequently, two or more strong stations beat together and mix at the bad joint to produce a myriad of interfering signals which can be picked up in nearby receivers. In fact, your own ham signal can get into this act and cause TVI and BCI in the neighborhood. Such signals are often referred to as “phantoms”. The only cure for this form of interference is the painstaking process of hunting down the device that is causing stray rectification, then repairing the faulty connection. All too often an accusing finger is aimed at the local broadcast operator, even though his a.m. signal is devoid of spurious components.

Building a Practical Filter

As stated earlier, formulas and detailed data on filter design are contained in the Handbook.² The fine points of filter design are purposely left out here because the value of an article can sometimes be completely lost by burying the reader under a blanket of mathematical formulas and computations. The main theme here is to point out the causes of BSI, how to locate the source

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Fig. 2 — Pictorai representation of the method of installing the traps and filters. For best results, an earth ground should be used on the trap or filter and on the cabinet and chassis of the receiver.

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of the interference, and how to build a practical BSI "nullifier".

Ideally, any filter should be built in a shield can or box. In Fig. 1, the models at B, C, and D were built in home-made aluminum channels whose walls are approximately 1 inch wide. The channels were made long enough to hold all of the parts without crowding. Because these units were built for experimental purposes, no covers were made for the channels. During tests, to assure good signal isolation, aluminum foil was wrapped around the open-channel models for shielding purposes. The model of Fig. 1E was built in a 3½ × 2½ × 1½ inch Minibox. To lessen cost and to make the units as small as possible, photo connectors were used for input and output fittings. A d.p.d.t. slide switch was added to the filter of Fig. 1E to permit switching it in and out of the line for comparison tests. The switch should be included if the ham receiver also covers the broadcast band. By placing it in the "out" position, normal broadcast reception will be possible.

The parts layout is not critical. The photographs show the inside and outside of three of the units. These photos can be used as guides in laying out the filter of your choice. It is recommended that all filters be enclosed in a Minibox or similar r.f.-tight enclosure.

Installation and Testing

If one of the tunable wave traps is selected for BSI rejection it must be installed as shown in Fig. 2 at A. If traps are used for eliminating two broadcast signals, they can be hooked to the receiver as in Fig. 2B. The variable capacitors are adjusted until the interfering signal is rejected, while listening to the ham band in which the BSI appears. The high-pass and stopband filters are installed in the same manner, as in Fig. 2C. No tuning is required and their effect should be readily apparent once they are installed. Two or more filters can be connected in cascade, Fig. 2D, where severe BSI problems exist.

Some Final Remarks

The filters described in this article are by no means the ultimate in design; many configurations are possible and the choice is often a matter of personal preference. The units shown were chosen because of their relative simplicity and low cost. The purist may wish to go all the way and design a multisection filter. Such a decision can best be inspired by the nature and magnitude of the BSI in his builder's area.

Better attenuation characteristics could be realized if using the filters of Fig. 1D and 1E. The inductors were of a very high-Q variety. Poli-cored and toroidal inductors both offer improved Q over the chokes listed in Fig. 1, but the cost would be significantly increased if these high-Q coils were used. The inductors used in these models work quite well and are readily available as standard components.

The filter and trap attenuation was not measured but relative tests indicate that the units of Figs. 1B, 1C, and 1E provide at least 40 decibels of rejection. The high-pass filter of Fig. 1D indicated an approximate signal reduction of 25 db in the broadcast band and approximately 35 db in the l.f. spectrum.

These filters and traps do not have to relate exclusively to BSI. They can be redesigned to operate in other frequency ranges to cope with other problems. For example, if you like to operate 40 meters and your next door neighbor is a 75-meter enthusiast, or vice versa, chances are that his signal overloads your receiver so that copy is impossible, even on 20, 15 or 10 meters. If you don’t mind retuning a trap, you can probably relieve the problem of overload by installing a unit of the kind shown at Fig. 1B or 1C, and readjusting it each time he QSYs. If a problem such as this exists on a long-term basis, perhaps a filter of the type shown at Fig. 1E would be more satisfactory since it would not require retuning. Oftentimes the nearby interfering signal isn’t heard across the entire band but is strong enough to produce a high level of a.g.c. voltage in your receiver, greatly reducing the receiver’s sensitivity. A trap or filter could help cure that, too.

Whatever your BSI problem, one or more of these devices could lead to its elimination. If you’re an experimenter with transistorized receivers, these units should be a real asset if you are troubled by BSI.

The attenuator shown at Fig. 1A is useful in reducing the level of strong local signals and can often be used to cure overloading. Unfortunately, the desired signal is also attenuated by the same degree and may become unreadable if it is quite weak to begin with. Another fault of the resistive attenuator shown is that it introduces a mismatch at the input of the receiver. A better choice would be a ladder- or step-type constant-impedance attenuator. Commercial versions of the step attenuator are available and work well through the h.f. range.
Radio amateurs are people with diversified interests, ranging from low frequencies to u.h.f., through c.w., RTTY, a.m. and s.s.b. and from the sociability of rag chewing to the competitive aspects of contests. In all these activities there is one common element—the antenna. It is fair to say that the ultimate success of the station is determined more by the antenna than by any other single item of equipment.

This article introduces a new concept in antenna test equipment—one that will enable the amateur to determine the characteristics of his antenna, whether it be mobile or fixed, a vertical, dipole, beam, quad, or random system with an antenna tuner. It is a complete unit that allows actual measurement of antenna resonant frequency and radiation resistance accurately, easily, and within the economic means of every amateur.

Design Concept

The design of the unit, which has been named the "antenna noise bridge," is based on standard principles: that is, a signal source, a bridge circuit, and a detector are used to measure the parameters of interest. Normally, a variable-frequency signal source excites the bridge circuit and a broad-band null detector is used. In the case of the antenna noise bridge, a broad-band noise generator excites the bridge and a conventional receiver is used as a frequency-selective detector. The unit includes a noise generator and bridge, hence the name. The inherent measurement accuracy, when determining resonant frequency of an antenna, is limited only by the accuracy of the receiver used for testing.

The basic circuit uses a potentiometer in one leg of the bridge, and measurement accuracy of antenna resistance is limited only by the calibration accuracy of the potentiometer. Calibrated L and C components could be included in the bridge if measurements other than at resonant frequency are desired.

Application

Use of the technique is based on the principle that an antenna system is fundamentally a resonant circuit. As indicated in Fig. 1, the impedance of an antenna will reach a minimum value at a single frequency, and the minimum value will be the radiation resistance. (Resonance occurs, by definition, at the frequency at which the inductive and capacitive components exactly cancel each other.) At frequencies higher or lower than resonance, the impedance of the antenna will rise rapidly.

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Fig. 1—Typical variation of antenna impedance vs. frequency. The curve also represents relative noise response when the antenna noise bridge is used for determining resonant frequency and radiation resistance.

A block diagram of the antenna noise bridge is shown in Fig. 2. Note that the bridge will be balanced only when the resistive value of the antenna is equal to the value set on the dial. At frequencies other than resonance, reactive components (L or C) prohibit the bridge from being balanced.

When listening to the noise in a receiver (or watching the S-meter), the amplitude of the noise will vary in a manner similar to the impedance plot shown in Fig. 1. The receiver serves as a bridge null detector, and measurements may be made by tuning the receiver over the frequency range of interest. The procedure is as follows:

1. Set the antenna noise bridge dial to an estimated value of the antenna radiation resistance and connect an antenna and receiver to the appropriate terminals.

2. Tune the receiver over the range where antenna resonance is expected. Determine the frequency at which the best noise null occurs. (Noise null is a minimum S-meter reading and minimum audio noise.)

3. Adjust the dial on the bridge for best noise null.

4. Read the antenna resonant frequency from the receiver dial and the antenna radiation resistance from the antenna noise bridge dial.

Steps 2 and 3 should be repeated several times to insure high accuracy, and best results are obtained by setting the receiver audio gain to maximum and the r.f. gain to a comfortable listening level.

In addition to measuring antenna characteristics, the same procedure may be used to determine electrical quarter or half wave lengths of coax. The antenna noise bridge dial should be set for zero ohms, and quarter-wave lengths of coax should be open at the far end while half-wave lengths should be shorted at the far end.

It should be pointed out that most antennas used by the amateur have a radiation resistance of less than 50 ohms. If the antenna radiation resistance is not the same as the characteristic impedance of the feed line, standing waves will result, and the impedance seen by the transmitter will be affected by the length of coax. This is explained in the ARRL Antenna Book.) The actual resonant frequency of the system comprised by the antenna and line will be affected by coax length if the antenna and line are not matched.1 Matching networks, if required, should be installed at the antenna to achieve accurate measurements, as well as maximum efficiency. Radiation resistance is an alternating-current quantity and may be transformed through the use of balun coils, r.f. transformers, or matching networks to the desired value.

Details of Design

The schematic diagram of the unit is presented in Fig. 3. While it is a simple circuit, there are certain pitfalls the do-it-yourself type should be made aware of. These and other details are discussed below.

Noise Generator: A silicon Zener diode CR1 produces a broad-band spectrum of noise when connected as shown. All Zener diodes have this characteristic. However, extensive testing was required to find a diode which produced both high-amplitude noise and a broad frequency spectrum. Variation of noise level between identical units is also high, and a selection process may be required to find a useful unit.

Amplifier: Three transistors are used to amplify the diode noise level to a value high enough to be useful with high-gain antennas under crowded band conditions. Typically, the circuit will produce a noise level in excess of 30 db. over 89, which insures accurate measurements in high QRM.

The transistors and their associated bias networks were chosen for maximum performance. The 2N3563 transistor has a gain-bandwidth product of 900 Mc. This feature allows the use of an RC coupled amplifier even at frequencies above 100 Mc. The noise level is essentially constant over the entire h.f.-v.h.f. spectrum. This permits use of the unit as a signal generator for receiver testing.

Bridge: The bridge circuit is conventional but requires special consideration. The particular

Fig. 2—Functional diagram of the antenna noise bridge.

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1 This point can hardly be overemphasized. A bridge can only measure what it sees, which is the impedance looking into the line at the station end. If the transmission line is a half wave long at the null frequency, the resistance shown by the bridge will be the antenna resistance; otherwise, if highest accuracy is desired, the bridge reading will have to be modified by applying standard transmission-line formulas for the electrical length of line actually used.

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QST for
Fig. 3—Schematic diagram of the antenna noise bridge. Capacitors are disk ceramic; fixed resistors are 1/2-watt composition.

BT1—9-volt battery.
CR1—Zener diode (Hoffman HW6.8A).
J1, J2—Shielded connectors (phono jack or coaxial).
Q1, Q2, Q3—2N3563 (Fairchild).
R1—100-ohm composition control.
Si—S.p.s.t. slide switch.
T1—4 quadrifilar turns No. 28 enam. (see text) on 1/8-inch o.d. ferrite core (Indiana General type CF102Q2 core).

ferrite toroid core chosen for T1 allows use at the higher frequencies, provided the winding is carefully balanced. The winding must be quadrifilar; that is, all four wires must be twisted together, then wound on the toroid at one time. After the winding is complete (4 turns), two of the windings are connected in series for the primary and two for the secondary. This technique assures a high-accuracy center tap on the secondary winding, and assures good capacitive balance.

A potentiometer, R1, with minimum distributed capacitance should be chosen, for best high-frequency performance. The small capacitance that does exist must be compensated for by placing an equivalent capacitor across the antenna terminal. This can be done by trial and error when using a good dummy load in lieu of an antenna. Caution: A conventional resistor does not make a good dummy load at frequencies above 10 Mc. due to the inherent inductance. 2

The unit was designed for 50-ohm coax systems. Increasing the resistance of the potentiometer to accommodate 200-ohm antennas will significantly degrade the accuracy unless the distributed capacitance is compensated for.

The Complete Unit: This article was prepared to acquaint the amateur with a new concept in test equipment rather than to provide detailed information for duplicating the unit shown in the photographs. For example, the plastic container was specifically designed by the manufacturer for the purpose. The toroid core and the Zener diode pose an availability and economic problem to the average ham, as these items are not stocked by local distributors, and the manufacturers do not normally accept small orders. The potentiometer, when purchased through a local distributor, may have a tolerance variation as high as 30%. To achieve accuracy, the dial must be hand calibrated using an ohmmeter or dummy load. These factors are pointed out to assist rather than to discourage the more enterprising amateur who prefers to build his own.

Whether you build or buy, the antenna noise bridge allows you to measure antenna characteristics easily and accurately. The unit gives a very sharp null at the actual antenna resonant frequency and the radiation resistance of the antenna system is readily determined. This allows the bridge to be used to determine the true characteristics of the system and to make adjustments while monitoring performance, thus achieving an increase in communications capability.

2 For resistors in the 50-ohm region this inductance is primarily in the leads. If the lead length can be made negligible (mounting the resistor in a coaxial plug is one method) the resistance is essentially "pure" up to 100 Mc. or so. The errors become greater with large or small values of resistance. — Editor.
A yagi without a boom would fall apart, but a quad without a boom can be an easy-to-build, rugged antenna. HB9PL's Spider Quad is a good example of the latter.

The Spider Quad

A Two-Element Beam

Without A Boom

BY PETER B. LANGENEGGER, * HB9PL

With the recent move of HB9PL from Basel to Zurich and the possibility of building an "antenna test range" at the new location, it was decided to start with a two-element, three-band cubical quad that offered simplicity in construction and maintenance and the capability to stand up in rough weather. Due to the high torque necessary to rotate a conventional quad (one that has a boom) and the parallel need for a large rotator, the boomless quad or "Spider Quad" was selected.

Admittedly the Spider Quad is an unusual sight; however, the structure that is seen by an outsider's eye is definitely somewhat smaller than a conventional quad. Besides, we started with the principle of doing the job right and getting away from such compromises as using the same radiator-to-reflector distance for three bands. Since the Spider Quad closely resembles two pyramids with their peaks joining on a horizontal line, the requirement of having a different spacing of the elements for each band is no obstacle.

HB9PL's three-band Spider Quad before the reflector stubs at the base of the antenna were adjusted. Rope guys between the front and rear of the antenna help to strengthen the structure.

Because we believe in having the current in the antenna rather than in a large adjusting stub, the reflectors were purposely made somewhat larger (5 percent) than the radiators. As a result, the stubs are about one-third the length usually used.

Although it is rather easy to adjust a gamma match, the weather-exposed compensating capacitors often develop problems after a while. To avoid this, we decided to use coax between the transmitter and a 1:1 broad-band balun, and 70-ohm Twin-Lead between the balun and the driven elements. As shown in Fig. 1, two large, 2-pole mercury relays are used to do the switching between the balun and the three driven elements. The relays were modified to suit our needs and are remotely controlled from the shack; they are housed in a well-ventilated rainproof metal case that sits just below and to one side of the center of the antenna.

* Rynerstrasse 8712, Staeff, Switzerland.

Fig 1.—Method of feeding the Spider Quad and of selecting the desired radiator. K1 and K2 are d.p.d.t. mercury relays with 115-v. a.c. coils. S1 can be either a 2-pole, 3-position rotary or a d.p.d.t. toggle switch with a center-off position.
The heart of the quad is shown in Fig. 2. It consists basically of a center plate, which is welded to an iron mast, and two X sections that are bolted to the plate with two nuts and bolts. The use of only two bolts has a particularly great advantage during the installation and maintenance of the antenna. If the center bolt is loosened and the other bolt removed, the whole array can be turned around the horizontal line of forward radiation.

**Construction**

Details of the central portion of the quad are given in Figs. 2 and 3. The plates, tubes and pipes that form this part of the antenna are made entirely of iron. Construction is started by welding the center plate to an 18-inch length of pipe. Then a 2-inch length of rectangular tubing is welded to each end plate. Next, after eight 4-inch pipes are prepared as shown in the spider leg details, four pipes are welded to each rectangular tube. During this last operation, care must be taken that the pipes are positioned as shown in the sketches. It is advisable to make an arrangement to hold the pipes and rectangular tubes very steady during the welding process. Either prior to the last step or just after, the hexagonal head of the center bolt is welded to one of the end plates. Once all the parts have been welded, they are cleaned and hot-dipped galvanized.

The assembly procedure is started with the insertion of a 13-foot, 9-inch fiber glass rod in each welded pipe. A hole is drilled through the pipe and fiber glass rod at a point about 3 inches from the pipe end that isn't welded. Cadmium-plated hardware is used to hold the rods firmly in place (Fig. 4).

The next step is the wiring of the reflectors on one X section, and the wiring of the driven elements on the other. Note that, as shown in Fig. 5, each driven element and reflector terminates at a small porcelain insulator. A stub is connected to each reflector insulator, and a length of 70-ohm Twin-Lead is attached to each driven-element insulator. The stubs are uncritical in size; they can be made of No. 14 bare copper wires spaced 3 inches apart. To start with, the stubs are 10 inches long, but they are usually 5 to 6 inches long enough to have the stub ends spaced 3 inches apart. The necessary length of the stub may be determined by actually using the rod.

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The address of outfitters that do hot-dip galvanizing can be found in the yellow pages of the telephone directory. — Editor.

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**Fig. 2** — Sketch showing the heart of the Spider Quad. Once the various pipes, plates and tubes have been welded, they are cleaned and hot-dipped galvanized.
around the rings on each fiber glass rod. After the elements are wired and properly placed, the ends of each loop are soldered together, and the plastic rings are glued to the rods with epoxy cement. This method of securing the elements to the fiber glass rods results in fastening points that have negligible wind resistance and very little area where ice and snow can be deposited.

Once the wiring has been completed, the center bolt is used to provisionally secure the two X sections to the center plate (the other bolt is left out). Since the Spider Quad is a very flexible array, the front and rear X sections of the antenna must be laced together to assure the necessary strength. For this purpose, the quad is raised above ground, and plastic-coated clothes line is connected between the four fastening points of the 20 and 15-meter radiators and those of the corresponding reflectors. As mentioned before, for this work the whole antenna can be rotated around the horizontal line of forward radiation.

Before the final installation of the quad, it is important that both bolts used to fasten the X sections to the center plate be securely tightened.

**Adjustment**

The only elements in the Spider Quad that require adjustment are the reflectors. Tuning can be accomplished by feeding power to the antenna and adjusting each reflector stub for minimum field strength as measured on a simple field-strength meter located in back of the antenna. However, this procedure requires three men, if the job is to be done within a reasonable length of time. One man slides a shorting bar up and down the reflector stub, one controls the rig, and one measures the field strength. This was the first method we used; however, after one of the men was burned by r.f. on a reflector, we quickly sought a safer and easier way.

In the procedure arrived at, no transmitter is needed. We made a simple transistor crystal-controlled oscillator that would supply a signal in each band, and hung the unit by two 10-foot copper wires in a tree that was approximately 150 feet from the quad. The supporting wires served as the antenna for the oscillator. Alignment was accomplished by pointing the back of the quad at the distant oscillator and adjusting each reflector stub for a minimum 8-meter reading on the station receiver.

![Diagram](image-url)
Relay Driver For Use
With Solid-State Keyers

BY CHARLES UTZ,* WIDEJ

Some of today's transistorized electronic keyers will not operate with certain transmitters because of the limitations of the switching transistor in the final stage of the keyer. In many cases, voltages above 100 volts and currents greater than 30 to 40 ma. will damage the switching transistor.

One solution (Fig. 1) to this problem is the addition of a one-tube circuit to actuate a keying relay. The relay contacts then key the transmitter. In the normal state, $V_1$ is cut off by the negative voltage from the power supply and the tube does not conduct, leaving the keying circuit open. When the electronic keyer circuit closes, the grid of $V_1$ is at zero volts and the tube conducts, energizing the relay and closing the keying circuit of the transmitter.

Construction

The keyer in the photograph is built on a homemade chassis, but any chassis about $4 \times 6 \times 2$ inches will do. A smaller chassis could be used if power for the circuit is obtained from the transmitter. The wiring and layout are not critical. To keep down the noise, the relay should be mounted on rubber grommets or similar cushioning material.

Although other relays will work in the circuit, the one specified is designed for high-speed operation. Most ordinary relays will cause keying problems at high speeds because of contact bounce. The relay used here will have no problem following speeds of at least 40 to 50 w.p.m.

![Figure 1](image1.png)

**Fig. 1**—Adapter for use with tape-recorded code.

CR3—200 p.r.v., 100 ma. or more.

T2—5000 to 3,2 ohm universal output trans.

TB3, TB4—Same as TB1, Fig. 1.

With the addition of three parts, the relay driver can be used to key a transmitter from a tape recorder or other audio source. For contest work, a CQ tape could be made up and a switch would select either the electronic keyer or the tape recorder with the CQ tape.

The circuit (Fig. 2) uses the audio voltage from the output of a tape recorder, which is stepped up by $T_2$ and rectified. This d.c. voltage is then fed to the input of the relay driver and overrides the negative voltage at the grid of the tube.

Parts layout is not critical. The adapter may be put on the same chassis as the relay driver or a $2 \frac{3}{4} \times 2 \frac{3}{4} \times 1 \frac{3}{4}$-inch Minibox may be used.

To operate, the tape recorder is connected to $TB_3$ and the output ($TB_4$) is connected to $TB_1$ of the relay driver. The volume control of the tape recorder should be adjusted to provide enough audio to follow the keying.

![Figure 2](image2.png)

**Fig. 2**—Circuit of the relay driver. Except as indicated, resistors are $\frac{1}{2}$ watt; capacitors with polarity indicated are electrolytic.

CR1, CR2—400 p.r.v., 100 ma. or more.

K1—1000-ohm relay, s.p.s.t. contacts (Sigma 41P 1000S-310)

S1—S.p.s.t. toggle

T1—125 volts, 15 ma.; 6.3 volts, 0.6 amp. (Stancor PS-8415)

TB1, TB2—2-lug terminal strip (two Millen E-302 or one E-304)

December 1967
TOWER SAFETY

To keep the kids from climbing the radio tower and getting hurt, enclose the lower portion of the structure with chicken wire as shown in Fig. 1.

—Robert C. Magne, W18KRR

VOX-TO-P.T.T. MODIFICATION FOR THE KWM-2

Changing from VOX to push-to-talk with the Collins KWM-2 requires that the lid be opened and the VOX controls adjusted. As shown in Fig. 2, a simple modification can be made which will allow a front-panel switch to be used to select VOX, push-to-talk or manual control (XMT).

The modification consists of rewiring the function switch from OFF-ON-NB-CAL to OFF-VOX-P.T.T-XMT and rewiring S14 from MIC GAIN on-off to CAL on-off. The only switch function that is lost is NB (noise blanker). However, if the noise blanker is installed, it can be left running all the time, if the user grounds the noise-blanker control wire as described below. Once the transceiver has been modified, the CAL function can be activated by rotating the MIC GAIN control fully counterclockwise.

The steps to be completed in the modification are as follows:

1) Remove the wire which connects the ungrounded end of the MIC GAIN control, R8, to the MIC GAIN on-off switch, S14.

2) Disconnect the white wire with orange tracer from the CAL contact of the function switch, S11, and connect it to the free lug of S14.

3) Disconnect the white wire with black tracer from the NB contact of S11 and tuck it back out of the way. If the noise blanker is installed, ground the wire.

4) Connect two shielded wires to S11 as shown in the schematic. Route the wires along the existing cable which goes down through the chassis, and lace the new wiring to the cable.

5) Carefully scrape the old lettering from the front panel and apply new lettering around the function switch. However, if the transceiver...
might be returned someday to its unmodified state, the original lettering can be left on the panel. In this case, paint a small plate gray to match the coloring of the panel, letter the plate, and place it under the hex nut that bolts the function switch to the panel. Matching spray paint, part No. 097-6162-00, is available from Collins. — Robert W. Lewis, K8KNI

**SCR MOTOR-SPEED CONTROL**

Most electric hand drills operate at a single high speed; however, from time to time, the need arises to utilize low or medium speeds. Low speeds are useful when drilling in tight spaces or in exposed surfaces where it is important that the drill bit doesn’t slip, and when drilling bakelite, Plexiglas, and similar materials. Medium speeds are useful for drilling non-ferrous metals such as aluminum and brass. One way to accomplish these ends with a single-speed electric drill is to use a silicon-controlled-rectifier (SCR) speed control.

The circuit of an SCR speed control is shown in Fig. 3. The SCR, Q1, acts like an open circuit until it receives a positive trigger pulse between gate and cathode. If at this time the anode is negative with respect to the cathode, nothing will happen and the SCR will still appear to be an open circuit. If, however, the anode is positive with respect to the cathode when the positive trigger pulse arrives at the gate, the SCR will function like a normal diode and conduct. Once triggered, the SCR will continue to conduct until the voltage between the anode and the cathode returns to zero and reverses polarity. It will then cease to conduct and not conduct again, even when the correct forward polarity appears, until the gate receives another positive pulse. The timing of the gate pulse determines the instant at which conduction begins during a possible 180-degree conduction period for sine wave input.

The trigger circuit consists of C1, R1, R2 and neon lamp I1. When the voltage across C1 reaches the ignition voltage of I1, the neon lamp fires and sends a pulse to the gate of the SCR. The setting of R1 determines the charging rate of C1 and thus the conduction angle of the SCR. Decreasing R2 increases the speed of an electric drill plugged in the output connector, J1.

Because of the small complement of parts, the SCR speed control can be constructed inside a very small container. The model described was built in a 2½ × 2½ × 1½-inch Minibox (Fig. 4). Since the mounting stud and main body of the SCR are common with the anode, care should be taken to mount the SCR clear of surrounding objects. In the unit shown, two soldering lugs were soldered together and the narrow ends connected to one side of the female output connector; the large ends were used as a fastening point for the SCR anode stud.

Although the circuit described is intended to be used to reduce the speed of electric hand drills that draw six amperes or less, it has many other applications. It can be used to regulate the temperature of a soldering iron which is being used to wire a delicate circuit, or it may be used for dimming lamps or for controlling the cooking speed of a small hot plate. Note, however, that if the circuit is used with a device drawing from three to six amperes for a continuous period of over ten minutes, it will be necessary to provide a heat sink (insulated from the chassis) for the SCR anode case. — Lance Q. Johnson, K1MBT

**Fig. 3**—Circuit diagram of the SCR motor-speed control.

- C1—0.15-pf, 200-v. paper tubular.
- R1—NE-2 neon lamp.
- J1—Chassis-mounting line socket (Amphenol 61-F1).
- Q1—C20B SCR (General Electric).
- R1—4700-ohm 1/2-watt composition.
- R2—50,000-ohm linear taper potentiometer.
- S1—S.p.s.t. toggle.

**Fig. 4**—Small enough to fit in the palm of your hand, the SCR motor-speed control is housed in a tiny Minibox.
ABOUT THE "CONNECTICUT LONGHORN"

Technical Editor, QST:
The article "The Connecticut Longhorn" by KIKLO in the August issue of QST describes an interesting application to amateur use of a type of antenna that has been discussed in detail in the technical literature during the past few years. The earliest article I am familiar with describing the antenna is by King, Harrison, and Denton, but there are many other discussions. The Northrop Corporation has done a great deal of work on the antenna as the DDR Antenna and in this form it has been discussed in several popular magazines.

The author describes the antenna as "going horizontal" which is correct as a geometrical description, but actually the antenna radiation is vertically polarized. The antenna is non-directional as indicated by the author. The short vertical section does the radiating and is tuned to resonance by the capacitive reactance of the short transmission line formed by the horizontal portion of the antenna and its image in the car top. Since the car top is not a perfect ground plane, the antenna is affected by the road underneath on which the car is driven.

KIKLO seems to have done an excellent job of empirically determining the properties of the antenna, including the high Q and narrow bandwidth, which are adequately explained by theory. Variations on the antenna are possible; the horizontal portion can be bent into a circle, curied into a spiral, or distorted in other ways with no great effect on the antenna performance. This accounts for the names ring antenna and hula hoop found in some of the references, but the more general term in transmission-line antenna. The antenna is seen to be a version of the short vertical antenna, familiar from the earliest days of radio, and is distinguished principally by the method of obtaining the capacitive top loading to bring it to resonance. — Wade Blocker, K9CAP, 17241 Osborne, Northridge, California 91326.

7 J. M. Boyer, "Hula-Hoop Antennas; A Coming Trend?" Electronics, 11 January 1963, p. 44.

144-MC. IC CONVERTER

Technical Editor, QST:
For some time I have wanted to build a modern 144-Mc. converter. Therefore, I lost no time in getting started after I received my September 1967 QST. I think that my experiences in building it might be of interest to others.

I used the Motorola MFP102 JFETs as recommended, but used some unknown silicon bipolar transistors for the oscillator and doubler, and a zener diode for the voltage regulator. The difference in price between the Motorola MC-1550 and the RCA CA3026 IC induced me to try the latter even though I knew nothing about either of them. The I.F. circuit required some revisions which are shown in the diagram. This is by no means the only connection that will work, but it works well for me and did so from the beginning. In this configuration, the gain increases as the voltage at Pin 7 is increased.

The board layout is essentially the same as the original except in the area of the I.F. amplifier. I made mine 5 by 7 inches so as to mount it on a standard chassis, but it will trim to 4¾ by 6¾ inches. I'll be happy to provide full-size board drawings to those who send an S.A.S.E.

Adjustment was quite straightforward. The only serious problem encountered was traced to a bad disk capacitor from my junk box. On-the-air tests have been good. The converter definitely works well. I have no means of measuring noise figure, but the substitution of my antenna for a 50-ohm resistor at the input results in a considerable increase in noise.

My QTH is close to six TV and several FM transmitters. Therefore, I am always concerned about spurious responses. The new converter is so-so in this respect. On the plus side, one old friend, the sum of Channels 4 and 5 video at 144.5, is gone — and good riddance. Another, the difference between Channels 2 and 11 audio and video at 144.0 is not strong and my coaxial antenna coupler eliminates it.

On the whole, though, I am pleased. Do keep up the good work and publish more articles like this. — Clair J. Robinson, WDLCN/AFOLCN, 5038 17th Ave. South, Minneapolis, Minn. 55417.
HURRICANE PICTURES

Technical Editor, QST:
Enclosed you will find a series of pictures (three are shown below — Ed.) that I received from the Nimbus II Weather Satellite during the recent hurricane season. The series depicts the birth and life of Hurricane Doria.

The comments on the pictures are my own conclusions and are derived from observing the pictures only. No discussion was ever had with the weather bureau.

These pictures represent almost two years of work and I think are a great tribute to QST in showing how an idea can be planted and what it will yield when brought to a finish.

Thanks again to QST for its outlook and leadership and to Wendell Anderson for his fine article. — Aubrey Burton, W4TNT, No20 Hanover Ave., Richmond, Virginia 23226.

Sept. 10—Storm Doria in top right hand corner of picture, comes to full hurricane force off the coast of Georgia.

Sept. 12—Hurricane Doria stalls northeast of the Virginia capes.

Sept. 17—Hurricane Doria invades the eastern shore of Virginia.

Landmass outlines have been added to aid in reading the photographs.

Automatic Picture Transmission for the Radio Amateur

NELSON M. SEESE, W4BHD

The current mainstay of the meteorological satellite program is the ESSA (Environmental Survey Satellite) series. Certain of this series transmit cloud pictures to earth in the Automatic Picture Transmission (APT) mode via slow-scan television.

A number of amateurs have shown interest in reception of APT signals. QST for November of 1965 contained an article describing a homebrew APT station. While the equipment described was intended for use with earlier satellites, signal parameters remain the same except for the carrier frequency. Current ESSA satellites use 137.5 Mc.

Ephemeris data from which orbit times and antenna pointing information are derived are distributed domestically over Government teletype-writer lines and internationally by radioteleprinter. Both sources are beyond the reach of most amateurs. Consequently, W1AW will begin transmission of ESSA APT data early in December of 1967.

ESSA APT satellites take pictures while traveling in a north to south direction during daylight. This means the satellite crosses the equator in an "up" (northbound) direction in the dark on the "back" side of the earth. Knowing the time and longitude of the "back" side crossing and orbital period permits determination of satellite sub-point times and ground station antenna azimuth and elevation angles for any location. A plotting board is available to facilitate these computations.

Four or five orbits per day of an APT satellite cross the United States. A typical orbit prediction message from W1AW might contain the following information.

1. APT satellite ESSA 2 equator crossing times


and longitudes for December 1 are 0024Z at 110.1 W, 0217Z at 81.5 E, 0410Z at 52.9 E, 0603Z at 24.3 E, and 0756Z at 4.3 W. Frequency 137.5 Mc.

To obtain plotting boards, referred to above, or other information, contact Mr. David W. Holmes, APT Coordinator, National Environmental Satellite Center, Washington, D. C. 20233.


ESSA APT Signal Parameters

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<th>Deviation: ± 10 kc.</th>
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Sub-Carrier Parameters

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<th>Polarity</th>
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<td>a.m.</td>
<td>Max. amplitude — white</td>
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<tr>
<td>1000 cycles</td>
<td></td>
<td>Min. amplitude — black</td>
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</tbody>
</table>

Video Parameters

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<th>Scan time</th>
<th>Start tone</th>
<th>Phase time</th>
<th>Total frame time</th>
<th>Picture interval</th>
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</thead>
<tbody>
<tr>
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<td>200</td>
<td>4 per second</td>
<td>200 seconds</td>
<td>3 seconds</td>
<td>5 seconds</td>
<td>208 seconds</td>
<td>352 seconds</td>
</tr>
</tbody>
</table>

*Carrier and subcarrier remain on during the interframe gap.
National 200 Transceiver

This latest product from National, in the competitive price class, covers the amateur bands from 10 to 80, inclusive in s.s.b., c.w., and a.m. modes. Nominal output ratings are 120 watts p.e.p. on s.s.b., 120 watts c.w., and 30 watts (carrier) on a.m. A pair of 6JB6 sweep tubes is used in the final amplifier.

Receiving Channel

The block diagram is shown in Fig. 1. The receiving channel (bottom portion of Fig. 1) is essentially an S-tube single-conversion superhet with a 5.2-Mc. i.f. The line-up includes r.f. amplifier $V_8$, mixer $V_9$, crystal lattice filter, two stages of i.f. ($V_{12}$ and $V_{13}$), detector $V_{14A}$, and audio ($V_{14B}$ and $V_8$). A parallel-tuned trap in the cathode circuit of $V_8$ discourages 5-Mc. feed through. $V_{14A}$ is switched to product detection for s.s.b. or c.w. operation, or to grid-leak detection for a.m. reception. The b.f.o. $V_7$ (which also serves as the carrier generator on transmit) is crystal-controlled.

On 80 and 20, mixer local injection is the signal from $V_{11}$, the 8.7-9.3-Mc. v.f.o. (the only tunable element), amplified in $V_{10B}$. On the other bands (10, 15 and 10), the v.f.o. signal is combined in $V_{10A}$ with a crystal-controlled signal from "band oscillator" $V_{10A}$, $V_{10B}$, now operating as a "premixer," to yield the proper injection frequencies for these bands. The resulting ranges are 3.5 to 4.1 Mc., 6.6 to 7.0 Mc., 13.9 to 14.5 Mc., 21.5 to 21 Mc., and 28.5 to 29.1 Mc. Band-oscillator crystals for the ranges of 28.6 to 28 Mc. and 28.7 Mc. are not included, but are available as optional extras to be plugged in in place of the crystal furnished. (It is also necessary to unsolder a trimmer capacitor in the band-oscillator unit to operate in the 28.6-28-Mc. range.) The dial is calibrated for all ranges. It will be noticed that the particular heterodyne system used results in some bands tuning in a direction opposite to others.

All h.f. and i.f. circuits in the receiving channel are single-tuned, with capacitive coupling between stages.

The .g.c. signal is taken from a capacitive divider across the output of $V_{13}$, rectified in a voltage-doubling rectifier, and applied to $V_9$, $V_{14A}$ and $V_{13}$. The manual r.f. gain control is also applied to these three stages. The .g.c. system has fast-attack and slow-release characteristics.

The rectified .g.c. signal is also applied to the grid of $V_{4A}$, which functions as an S-meter amplifier when receiving. The resulting variation in cathode voltage is used to drive the S meter. The screen voltage of $V_{13}$ is used as the reference.

All oscillators are supplied with 150 volts, regulated by an OA2.

Transmitting Section

In this section, the carrier-oscillator signal from $V_7$ is combined with the microphone (high-impedance) audio signal from $V_8$ in a four-diode ring balanced modulator (1N542s), where the carrier is suppressed. The 5.2-Mc. d.a.b. output signal from the modulator is amplified in $V_4$, and fed to the crystal filter, which strips off one side band. The 5.2-Mc. s.s.b. output from the filter is amplified in $V_{10}$, and then fed to the transmitting mixer $V_3$. Here it is combined with the injection signal from $V_{10B}$ to produce mixer output at the desired frequency. The signal from $V_4$ is fed to driver $V_5$, and thence to the final amplifier $V_1/V_2$ (parallel neutralized AB1 (6JB6s))
with pi-network output. With the exception of the input and output circuits of $V_6$, all r.f. circuits in the transmitting channel are also single-tuned, and the stages are coupled capacitively. On transmit, the S meter is switched to read final-amplifier cathode current.

For the e.w. and a.m. modes, carrier is inserted by applying an adjustable d.c. voltage to unbalance the modulator.

The 200 is set up for i.s.b. on 80 and 40, and u.s.b. on the other bands, according to present customary usage. Sidebands are not changeable.

An a.c. circuit is included. The arrangement is more or less conventional in that it feeds any change in final-amplifier bias, as a result of over-drive into grid current, back to an earlier stage where it is applied as bias to reduce the gain of the stage. However, severe flat-topping resulted with the specified 10-mv. audio input signal as the microphone gain control was advanced toward maximum. A jack at the rear of the chassis permits connection of a linear amplifier into the a.c. line.

**Control Switching**

The change-over element is a 6-pole double-throw relay, actuated by either a push-to-talk switch at the microphone, or by a MON switch on the panel. On receive, the relay performs the following operations:

1) Switches B voltage to $V_8$, $V_9$, and $V_{13}$.

2) Removes protective bias from $V_8$, $V_9$, and $V_{14}$.

3) Closes the cathode circuit of $V_{14A}$.

4) Connects the meter for S-meter use.

5) Applies cut-off bias to $V_2$, $V_4$, and $V_6B$ (except with the function switch in the c.w. position).

6) Removes screen voltage from $V_1$ and $V_2$.

7) Removes plate and screen voltage from $V_4$, and

8) Closes an external circuit (such as a linear-amplifier relay) connected to a pair of terminals at the rear of the chassis.

On transmit, the relay switches the meter to read final-amplifier cathode current, and grounds the a.c. bus to avoid accidental charging of this bus, in addition to the reverse (on or off as the case may be) switching of voltages mentioned above.

It will be noticed that there is no provision for switching the antenna. The grid of $V_6$ is coupled to the "hot" side of the transmitter pi network through a 22-pf. capacitor. Thus, the pi network serves as the tuned input circuit for the receiver r.f. amplifier. $V_6$ and other receiving tubes are protected on transmit, as described above.

On s.s.b., the function switch shifts $V_{14A}$ to product operation, disconnects the key jack, increases the bias on $V_4$ to reduce gain, and disconnects the carrier-insertion control (available for adjustment at the rear of the chassis). On a.m., $V_{14A}$ is shifted to grid-leak operation, the carrier-insertion control is switched in, the b.f.o. ($V_7$) is biased off, and the bias on $V_4$ is lowered for full gain. On e.w., the product detector and b.f.o. are in use, the key jack is connected, $V_4$ is
at full gain, the carrier-insertion control is operative, and the plate of $V_{68}$ is grounded to avoid accidental modulation. As mentioned earlier, with the function switch in the c.w. position, $V_3$ and $V_4$ are biased to cutoff. Operation of the key then removes this bias (grid-block keying). There is no provision for break-in operation, aside from that measure obtainable by a foot switch plugged into the p.t.t. microphone jack.

**Performance**

Specifications of particular interest are as follows:

- **Output:** 120 watts p.e.p., s.s.b. and c.w.
- **Crystal filter:** Bandwidth 2.3 kc at 6 db, 6-50-db. shape factor 2.2 to 1.
- **Frequency stability:** Nominal 1500 cycles in first 30 minutes after a 5-minute warm-up. Long-term stability 400 cycles for ordinary room ambient.
- **Suppression:** Carrier -50 db., unwanted side-band -40 db., third-order distortion products -30 db.
- **Receiver sensitivity:** 0.5 µv. for 10 db. s/n (s.s.b.). Output impedance: 50-60 ohms.

These specifications were met or exceeded in laboratory tests made at A.R.R.L. on an off-the-shelf unit from a local dealer. It was noticed that third-order products could be reduced to well below the specification figure by careful adjustment of the driver tuning control, while maintaining essentially the same p.e.p. output. Second-harmonic output was down 45 db.

The range of load impedances into which the transmitter will work is limited, so the use of a transmatch is recommended for loads outside the range of 50 to 60 ohms. However, the instruction book contains information on simple modification of the pi network to accommodate reasonable departures from 50 ohms.

The v.h.f. shielding is not complete, but it will probably be found adequate for all but fringe TV areas.

Checks on i.f. feedthrough showed that the attenuation of a 5.2-Mc. signal was 50 to 70 db., depending on the band in use, after adjusting the 5.2-Mc. trap for maximum attenuation with the receiver tuned to the 20-meter band. However, the receiving channel appears to be quite susceptible to cross-modulation from nearby broadcast stations. The article by W1CER in this issue discusses this problem. At the test location, the stop-band filter described in the article proved to be a complete cure. However, if the filter is not to be switched out on transmit, the coils should be of heavier wire. Sections of Miniductor, Airdux, or Polycoil stock, cut to the same inductance values, should be suitable.

Neither power supply nor speaker is included. The transceiver may be operated from the National NCX-A power-supply/speaker console, or from the AC-200 supply illustrated, which does not include a speaker. Speaker connections are available at the power receptacle, or they may be made by a plug in the headphone jack, since headphone connections are also taken from the output-transformer voice-coil winding. Thus the output is suitable for either high- or low-impedance headphones.

**Physical Details**

The unit appears to be well-built mechanically. The slate-blue cabinet is a perforated wrap-around type with open back and matching base plate. The panel is brushed-aluminum. Controls are black with chrome inserts. The tuning dial is combination pinch and planetary drive, with a ratio of 45 to 1. No backlash was discernible. A separate calibration scale is provided for each band, with marks at 5-ke. intervals. The position of the hair-line indicator is adjustable by a control on the panel to obtain an accurate setting against a calibration standard. A 100-ke. calibrator is not furnished, but is available as an optional extra (type XCU-27) that plugs into an accessory socket at the rear of the chassis. When so used, the calibrator is turned on and off by a push-pull type switch on the shaft of the microphone gain control.

The instruction book is very complete. In addition to the usual tuning data and tabulations of point voltages and resistances, it includes an explanation of the circuit operation, and complete instructions for alignment, with illustrative scope patterns. — WITS
An Unusual Story

BY Dr. J. MICHAEL BLASI,* W4NXD

Most of us like to hear a good yarn about ham radio and the one that I'm going to tell you is probably the most unusual I've ever heard.

Well, last summer I was cleaning out some of the junk in my shack when W4--- calls on the land line and invites me over to see his new receiver. I've never been too close with Bob, but he's a decent sort of a chap. He works 20 meters mostly and since the noise level had been SO the past few days, I guess he wanted somebody to shoot the breeze with.

About twenty minutes later I'm sitting in his shack looking over some of his QSL cards and wishing my DXCC total was up around 300 countries where Bob's is. He had just set up two cool ones with plenty of ice and passed me his tobacco pouch when he got a real funny look in his eye.

"You know, Doc, I've gotten a real thrill out of ham radio this week. I'm going to tell you an incident that started almost twenty-five years ago. I've never told this to a living soul, but since it was so long ago, nobody would raise any smoke about it today.

"A young fellow like you wouldn't remember this, but DX was a bit different before WW II. The big thing in those days was trying to get a Worked All Zones certificate. Not very many fellows had the award and there was real competition for some of the Asian zones. Why I even put up a rhombic pointed at Tibet just so I could try to work A64YN. I never worked him, but I sure had a ball trying to chase him down. The closest I ever got was to work a whole mess of Js in Japan. They're signing JA nowadays.

"All of this came to an end when the war broke out and I signed up, like a lot of other hams I knew. They shipped me out to the South Pacific where I could count to ten.

"Well, it was in '42, or maybe it was the beginning of '43, that I got a taste of the enemy. It seems there was a small island about five miles from us that the Japs were using to report all ship movements in the area. We figured they had a radio station and a few men, since the island was only about a mile square.

"To make a long story short, two other fellows and I volunteered to go ashore and look around and try to close shop for our friends from Tokyo. Well, when we were trying to beach our rubber boat, the other two fellows got cut up real bad on some coral and were just about useless 'til they could be moved back to the ship.

"I was much younger then and much more foolish or brave, I guess, so I said I'd have a look around and be back in a couple of hours. Well, I must have hacked my way through about half a mile of jungle when I noticed some wire that had been strung through the palms. It was fed with open line, so I just followed the spreaders until I hit pay dirt. There was a small bamboo hut with a table and a chair and some radio gear that seemed to be in operation. I moved to a small hill and looked the situation over. There was only one fellow inside and he didn't seem to be more than five feet tall, so maybe I could handle the problem alone. Where I was lying offered a good position for me to jump this fellow if he came out of the hut.

"It seemed like five hours, but it must have been less when he decided to come strolling out next to that little hill I was on. I got my jungle knife ready and landed right on top of him. I'm all set to give some cold steel in the stomach when I get the surprise of my life. He's got a magazine in his hand and it was QST. Well, I was so stunned when I saw it I dropped my knife and just looked at him. We must have stared at each other for a full two minutes like mad men. Then, do you know what I said to him?"

"'What's your call?'

Well, he grins and says, "'Jay Too ---.'"

"I had worked him about half a dozen times on 20 c.w. His handle was Iko. His English wasn't too bad so we just shot the bull for a while. I know this sounds crazy, but how could you take the life of a fellow ham whose QSL card is hanging on your wall back home. Some things are just bigger than war.

"Before long we're having a gay old time as he's broken out a special bottle of rice wine and started gabbing about old DX on 20 c.w. I finally explain that, ham buddy or not, there's going to be hot times for him real soon.

(Continued on page 146)
The QTH Here is . . .

BY VIC C. CLARK,* W4KFC

The attraction which high elevations and remote locations hold for radio amateurs has always been a source of fascination for me. The general idea seems to be that, if you can set up your station on a hill or in a wilderness, you have it made.

Few red-blooded hams can ever have a prominence in the terrain without mentally embellishing it with their favorite antennas, complete with towers to hoist them even higher. We all suffer from this addiction to lofty locations and one needs only to rifle through the Call Book to observe the profusion of addresses which attest to our collective success in achieving these "heights." In fact, I cannot remember hearing of a ham station which has been flooded out since it happened to Headquarters Station W1MK way back in the thirties.

I'm as guilty as the rest. My "hill" commands a good view to the horizon in most directions, and it is my pleasure to report that very little of the r.f. generated here remains to warm the trees, prowed down power lines from which it originally came, or course through the wiring of neighborhood TV sets, hi-fi's, and telephones. However, my address on "Popes Head Road" connotes no altitude or other advantage and leaves me feeling strangely underprivileged.

I have seen W4ACY's QTH on Hill Top Road, for example, and am well aware that whoever selected the name did so advisedly and from firsthand knowledge. I could never give Phil S7.

Some reflection on the point leads to certain conclusions: If you want to be off to a head-start that should be good for at least an extra S-point, settle in a community that implies height at the outset . . . Chapel Hill, Oak Ridge, or Mount Airy, for example. If you can add emphasis, as in the case of WAIJPCP, by all means do so. He lives on Flintridge Drive in Stone Mountain, Georgia! He may not have the best ground, but when he passes along that QTH his signal has got to come up!

One needs only to consult the Call Book to see how far this trend has taken us. The first two pages of my own cell area provide several examples:

W4AMO and W4AAP live simply on High Road and High Street, respectively. W4AKM takes it a little further by settling on Highland Street. K4AKB is camped out on Cravenridge Road — and we all know what he craves. K4AIS has a QTH on Upper Hunter's Trace — not merely Hunter's Trace, mind you — and the added implication of wilderness is not lost on his fellow hams. WB4IAGO isn't deceiving anyone with his spelling of Hydeville Avenue; we hear you, OM, loud and clear. We are further convinced that W4APQ's Mountain Way is not just the road on which you get to the mountain!

W4AJX gets out fabulously in all directions but one from his QTH on Hillside Drive, and K4AKF does well on Ridgview Scenic Drive, when he can break away from the view.

If you prefer something a little less obvious that still conveys the message, you might like K4ACL's QTH on Mountainview Drive, or Ridgview Drive, where W4ACX lives, or maybe W4ABC's place on Sycamore Drive. You have to go up for those views, you know.

Shucks, pick yourself any page in the Call Book and have a look at the psychological warfare being waged against us fellows with commonplace-sounding QTHs: I tried page 217 and found K4OA on Bluff Street, K4QX on Hickory Hill Lane, K4OVH on Terrace Drive, while his counterpart W4OHY is paying off the mortgage on Plateau Road. K4OYX lives on Pinecrest Drive, while W4PFF holds forth on Hillcrest Drive and W4OXQ has sunk his roots on the Avenue of the same name. With W4APF, it is Highland Avenue and W4APF has landed on Lookout Street. W4EP's house is on Bluecrest — and we suspect that the "blue" comes from lack of oxygen at that elevation. K4PEM has a pad on Highview Drive and WA1BPN settled down (but not very far) on Ridge Top Drive.

If circumstances prevent your selecting a QTH
Life with a Ham "Hubby"

BY JUNE FORD CUNNINGHAM*

My husband had mentioned before we were married that he was an amateur radio operator, but not having been exposed to this type of thing before, I didn't think anything of it. It was two days before the wedding that I began to have doubts.

While I was away (and unsuspecting), into the freshly painted room, on to the new white carpet, he moved what appeared to be the lifetime collection of an electrically oriented pack rat. His treasures came in large cardboard boxes filled with small cardboard boxes, wooden boxes and metal cabinets. After I recovered from the initial shock, filled up the space between bed and floor, one double closet and two corners—dried my eyes—I decided to marry him anyway.

Our first apartment was an "efficiency." There is nothing efficient about two people and one radio station in a room and a half. The right by ten kitchen became the radio shack, and to this day I can't understand why I was not allowed to use the sink while he was transmitting. We took certain precautions to keep the landlord out of the kitchen after he told us not to use over 100-watt bulbs—he paid for the electricity.

Just about the time I was getting used to the mass of wires and tubes, "hubby" decided the old oak tree in the backyard was an excellent place to attach an antenna. Horrified, I watched as leaves and twigs tumbled down. With visions of splattered husband, I waited and finally welcomed him back to earth with renewed disgust for his hobby and electronics in general.

I tried, "It goes or I go" a few times, considered a sledge hammer, but finally settled down to peaceful coexistence. With the birth of our first son I became outnumbered. He wasted no time in discovering the knobs and buttons and at the age of two managed to blow up his Dad's transmitter. Shortly afterwards we moved into student housing at our state university. We read the fine print in the lease only to find that there were antenna restrictions. Since that time "hubby" has really had to put that "ham" ingenuity to work. He's found that wire attached to a tennis ball works pretty well on a flat roof, until it is covered with rainwater or a neighbor's child discovers the shining wire. He has had some success with wire attached to a kite—until the wind shifts or dies down. Our closets are filled with ill-fated kites. Lately, balloons are being considered to replace the kites.

Life with a ham is never dull and I would advise it for anyone with a strong nervous system and more than his share of patience. Actually, I find myself enjoying it often now, though I'd never admit it to "hubby."

*13102 Larchdale Rd., Laurel, Maryland 20880.
Examination Room Revisited

BY PERRY F. WILLIAMS*, W1UWD

Examinations for amateur licenses are given regularly at 24 FCC District offices and six suboffices. In addition, the tests are administered in 58 other cities from one to four times annually. An applicant for Extra, Advanced or General Class license may appear at any of these points, and not necessarily in the district where he lives. Most offices want the candidates present between 8 and 10 A.M., though a couple have morning and afternoon classes.

For examination at most District Offices, you can just drop in at the proper time on the right day, without advance notice. For appearance at the Anchorage District office, the suboffices and the field points, an advance appointment is required; arrangements should be made at least a week ahead of time. Where only a month is shown in the FCC schedule, it is a good idea to apply by the third week of the previous month. A schedule of places and times appears later in this article.

Form 610 is used in applying for any amateur license, and the application fee is $1.00 for every class except Novice, which is free. When appearance will be at a field point rather than a Commission office, payment should be made in advance, by check or money order payable to the Federal Communications Commission.

Code Test

Code tests are administered first to those who must fulfill this requirement. Twenty w.p.m. is required for Amateur Extra Class applicants. Thirteen w.p.m. is required of applicants for Advanced Class except that holders of a General Class license and holders of commercial radiotelegraph licenses get credit for the code requirement. (Since the code test for Conditional was administered by a volunteer, no credit accrues toward a higher class license.)

*Senior Assistant Secretary, ARRL

The other shoe has finally been dropped. Incentive licensing is now "the law of the land." Whatever their earlier feelings about it had been, amateurs from Maine to Malibu Beach and from Kauai to the Keys are preparing for the new tests. Since some of us haven't been near an examining room for the past decade, a review of "how to" may be in order.

The receiving test consists of plain text, occasionally broken up by call signs or other combinations of letters and numbers. You must get one minute or more solid out of a five minute test; that is, 100 consecutive characters for Extra, 65 consecutive for Advanced or General without error or omission. Common punctuation and procedure signals (e.g., BT, AT, SK) can be expected but you don’t need to worry about parentheses, semicolons and the more exotic signs. (Note to Old Old Timers — MTM means comma nowadays rather than "!"). Copy is by pencil or pen, longhand or printing; typewriters may generally be used only by the handicapped.

The sending test is next, at the same speed. Again, you have to send for one minute without uncorrected errors out of a five-minute test. In practice however, most examiners will have you stop as soon as you've sent a good minute. Here you are permitted to use a "bug" or electronic key if you bring it with you.

Written Examination

Now comes the written exam. Both the revised Amateur Extra and the new Advanced Class consist of 50 multiple-choice questions. You'll probably have to analyze some schematics and locate errors or missing components. There’s no time limit — so long as you finish during office

Here are the frequency allocations by license class which will go into effect on four popular bands in 1968 and 1969. The frequencies 50.0-50.1 Mc. will also be restricted to Advanced and Extra after November 22, 1968 and 50.0-50.25 a year later. No changes have been made on 160, 10, and 2 meters or on higher frequency bands. This chart was adapted from one drawn by WA2KCP; thanks too to K1MPN, W2TUK, WB4GFK and WB6SPB, who also suggested chart presentations.
hours! Recent reports of the time necessary for Extra have ranged from little over an hour to four-and-a-half hours.

The questions which QST published last month — and which appear (with answers) in the new edition of the License Manual — are those released by FCC as a study guide. Most of them are pretty broad, and there could be two or more actual test questions drawn from the area of one study question. We urge additional study in the Handbook, Understanding Amateur Radio or any good radio text, especially on any questions areas which are not completely clear to you.

Examination Credits

On the written exams, you'll be excused only from amateur exam elements previously passed before an FCC engineer. Examples: If you hold Advanced and go for Extra, you take only element 1B, advanced amateur practice (plus the code test at 20, of course). If you hold General and go for Extra, you need to pass element 4A, intermediate amateur practice, in addition. Since FCC does not give credit for elements taken before a volunteer examiner where higher class licenses are sought, a Conditional must also take element 3 (new name for the combination element 2 and 3B) — general amateur practice and regulations. No credit accrues for commercial radiotelephone and telegraph licenses held (other than for the General or Advanced code test, described above), since amateurs have different regulations and some additional technical subjects (e.g., proper choice of frequency for distance and time of day) not required for commercials.

Handicapped amateurs who can travel to exam points will appear the same as other amateurs. They may dictate answers to questions and dictate or type the code copy as necessary depending on the type of disability.

Shut-ins wishing to take Advanced or Extra should get in touch with the District FCC Engineer-in-Charge to make arrangements for testing on a case-by-case basis, as for instance when an engineer is checking the local broadcast station in the shut-in's town.

If You Fail

What about failure? Taking the maximum case, if you are a Conditional Class amateur striving for Extra and you fail, you may receive the highest class of license you do qualify for. That is, if you fail the Extra Class code test but do get 65 consecutive letters, you can tackle the Advanced Class written exam. If you fail the Extra code test and the Advanced written, but pass 13 w.p.m. and the General Class written (element 3), you'll get a General Class license, thus shortening your next trip.

If the Conditional has a bad day and doesn't pass anything, however, he can continue his Conditional status; FCC doesn't require him to risk everything in a voluntary try at upgrading.

(If a Conditional is called in for reexamination, he must pass or lose his privileges, of course, but where reexamination is completely voluntary, the Conditional licensee won't be put off the air for failure.)

A test can be retaken after thirty days, and there is no limit to the number of times you can try. One of our friends just made Extra on attempt number eight!

Summing up — grab last month's QST or your new 58th edition License Manual (still only 50¢, by the way) and the Handbook or other text and start in. And if your c.w. is rusty tune to W1AW for practice at 20 and 25 w.p.m. every night of the week shortly after 0230 GMT (See the schedule on page 100).

Examination Schedule

For the convenience of those planning to take an FCC examination for General, Advanced or Extra Class license, we present below a tentative schedule of dates and places. (Applicants for Novice, Technician or Conditional Class licenses should follow procedures outlined in Chapter 5 of the Radio Amateur's License Manual.)

1 Boston, Mass., 02109; India & State Streets; Wed.-Fri., 8-10 A.M.* Also conducts examinations at Bangor, Me., in May; Hartford, Conn., in March and Sept.; Portland, Me., in Apr. and Oct.
2 New York, N.Y., 10014; 641 Washington Street; Tues.-Fri., 9-12 A.M.* Also conducts examinations at Schenectady, N.Y., in Mar., June, Sept., and Dec.
3 Philadelphia, Penn., 19106; 2nd & Chestnut Streets; Wed., 9-10 A.M.*
4 Baltimore, Md., 21202; Gay & Water Streets; Mon., and Fri., 9 A.M.*
5 Norfolk, Va., 23510; Granby & York St.; Fri., 4-10 A.M.* Also conducts examinations at Elkton, Va., in Apr. & Oct.; Wilmington, N.C., in June & Dec.; Winston-Salem, N.C., in Feb., May, Aug., and Nov.
7 Savannah, Ga., 31402; York & Bull Streets; 2nd & 4th Tues., each month, by appointment only.
8 Miami, Fla., 33130; 51 S. W. First Ave.; Thurs., 9 A.M.* Also conducts examinations at Jacksonville, Fla., in Apr. and Oct.
9 Tampa, Fla., 33602; 500 Zack Street; Mon.-Fri., by appointment only.
10 New Orleans, La., 70130; 600 South Street; Mon., 8:30 A.M. Also conducts examinations at Jackson, Miss., in June and July; Little Rock, Ark., in Feb., May, Aug., and Nov.
11 Mobile, Ala., 36602; 118 St. Joseph Street; Wed., by appointment only.
12 Houston, Texas 77002; 515 Rusk Avenue; Tues., 9 A.M.* Also conducts examinations at San Antonio, Texas in Feb., May, Aug., and Nov.; at Corpus Christi, Texas in Mar., June, Sept., and Dec.
13 Beaumont, Texas 77701; 300 Willow Street; Tues., by appointment only.
14 Dallas, Texas 75202; 1314 Wood Street; Tues., 8 A.M. to 1 P.M.* Also conducts examinations at El Paso, Texas in Feb. and Aug.; Lubbock, Texas in Feb. and Gettysburg, Penna., 17325; 334 York Street; 1st & 3rd Tues., by appointment only; Aug.; Oklahoma City and Tulsa, Okla. in Jan., Apr., July and Oct.

(Continued on page 58)
AIDS FOR LICENSING QUALIFICATION

In thinking about qualifying for a higher class license, don't overlook the many aids available from HQ, both to local clubs and to individual amateurs.

Many amateur radio clubs conduct theory and/or complete licensing courses, and most of these are currently planning special courses or programs to cover the requirements for the new advanced and new Advanced Amateur Extra exams. Participation in such classes is usually the best and easiest way for the amateur to prepare himself for the examination. However, for those who do not have access to a club, or who wish to tackle the project on their own, there is help too.

First, let's review what is available from headquarters to assist affiliated clubs in planning and conducting licensing courses.

The ARRL Communications Department pamphlet, Licensing Classes, prepared by Bill Walsh, WDQBD, is an excellent and comprehensive guide, how to plan, organize and conduct a complete course. It also includes suggested quizzes, supplementary material, sources of training aids, publications from many sources, and so on. It is available to any affiliated club on request.

Perhaps next in importance is the ARRL Training Aids List, also available on request, which is a complete listing of motion picture films (classified by subject area), film strips (with scripts), slide collections (with scripts), and magnetic tape recordings. These include excellent presentations on both basic and advanced radio theory. All may be booked on an availability basis by any affiliated club.

Also available for clubs on request to the Communications Department are the following mimeographed materials:

"Suggested Outline For A Radio Course" (basic and general, but comprehensive).

"FCC Exam Standards — Club Newcomer Programs".

"Club Code Proficiency Award" certificates (attest to achievement in club code classes). For the individual amateur (and clubs, too) the following items are available on request to the Communications Department.

"Reference Guide: For New Operators and Code Trainees": (general suggestions plus a listing of sources for code practice tapes, booklets and reprints, the Continental Code symbols for ready reference, and commonly used punctuation and message signals).

"Current On The Air Code Practice Stations", "WIAW Master Schedule" (including code practice transmissions).

ARRL publications, notably the Radio Amateur's Handbook (S4) and Understanding Amateur Radio ($2) are complete reference sources for the individual amateur and for club class use. Particularly applicable to higher class license preparation are the new edition of The License Manual (still 50c) with complete requirements for each license class, plus sample study questions and answers for each, and Learning the Radio Telegraph Code (50c) which can be adapted to both individual and classroom instruction.

(Continued from page 67)

11 Los Angeles, Calif., 90012: 312 N. Spring St.; Wed., Sat., and I P.M.
12 San Diego, Calif., 92119: 1245 Seventh Avenue; Wed., by appointment only.
12 San Francisco, Calif., 94111: 335 Battery St.; Fri., 8:30 A.M.
* Also conducts examinations at Fresno, Calif., in Mar., June, Sept. and Dec.
13 Portland, Ore., 97203: 830 S. W. Main Street; Fri., 8:30 A.M.
* Also conducts examinations at Boise, Idaho, in Apr. and Oct.; Klamath Falls, Ore., in May.
14 Seattle, Wash., 98104; 901 1st Avenue; Fri., 8:45 A.M.
* Also conducts examinations at Billings and Butte, Mont., in May; Great Falls, Mont., in Sept.; Spokane, Wash., in Apr. and Oct.
15 Denver, Colo., 80202; 19th Street between California and Stout Streets; 1st & 2nd Thurs., 8 A.M.
* Also conducts examinations at Abilene, Kans., May, in Apr. and Oct.; Rapid City, S. Dak., in May; Salt Lake City, Utah, in Mar., June, Sept. and Dec.
16 St. Paul, Minn., 55102: 6th & Market Streets; Fri., 8:30 A.M.
* Also conducts examinations at Jamestown, N. Dak., in Oct.; Marquette, Mich., in May; Sioux Falls, S. Dak., in Mar., June, Sept. and Dec.
17 Kansas City, Mo., 64110; 101 E., 12th St.; Thurs., and Fri., 8:30 A.M.
* Also conducts examinations at Des Moines, Iowa, in Mar., June, Sept. and Dec.; Omaha, Neb., in Jan., Apr., July and Oct.; St. Louis, Mo., in Feb., and Sept.
18 Cheyenne, Wyo., 82004: 212 South Dearborn St.; Fri., 9 A.M.
19 Detroit, Mich., 88220; Washington Blvd. & La Fayette Street, Wed. and Fri., 9 A.M.
20 Buffalo, N.Y., 14223; Ellicott & Swan Streets; 1st & 3rd Fri., 9 A.M.
* Also conducts examinations at Hilo in Oct.; Lahaina, Maui in Nov.; Wailuku, Maui in Oct.
22 San Juan, P. R., 00901; 302 U. S. Post Office & Courthouse; Fri., 9 A.M.
23 Anchorage, Alaska, 99501; 11th Avenue at F & G Streets; Mon.-Fri., by appointment only.
* Also conducts examinations at Fairbanks in May and Sept.
24 Washington, D.C. 20554; 1919 M St., N.W.; Fri., 9:30 A.M. and 1 P.M.

IMPORTANT

* Appointments should be made in the previous month with the District Engineer in-charge, who will then furnish the location, date and time of the test. He will probably require advance submission of the completed Form 110 and check or money order for $4, payable to the FCC.

The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League headquarters. Use ours, too. It's 06111.
21st V.H.F. Sweepstakes—January 6-7

It's count-down time to one of the big-four operating events of the year in your ARRL contest program. The 21st ARRL VHF Sweepstakes starts at 1400 your local standard time on Saturday, January 6, and ends at midnight local time on Sunday, January 7. Clubs in particular are reminded that only ARRL affiliated clubs (or groups awaiting final approval on their affiliation application) are eligible to compete in the special club competition (see rule 7).

Unlike the June and September QSO Parties, in this January event sections count only once no matter what band they're worked on, although you may work the same station on a different band again for additional points. In scoring, the multiplier is the number of sections worked plus ten and each complete exchange counts two points.

On your entry be sure to express your ideas on possible revision of the time period to permit expression in GMT—note the Sept. VHF QSO Party results elsewhere in this issue.

What's new? We have new entry forms, each of convenient 8½ x 11 inch size, with room for 80 QSOs, providing a concise summary and a multiplier check-off list. Let us know how many you can put to use by writing ARRL, Hq, 225 Main Street, Newington, Conn. 06111. (Let us know your zip code too!) S.a.s.s.e.s (with sufficient postage) will ease the Hq, load and speed response.

Logs must be postmarked by February 3 and we'd like good operating/antenna photos of your VHF SS participation.

Rules
1) Eligibility: Amateur operators in any ARRL section (see page 6) operating at home, or mobile, or portable under one call on or above 50 Mhz, are invited to take part. Yonkers, N.Y., VE6C counts as a separate multiplier.
2) Object: Participants will attempt to contact as many other stations in as many ARRL sections as possible.
3) Contest Period: The contest starts at 2:00 p.m. your local time, Saturday, Jan. 6, 1968 and ends at midnight, Sunday, Jan. 7, 1968. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the zones concerned.
4) Exchanges: Contest exchanges, including all data shown in the sample, must be transmitted and received for as a basis for each scored point.
5) Scoring: (a) Contacts count one point when the required exchange information has been received and acknowledged; a second point when exchange has been completed in both directions.
6) Foreign entries: All contacts with foreign countries (such as Mexico and the Bahamas) count for score. All foreign countries are grouped together as one, and a section multiplier of no more than one may be claimed for contacts with all foreign stations contacted. Foreign stations may only work any one ARRL section for contest credit. Foreign stations will give their country name in the exchange.
7) Final score is obtained by multiplying total contact points by the sum of different ARRL sections worked (the number in each of which at least one SS point has been credited) plus 10.
8) Conditions for Valid Contact Credits: (a) Repeat contacts on other bands confirmed by completed exchanges of up to two points per band may be counted for each different station worked. (Example: W1NLO works W0S8/D and 144 Mhz for complete exchanges of 2 points on each band; 2 X 2 gives 4 points but only one section multiplier.)
(b) Cross-band work shall not count.
(c) Portable or mobile station operation under one call, from one location only, is permitted.
(d) A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest (with the exception of family stations, where more than one call is assigned to one location by FCC/DOT).
(e) Contacts with aircraft mobiles cannot be counted for section multipliers.
(f) Contacts made by retransmitting either or both stations do not count for contest purposes.
8) While no minimum distance is specified for contacts, participation in use should be capable of real communications (i.e., able to communicate over at least a mile).
7) Awards: Entries will be classified as single-or multi-operator, a single-operator station being defined as one manned by an amateur who neither receives nor gives assistance to any person during the contest period. Certificates will be awarded in each ARRL section to the top-scoring amateur in the single-operator classification. In addition, a certificate will be awarded to the top Novice in each ARRL section where at least three such licensees submit valid contest logs. Multioperator work will be grouped separately in the official report of results in QST.

When three or more individual affiliated club members compete and submit logs naming the club with which they are identified an ARRL certificate will be issued to the leading club member. A letter must be received from the club's secretary itemizing participating members and approximate claimed scores. When less than three individual logs are received there will be no club award or club mention.

This year with an enforced band will be offered the affiliated club whose secretary submits the greatest aggregate score, provided such scores are confirmed by receipt at ARRL Hq, of the individual contest logs from such members. Only the score of a bona fide club member, operating a station in the same section as his club members may be included in contest entries. Claims from federations, radio club councils, or other combinations of radio clubs, will not be accepted, nor can special memberships granted for contest purposes be recognized.

8) Conditions of Entry: Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Annual Convention.
9) Reporting: Reports must be postmarked no later than Feb. 3, 1968, to be considered for awards.

EXPLANATION OF V.H.F. SS CONTEST EXCHANGES

<table>
<thead>
<tr>
<th>Send Like a Standard</th>
<th>ARRL Exchanges</th>
<th>Send your own call</th>
<th>CK (Readability and strength or RST of station worked)</th>
<th>Your ARRL section</th>
<th>Send G.M.T. time of transmitting this NR</th>
<th>Send date of QSO</th>
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<tbody>
<tr>
<td>Map, Preamble, etc.</td>
<td>NR 1</td>
<td>W1AW</td>
<td>50</td>
<td>CONN</td>
<td>1905</td>
<td>JAN 6</td>
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</table>

December 1967

59
1968 DX

Competition

In an advance notice for overseas DX contest participants, it seems to follow that the full rules (for all) would be even better. Here they are for 1968 (and we’ve barely recovered from the 2400-plus 1967 whopper!). The changes were tried and proved successful so once again it will be VE/W against the world with K6G/KL7 grouped with DX, no W/VE c.w. quota, and the DX participant’s multiplier to be the 48 continental United States and Canadian call areas. The handsome plaque shown above will be personalized and presented to single-operator continental phone and c.w. high scorers (non-W/VE).

We have all the necessary papers ready and waiting to fill your request (name, full address and zip code please). It isn’t an absolute requirement that you use our forms, as long as you submit a legible log (style shown), the summary information and your method of avoiding duplicate QSOs. If more convenient, you may keep logs separately for each band. Your entry must be postmarked by April 20, 1968 to be eligible for QST listing and awards. Send your photos with your entry and address the whole package to the ARRL Communications Department, 225 Main Street, Newington, Connecticut, U.S.A. 06111.

Banned Countries

U.S. amateurs may not work amateurs in Cambodia (XU), Vietnam (VW), Indonesia (JZ, 8F) and Thailand (I6).

Canadian amateurs may not work Cambodia (XU), Vietnam (VW), Indonesia (JZ, 8F), Laos (XW), Jordan (JV) and Thailand (I6).

Rules

1) Eligibility: Amateurs operating fixed amateur stations in any and all parts of the world are invited to participate.

2) Object: Amateurs in the 48 continental United States and Canada will try to work as many amateur stations in other parts of the world as possible under the rules and during the contest periods.

3) Conditions of Entry: Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Awards Committee.

4) Entry Classifications: Entry may be made in either or both the phone or c.w. sections. c.w. scores are independent of phone scores. Entries will be further classified as single- or multiple-operator stations. Single-operator stations are those at which one person performs all the operating, logging, spotting etc., functions. Multiple-operator stations are those obtaining assistance, such as from “spotting” or relief operators, or in keeping the station log and records. The use of “spotting nets” places an entry in the multi-operator category.

5) Contest Periods: There are four weekends, each 48 hours long; two for phone work and two for c.w.

6) Valid Contacts: In the phone section, all claimed credits must be made voice-to-voice. In the telegraph section, only c.w.-c.w. contacts count. Crossband contacts may not be counted.

The log extract above illustrates the desirable way to record your entry while the cut below represents the ARRL CD-175, a suggested check-sheet to help you avoid duplicate DX QSOs. Got your own better system? Fine, but be sure to use it during the contest to avoid dupes, not other to eliminate them from your log.

QST for
7) Exchanges:
a) Amateurs in the 48 continental U.S. and Canada will transmit a three-figure number, representing the HST report, plus their state or province. (The latter may consist of an appropriate abbreviation.) Phone participants will transmit a two-figure number consisting of the readability-strength report plus the state or province. *Example: W6DQ, TX will transmit "58 CAL" on cw, "58 Calif." on phone.
b) Amateurs outside the 48 Continental United States and Canada will transmit six-figure numbers, each consisting of the HST report plus the three "power" numbers; the power indicator will represent the approximate transmitter-power input. Phone contestants will transmit five-figure numbers, each consisting of a readability-strength report and the three "power" numbers. *Example: K9HFL, with 150 watts input, might transmit "590150" on cw, "590150" on phone. If the input power varies considerably on different bands, the "power" number should be changed accordingly. (Note: KH8 and KL7 are considered as DX.)
8) Scoring:
a) Points: One point is earned by a W(K) or VE/VQ station on phone and upon acknowledgement of a contest exchange sent, and two points are earned by any other station upon phone acknowledgment of a contest exchange sent, and one point upon acknowledging an exchange received. b) Final Score: W(K) and VE/VQ stations multiply total points earned under Rule 8(a) by the number of countries worked on each band, and add the total to the total points earned under Rule 8(a) by the number of continents and VE/VQ licensing areas worked on each band. There are 48 continental states plus VO and VE1-VES, a possible total of 57 multipliers per band.
9) Repeat Contacts: The same station may be worked against the condition if the contact is made on a different frequency band. The same station may be worked again on the same band if the complete exchange for a total of three points was not made during the original contact on that band.
10) Reporting: Contest work must be reported as shown in the sample forms. Each entry must include the signed statement. Contest reports must be mailed no later than April 20, 1966 to be eligible for QST listings and awards. All DX Competition logs become the property of the American Radio Relay League and none can be returned.

11) Awards: To document the performance of participants in the 4th ARRL International DX Competition, a full report will be carried in QST. In addition, special recognition will be made as follows:
   a) A certificate will be awarded to the high-scoring single-operator phone and to the high-scoring single-operator cw entrant in each country, in Alaska and the U.I.L., and in each of the continental U.S. and Canadian ARRL sections (see page 6, QST) from which valid entries are received. In addition, a certificate will be awarded to the high-scoring multiple-operator station in each section or country from which three or more valid multiple-operator entries are received.
   b) A suitable certificate will be awarded to the DXCC (DXCC stands for DXCC) for each country, in Alaska and the U.I.L., and in each of the continental U.S. and Canadian ARRL sections (see page 6, QST) from which valid entries are received. Only a bona fide resident member, operating a station (his or another club member's) in local club territory, may compete for club certificates.

12) Judges: All entries will be judged by the 4th ARRL Awards Committee, whose decisions will be final. The Committee will void or adjust entries as it interprets these rules. Deviations from the rules may require a more severe penalty than those previously described.
13) Disqualifications: Each participant agrees to observe the contest rules as well as all regulations established for amateur radio in his country. Violation of any regulation, as confirmed by a single FCC citation or advisory notice, or two ARRL accredited Official Observer reports, may constitute grounds for disqualification. Some examples of practices which can result in disqualification: out-of-band operation, harmonics, spurious emissions, low tone reports in logs, key clicks, splatter, excessive widebands (W(K) stations working banned countries, interfering with channels handling amateur emergency communication.

Dx'er's Check List

December 1967

Sample summary sheet that must accompany all reports.
SEPTEMBER VHF QSO PARTY RESULTS

COMPiled by Ellen White,* W1YVM

Well, it sure wasn't anything like the June event! This pretty well sums up the September 9–10, 1967, ARRL VHF QSO Party. A total of 314 entries was received which, though below the June contest, was above that of last September when 310 participants reported their results.

The pickings were particularly slim in the western areas and a special word to those way-out-west hilltoppers who tried hard to spark interest in the world above 50 Mc.

As a direct result of numerous comments by contest participants the ARRL Awards Committee has met and voted their approval of several changes. The first is purely an editorial treatment of the score listings so that single-band section high scorers will be shown more prominently in a bolder-face type (we'll try that one on for size this time!). We did discuss single-band awards but they just aren't possible to handle, and maintain the standards of promptness and quality we now can supply. How then can we give recognition? It seems obvious that the best all-around performer, devoting the time and ability to the task, should be eligible for the section award. In most cases that versatile performer will top the section listing and qualify for the certificate. Let us know, however, how you like the reporting style shown in the score tabulation and if you feel that this helps to supply that special boost to the single-band entrant.

The other subject was a direct result of a hilarious exchange of letters with moonbouncer W3GKP. In a superbly written petition Bill adroitly pointed out that Public Law 89–387, by act of Congress, states that (in effect) daylight savings time does become the standard time of most zones (covered by the state-wide law). This promptly brought to a head a decision to simplify the starting and ending times of the June and September VHF QSO Parties so that they may be expressed in terms of GMT. What we came up with, on the advice V.H.F. Editor, W7IDQ, should simplify things for everyone!

Operation may be in any continuous 24-hour period beginning no earlier than 0600 GMT Saturday and ending no later than 0600 GMT Monday (starting time on the hour).

This should take care of the confusion involved in interpreting local standard time and, additionally, be a big boost to the many mountain-toppers who want to get home earlier. They could start at essentially the same time as they always have, but quit four hours earlier, leaving plenty of daylight to dismantle and get started home. We hope that the flexible starting time will help some who have to work most of Saturday and be a brake for the go-broke-and-operate Sunday-only crew. You can now work out your own schedule for fuller participation according to your own needs and desires.

Thanks to your comments and wishes we hope the future ARRL VHF QSO Parties will be better ones and enjoy even better participation.

Those 65 certificate award winners shown in the following tabulation are reminded that their special awards are scheduled for a December 15 mailing. Nice going, OMs!

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* Deputy Communications Mgr., ARRL.
A good invasion kept all sections from Delaware to Maine booming solidly into Wl-band. Really made this a great contest and only 5 watts input on 2 at this QTH! - \textit{W1DZA}. "Arrived home from the hospital Saturday morning to recover from an eye operation. I just got on to briefly give a few points, 8th well, CU in January!" - \textit{K1TPK}. "This exercise was set up by members of the Milford (Conn.) CD Communications Group and served as an example of our ability to provide around-the-clock emergency radio service for the city." - \textit{K1FXE/J}. "Operation was from Mt. Everett in the southwest corner of Mass., 2500 ft, elevation; battery power." - \textit{W1HDL/J}. "Our generator went west at 2145 GMT, Thank you, Mr. Murphy, the contest would have been better had more of the high power stations used their receivers before transmitting. All in all, it was a fun day on little Mount Equinox." - \textit{W1AVG/J}. "Your minimum multiplier box sure made me work a little harder!" - \textit{W1AIG/E}. "What ever happened to 2-meter activity in Vermont? I noted what seems to be an increasing tendency not to tune below 145 Mc, This cost me N.Y.C. - L. - W1FJ/C. "A certain N.Y. multnip, high-power station had everything for the contest in his favor except operating sense. Never before have I seen such mal use of a v.l.o. I would think that a little less sense would come from a thousand watts!" - anon. "Next time I’ll have more rig than a closet set!" - \textit{W1FSK}. "This time 40% of my contacts were on v.e.w. - W1J/C. "Zest! By, Heavy rains tell on our contest site on Mt. Washactus, Princeton, Mass." - \textit{K1YLU/J}. "I am submitting this log to prove that there was a 6-meter station on in Vermont. Sorry the rig blew as I had fine tunes waiting for a session multiplier. Mobile operation on 432 Mc was tough, but fun." - \textit{K1JQZ/J}. "The hardest part of the contest was trying to read other people’s writing when recvying the log, 432 Mc, wouldn’t work, but wait till June! This was just the second effort by our Takeoff Mountain VHF Society." - \textit{K1ZDI/J}. "Tried the entire contest on 6 meter v.e.w. and disappointed about the number of v.e.w. stations active. However, this sure is a good way to get rare multipliers!" - \textit{W1GYV/H}. "Is Vermont still in the Union?" - \textit{W2FGC}. "Without a v.e.w., you don’t stand a chance. Some multipliers should be found to encourage a bit of spreading out." - \textit{W2FKG}. "Our location was 2170 ft. up on top of Summit Mt. (W.N.Y.) in the fire tower." - \textit{W2BEP/2}. "This was a new experience for the 0200 Club. We operated from r.v.o., Bergen County, close to home for a change. The actual location was Hill 73 in Oakland, N. J., elevation 1000 feet. It’s easy to get to and you can drive up with a car." - \textit{W2FEC/2}. "This was my first contest and I had a ball! I used a Telex with one crystal and a helipendium 15 feet high which I rotated from my window using a yardstick." - \textit{W2JSW/X}. "I’ll be back in January with more power and 220/432 Mc, capability." - \textit{W2K0O}. "When reaching our planned air, we find it occupied by W1GSA r/zQZ VJW. They had gear for 6 and 2 and we had equipment for 220/432/1200. We decided to join forces and had a fine time until hit by a severe rain storm." - \textit{K1VUH/H}. "This contest was the best I have ever entered. More activity plus good conditions with Vermont and R. L. represented." - \textit{W2BMRK}. "Reminding our June mis-

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<thead>
<tr>
<th>Minimum Number of Sections (If any one minimum figure is met, all bands are shown.)</th>
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<tr>
<td><strong>Band (Mc.)</strong></td>
<td><strong>Minimum (Oct., 2, 1</strong></td>
<td><strong>Minimum (Oct., 2, 1</strong></td>
<td><strong>Band (Mc.)</strong></td>
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<td>W2AGT</td>
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</table>

*Multiplier station.

Alabama certificate winner W84DQW (remember K17D/E9) felt that he could have worked many more 2-meter stations if they had tuned up to 145.0-145.4 Mc. Mel reports the ground wave was exceptionally good during most of the contest period.

\textit{W2DXG}. "Our location was 2170 ft. up on top of Summit Mt. (W.N.Y.) in the fire tower." - \textit{W2BEP/2}. "This was a new experience for the 0200 Club. We operated from r.v.o., Bergen County, close to home for a change. The actual location was Hill 73 in Oakland, N. J., elevation 1000 feet. It’s easy to get to and you can drive up with a car." - \textit{W2FEC/2}. "This was my first contest and I had a ball! I used a Telex with one crystal and a helipendium 15 feet high which I rotated from my window using a yardstick." - \textit{W2JSW/X}. "I’ll be back in January with more power and 220/432 Mc, capability." - \textit{W2K0O}. "When reaching our planned air, we find it occupied by W1GSA r/zQZ VJW. They had gear for 6 and 2 and we had equipment for 220/432/1200. We decided to join forces and had a fine time until hit by a severe rain storm." - \textit{K1VUH/H}. "This contest was the best I have ever entered. More activity plus good conditions with Vermont and R. L. represented." - \textit{W2BMRK}. "Reminding our June mis-

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December 1967 63
DIVISION LEADERS

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<thead>
<tr>
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<th>Multioperator</th>
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<tbody>
<tr>
<td>K3JPM</td>
<td>Atlantic</td>
</tr>
<tr>
<td>K3DJK</td>
<td>Central</td>
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<tr>
<td>K3BWX</td>
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<tr>
<td>W4AYKN</td>
<td>Delta</td>
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<tr>
<td>K4QJF/4</td>
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<tr>
<td>WB2MRK</td>
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</tr>
<tr>
<td>W8WBF</td>
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</tr>
<tr>
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<td>K6IBY</td>
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<tr>
<td>W3SHX</td>
<td>West Gulf</td>
</tr>
<tr>
<td>VE2SH</td>
<td>Canada</td>
</tr>
</tbody>
</table>

We had closed down our Novioes. However, when the groundwave conditions started to get really good, the Novioes went back to sending signals. However, it was a good time in spite of poor band conditions. - K65FD.

"I had only been on the air for a week when the contest started and I think that I had more fun than all of the others put together." - WSGG.

"Too many of the stations had to QRT early and missed the tropo on 144 and 432 Mc. During tropo work I worked stations 932 (S, Dak) and 933 (Min.) on 144 Mc. Also worked WJ, WA1, W7, and AE2H, for four new ones on 432 Mc. I was heard by K2UF/8 in Iowa who did not have a working 432 Mc. transmitter. Sob!" - K4ZQ.

"You are most likely wondering why I'm turning in a score of 3. Well, until the following reports are received from the area I'm listing will remain the same." - WB4DFW.

"Very poor a.m. activity in the Alabama area and bad weather kept me from operating on a hilltop so I stayed home. Guess I'll have to go to A.S.B. seems like they are doing OK." - K4BWH.

"It took about 9 hours to get the 2-meter rig going but lots of action on Sunday so it was worth it. Lots of a.m. and c.w. this time but s.s.b. was the points maker." - K5BMB/4.

"The portable location was atop Big Black Mountain in Harlan County, Kentucky, the highest point in the state and about 1 mile from the Virginia state line." - K4QPH/4.

"Two was very good during the contest and the number of s.s.b. stations heard but not worked convinced me that sideband is a contest must." - K1HIG.

"From our location on top of Mt. Jefferson we experienced good local and extended ground wave on six and moderate local and ground wave on two. No openings, but some early morning openings. We'll be back for our fourth year on Mt. Jefferson next June under the call of WA4BNX." - K4LVU/4.

"The few contacts I did make were hard work without hand openings but I did enjoy the contest." - W9LTA.

"Two was in better shape than in June, but no skip." - K5BDQ.

"W3KWH was in very good all day Sunday morning on 50 Mc. Station Tropo was very good both Saturday and Sunday evening on 144 Mc and I worked as far as 900 miles. Worked S, Dak, and Ohio for two new stations on 2 meters. W5, W7, and W8, were worked into scatter on 50 Mc. All in all my best section total for a September Party since I started in 1963. The opening on 144 Mc. peaked after the contest ended Sunday night or my two-meter section total would have been much higher." - W8WAX.

"Just moved into a new home and the XYL. had me planting shrubs. Thanks to WAGGER/7 I did work Nevada for a new state although conditions on 144 Mc. was very bad." - W9DOR.

"Not as much activity on 2 as there should have been. Somebody booted up by scheduling our combined Southeast/Westxie convention on the same weekend." - W8WBF.

"Let's exchange handle and QTH." - W9ERBZ/8.

"Sorry to see such a poor showing. I think
On the left, the 15-year-old WA5KID of Louisiana reporting a lack of 6-meter openings although ground wave was fair. On the right, one of the WB2MZE crew (WB2s MZE QLP RIR) with nice results on six and two for 6600 points.

Some were boycotting because of the change in rules (FCC). I personally think the change is a good step in the right direction. — K5BY. W5BWL.

"Work with rain and lightning and wind, no wonder there's nobody in Idaho! I had to QRT with a dead battery at 0100 GMT." — K7ZBFQ. "The contest was loads of fun although the lack of local Washington participants was observed. Only several EA9s, AA8, and EA11 QSOs were made for the Oregon stations on 2." — W7EGRY. "I sure like the Washington hams to get the job for their inactivity. It's getting so we have to send out satellite groups to ensure contact! The first storm in over 2 and a half months of superb weather hit — guess when. Yep, the second weekend in September. That, and no 6-meter openings kept scores down but the addition of 1296 Mc to our operation helped offset this. It is interesting to see s.s.b. becoming the dominant mode on 6. - K7LJDO. "Murphy's Law really struck everywhere including here and me (Doux Murphy!). Antenna problems before and during the contest, poor 2 and 6 meter activity. Thanks to K7ZBFQ for our only additional section multiplier." — W5LAT. "Almost all of the two meter rigs were still up in Parnaisia so there weren't very many on from Anchorage. I think that is the only way I stand a chance of winning, Hill!" — K5GCK. "We were located east of Mt. Vernon, Wash., at an elevation of 2000 feet at Devil's Mountain lookout." — W5BTKF.

"Club station and hilltop efforts would be more worthwhile if the contest ended at around 1900 GMT and some confusion might be avoided if all time zones started together." — W7APTE. (See the lead Tim — Ed.) "K5BQ is my 13th state on 432 Mc." — W7PT. "The best 2-meter opening of the summer was noted here as the contest closed." — K5MUIA. "Good 6-meter ground wave during the whole contest. I made nearly as many contacts in Wisconsin and Illinois as I made in Michigan. Local activity fair but not very many stations trying hard." — K5BKNH. "S.s.b. accounted for 40% of the QSOs on 6." — W5APBC.

"Curious to know how many contest participants were running commercial vs. home-built rigs. A need for more operators to listen for and then copy e.w." — W5KGH. "I suggest future v.h.f., u.h.f., contests be judged solely on band for band. On 6 it is a snap, 2 is hard, 432 is mighty rough and 1296 is a bear cat." — W5XNP. (Bob, handling perhaps 5 or 6 times the volume of certificates now handled is a formidable problem and we will indicate simple handle — Ed.) "Lots of enthusiasm sparked by this first attempt of our newly formed h-p Loving ARC. Several new stations have been added to 2 locally as a direct result. Contest thus far has been exciting and stations result too. Two metros into Wyoming and Nebraska proved so easy that future contests may see us using a portable site in each state to provide contacts for other contest stations at least on 6 and 2." — W5GSKH.

"One of the worst contests I've ever operated with poor conditions, high noise level and worst of all, no contacts!" — K5PGCQ. "Please accept my fantastic score of 2 points. What else can I say?" — VE3MC. "Ours was a great group activity of the Hamilton & District ARC." — VE3RDC. "The band seemed to be time in the first 6-hour period and then it was tough to work out, high noise levels. Anyway, it was worth the QSO with VE3RDX on 432 Mc. I flew home from VQ1 land for the test." — VE3FHE. "Look for me on 1296 Mc in the next contest, the extra points are worth it." — VE3BDO. "Unable to operate the entire period as I had to fly to Baltimore Sunday afternoon. I got a real kick out of flying over such states as Pa., N. J., and landing in Md. only a few hours after trying to work them on 2 meters. Generally poor conditions and I didn't hear one signal west, except for Ohio. Don't know where all the Michigan boys have gone to!" — VE3BZC.

**SCORES**

In the following tabulation scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and brackets used. A represents 40 Mc B; 144 Mc. C; 220 Mc. D; 1, 120 Mc. E; and 1296 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation. An asterisk denotes a Headquarters staff member, ineligible for an award. A double asterisk denotes a Novice Award winner. Bold-face listings denotes singleband high scorers.

### ATLANTIC DIVISION

#### Maine

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<td>288</td>
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<td>W3JNY</td>
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<td>W3JWY</td>
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<td>K5FVT</td>
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<td>K5GOQ</td>
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<td>624</td>
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#### Marland-D. C.

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**December 1967**
Here's a view of the K7AOU/7 microwave activity with W7UDM working on the 2300-Mc. equipment. The crew manned seven v.h.f. bands for a total of 13 multipliers.

Louisiana
WASKID 116-29-4-4A

Pennesse
WAAYKZ 902-105-17-AB
K4ZKN 1000-72-20-AB
WDYJOV 3-3-1A
WA4QG/1 (5 ops.)

Great Lakes Division
Kentucky
KIQ7Z/4 6238-165-26-AB
K8NRA/1 (4 ops.)

Ohio
WAHLRE 3448-165-21-A
WBWEN 1800-165-11-AB
K7ZME 308-117-5-A
W4HPL 700-105-11-AB
W4HFR 78-39-2-A
W4HMP 82-6-AB
WASTYF 10-10-6-AB
K7XCF (WSTYF, opt.) 12-2-14-AB
W4BPA/4 12-12-14-1H
W4BDA/3 (6 ops.)

Illinois
WASPAR 1504-165-40-AB
W4BAU/4 1009-216-26-AB

Hudson Division
Eastern New York
K4AYU 7414-185-26-ABCD
W2AYVF 6293-129-21-AB
K2ZDK 2714-107-25-BC
W4YFU 1048-88-21-AB

WBYQ/1 1242-138-9-AB

W2OJO 1212-191-12-AB
W4HAP 409-43-12-AB
W4HBE 376-97-8-A
W4H4R 527-53-15-AB
W4HJN 312-47-12-AB
W4DPD 196-24-7-H
W4DXP 190-18-9-A
W4HAKB 136-34-4-H
W4HGR 81-61-12-AB
W4JKJ/1 (6 ops.)

W2KZV/2 (5 ops.)

W4BZV/2 3625-175-15-AB

W3AYC/2 (4-1/2 ops.)

W2COMK
W2RZK 1009-327-32-AB/FK
W2Q3K 7844-238-19-AB/FK
W2KXG 440-88-5-AB
W2KBE 125-43-10-AB
W2HME 591-32-4-AB
W2H4R 334-61-4-AB
W2IQB 196-24-7-H
W2DZP 190-18-9-A
W2DXD 136-34-4-H
W24ZJ 81-61-12-AB
W4DAP 276-28-4-A/HCD

Western Pennsylvania
W3KWH (W3GFI, opr.)
K37ME 1188-113-10-B
W3WU 1100-96-1-L/AB
W3XVF 232-72-13-AB
W3XAJ 576-63-9-AB
W3JLA 744-74-16-AB
W3XBT 112-28-5-AB
W3XO 48-10-AB
W3XBI 344-56-10-AB
K3KA/3 (9 ops.)
W3JFO/2 (4 ops.)
W3KCR/8 (W3M, FK/FK/FK)
W3XAV (W3S, FT8, GJQ)

Central Division
Illinois
W4JUS 900-193-18-AB

K9ZTF/1 1188-113-10-B
W4V3N 919-91-9-AB
W4WOO 900-100-4-AB
W4HR 384-96-4-AB
W4LOIS 151-74-10-AB
W4MBZ 188-47-4-AB

This is a mighty fine way to go hillhopping! WB6ODM (left) joineforces with WB6PXL/6 to operate two bands at Leek Springs, El Dorado County, Sacramento Valley.
The new high-loveland ARC, WA8SKH, operated near Loveland, Colorado with an enthusiastic crew of 14 managing 4 bands, 50/144/42/1217. Gear on 220 and above was homebuiltd or modified surplus. They doubt thinking that hilltop in January but wait till June '68!

The Cleveland 50 M silent key, WA8BCA, is an old hand at making up big contest scores. The crew of 8 manned two bands for a total of 464 exchange and 40 multipliers (21 on 6, 19 on 2). Here's the 6-meter position, 20 minutes before zero hour.

December 1967

67
The Local Scene

In the jargon of modern youth, a lot of us amateurs are just not "making the scene" in local public service communications. There seems to be a growing tendency to relegate this kind of communication to other services, principally CB, because we "can't compete."

Fiddlesticks! Won't compete, maybe, but not can't. Because we most certainly can, if we want to enough. We amateurs have a combination of numbers, versatility, technical and operating know-how and maturity that can't be beat by any other service. True, other services may outstrip us in one, or even two of these qualities, but by and large none of them can outperform us -- unless we permit them to do so.

In local communications, this is just what we are starting to do. We are allowing younger, more eager, more numerous services to take away from us our traditional role of service to the local Red Cross, law enforcement and other public safety agencies, civil defense, local industries and allowing ourselves to be relegated to handling "long distance" communications (because we are "better suited" to this) and unimportant communications such as disaster inquiry traffic while others handle the high-priority stuff.

This is occurring not because we can't handle it, but because we aren't handling it.

*Communications Manager.

Take a look at the record. There are over 275,000 amateurs, second largest of any communications service regulated by FCC. We amateurs have more spectrum space than a great many other services and can do more things in more different ways on more different frequencies than most of them. The average amateur has better technical know-how than the average in any other service and better and more versatile operating know-how. And the average amateur is a mature citizen with years of communications experience in all kinds of communications specialties. And the amateur has a greater diversity of privileges, generally speaking, than any other service.

With all these attributes, it is ridiculous to say we "can't compete." If enough of us want to, we can offer a public service that no other service or combination of services can touch. If enough of us want to, we will render this service and thereby insures the respect of other services, other governments and the general public for the good that we do and thereby insure our continued occupancy of much-coveted frequency space.

Let's not leave the local scene. Local amateurs should and must continue to take the leadership at the local level in any kind of emergency or standby communications. Let's not "break and flee" because the going is rough. — WINJM.

Texas RACES Views

Your headquarters is fortunate to be on a number of mailing lists for publications having to do with amateur communications. One of these, believe it or not, is the Texas Defense Digest which, among many items about c.d. in general, always contains an item about RACES. In last September's issue there appeared this item, which we feel is worth quoting, at least in part:

"Much criticism has recently been heard from radio amateurs who feel that RACES operation violates the integrity of the amateur frequencies. This comment comes from hams who are sincerely concerned and honestly motivated. They are concerned about operation on amateur frequencies by non-licensed individuals and operation that is foreign to normal amateur procedures."

"Subpart F, Section 97.203 of the Amateur Rules and Regulations permits operation of RACES stations by commercial radio operators under certain conditions. This, we presume, is to permit continued operation of vital RACES facilities in the event no amateurs are available at the time and place of a disaster. Much emergency communications planning was built around RACES, and it is felt that all contingencies must be provided for in the rules. In Texas, such use
of non-amateurs is strongly discouraged. In fact, the State RACES Plan simply does not permit such operation. This, we feel, is the only proper way to keep the RADIO AMATEUR Civil Emergency Service a truly RADIO AMATEUR operation.

"The second criticism is centered around the type of operation that seems to be more governmental or military than amateur. It should be remembered that RACES is not a normal type of operation. It is designed to be used in extreme emergencies, including war emergencies, when amateur operation in the normal sense will not be permitted at all. In this event, amateurs will, in effect, be serving their local governments and such service must be in a uniform manner that can be efficiently utilized by those directing emergency relief efforts."

"All RACES operators and others interested in RACES are urged to study Subpart F of the Amateur Regulations and to direct any criticism, comments or questions to their local or state civil defense officials, the FCC, and national amateur organizations. Only in this way can understanding be achieved and RACES operation be shaped to fit those serving as well as those served."

**Hurricane Beulah**

On Saturday Sep. 23, W1AW, at the request of the FCC, sent a Special Bulletin (Nr. 784) with extra transmissions in addition to the regular schedule, asking for clearance of the RACES Segments on the 75- and 40-meter phone bands, for amateurs operating in the emergency areas under 75.107. W5QEM/mobile was dispatched and found that several hundred persons had taken refuge in Hays County. Hays County then contacted the Red Cross representative to find out the requirements and radio them to Red Cross headquarters at Corpus Christi. Later, W5QEM/mobile was relieved by WA5MPA and eventually by WASGWT during the next 24 hours. On Sep 24, c.d. officials at Raymonville requested communications equipment for use in evacuation operations. W5HQR and W5CYP gathered the portable 2-meter equipment previously utilized in the Corpus Christi shelters and instructed personnel on the use of the equipment after it had been transported via helicopter to Edinburg nearly 135 miles away. Rescue work was still being conducted by Sep 27, and radio amateurs were still providing 24-hour-per-day communications.

W5KR (EC Cameron County, Brownsville), set up 75- and 40-meter equipment at the Weather Bureau when it appeared that the area was going to be hit by the fury of the hurricane. Twenty-four hour coverage was maintained with the help of W5s DNT QOG QCT OGY and WA5GZL. The Brownsville Radar was the only facility capable of detecting the hurricane's eye, and the reports were very important during the outage of the telephones and teletype. Corporal James McCarty, 558th Engineer Battalion, was on duty for Matamoros-Reynosa area, and Mexican amateurs who were quite well organized, making contacts with Mexican Government offices and the Red Cross. Things would have been much simpler had RTTY circuits been available to relay the somewhat unfamiliar weather language.

W5KLV and K5HXR made the following combined report: "W5QEM/mobile and the coast at Brownsville on Sep 19, the only communications from the area were from W5KR at the Weather Bureau until Sep 24. Then teletype and landline services were restored. During this period, Brownsville Weather Radar reports involving 'eye position' movement and hurricane diameter were relayed via the amateurs to Miami and New Orleans forecast centers. In San Antonio, W5SC (San Antonio Radio Club station, manned by 26 different operators) maintained constant contact with W5KR and furnished data for the Hurricane and Tornado warning alerts for civil defense agencies, Dept. of Public Safety. Red Cross and even damage estimates for the office of the President of the U.S. Flooding of the Nueces River in the towns of Three Rivers and George West cut off normal communications channels, so W5MF went to 'Three Rivers and operated from a hospital which was being used as a shelter. The area was also represented by W5PL at Beeville and WA5OFN at George West. K5PPJ and W5BRC went to Brownsville from Kennedy, Texas. The amateurs provided vital communications for rescue operations and requests for supplies, food, clothing and shelter facilities. The flexibility of the amateurs to fit the needs and move and operate utilizing improvised antennas and rigged emergency power sources is a somewhat unique feature of the amateur service. Houston mobile operators went..."
into the valley area at their own expense and provided a link for welfare messages. Harris County amateurs W5CVL, K5HXR, WA5BWE and WA5OPK went into the stricken area, taking 19 hours to make a trip that under normal conditions takes only 8 hours. The information on road conditions furnished by W5CVE prevented backtracking so that no time was lost. They had a KW mobile rig operating from a trailer-towed auxiliary power supply. This unit operated for 4 days continuously and handled nearly 300 messages from Brownsville.

W5BRZ (EC San Patricio County Sinton) learned on Sep. 21 that communications were needed from Sinton, Texas to Red Cross headquarters at Corpus Christi. He then set up a station at the courthouse in Sinton and operated for 10 hours. When flooding started and the power was shut off for safety reasons, he returned to his home but his line was dead. On the morning of Sep. 22, the telephone service had been restored and the Red Cross set up at the New Sinton High School where WA5NTB and WA5NTF set up and handled messages. On Sep. 23, the Red Cross moved their headquarters to the Old Sinton High School and W5BRZ set up there and operated until after noon when the telephone link was restored with Corpus Christi.

W5DA (EC Kieberg County) reports that equipment was set up at the Kingsville city hall by the Kingsville Radio Club and the call sign utilized was W5ERC. They used 75 meters for county communications and 6 meters for locals. The 6-meter unit was at Red Cross headquarters at each shelter and worked well with simple antennas. At one time the hospital had lost landline communications and the amateurs rushed a 6-meter unit to the hospital to provide a link until telephone service could be restored. Three portable 6-meter units, and two mobiles were dispatched along with two 75-meter mobiles, the base station utilizing both 6 and 75 meters. The amateurs were alerted Sep. 22, but no communications emergency developed.

W5ONQ (EC Victoria), had WA5MWW and WN5RFA operate his station for messages received and relayed to and from the Red Cross. WA5NVO and WA5NCP operated at City Hall and W5ONQ at the local broadcast station, W5WV/5 used 2-meters at the Red Cross building. Victorias was well represented during the emergency.

K5BN1 (Secy of the 7200 Traffic Net) reports 2260 hours of activating 77 hours with 12 different net control stations with nearly 1230 check-ins and 1118 formal message handlings. Especially helpful were: W5s KFI KPX QVJ, K5QGY, W1s DKN NRD.

W5ALC, 72s KR BYZ KPX WYJ, K3s EFIY MK3 participated in the Hospital Network, which utilized the RACES frequencies of 3975.5 and 7218.5 kc. to handle messages concerning medical availability of blood, beds, doctors, etc.

W5ZJF (Gulf Coast Hurricane Net), reports operation from Sep. 14 to Sep. 20 with twice-daily schedules held with X52s CY FFC QQO during which barometric pressure readings and storm coordinates were relayed into the Mexican Weather Nets. The Net was in continuous operation from Sep. 17 to 20 and provided hourly weather reports and advisory data which enabled many persons to keep posted on the storm's course.

W5OBC (Houston Area Tornado Watch Network) reports the activities of 40 different stations utilizing a 2-meter f.m. repeater system with the stations making reports and sightings. Hurricane Beulah created about 100 tornadoes in South Texas from Galveston to Brownsville. Prior to Beulah, the record number of tornadoes associated with a Hurricane was 19. Nearly 25 funnel were sighted in the Houston-Harris County area during a 34-hour period on Sep. 21.

All but one member of the Pacific Area Staff of NTS showed up at the Pacific-Southwestern Division convention in Los Angeles in September. Left to right are WA6BRS (at large), K7JHA (RN7), WS6VQ (PAN), K7NH (TWN), W6HC (Chairman), WB6BBO (RN6), W7DZL (TCC Pacific). Missing was member-at-large W5EOT.

Diary of the AREC and RACES
On Sep. 16 to 19, amateur radio operators performed meritoriously during the Typhoon Sara communications emergency. KW5E of Wake Island was one of the spark plugs for the activity. WA4QXW/KW5 passed most of the messages with the help of one unidentified operator. KW5E and KW5CB were helpful representing their areas, while KG5QF and QW5A helped to relay from Wake to Honolulu when conditions were difficult. KI6EB, operated by WA5ZTY and K6BBNQ, was the net control station during the entire emergency. Some of the statewide stations who helped by passing messages and maintaining communications were: WA6HR, K6BPL, K7HYI and K7TWD. All these stations had a common quality, preparedness, which is something that no emergency should be without — KI6ZBT SCM Hawaii.

On Sep. 23, VE2KJ broke in on a conversation being conducted via the Montreal Repeater to report that a transport truck had lost its bottom and boxes were strewn over the road uniformly blocking the highway. VE2AE and mobile Hamilton, stopped at the nearest service station and reported the hazard to the authorities — VE2AEL SEC Quebec.

On Sep. 27, K0EIT heard a news report concerning a drunk's mistake in filling a prescription for a 9-month old child. The family was enroute to Southern Oregon and had just left the San Francisco bay area. K0EIT put the bulletin on the West Coast Amateur Radio Service frequency of 7255 kc., at 0900 PDT. WA6VIB was net control; he and the members of the net helped to spread the information as widely as possible to other hams and agencies. Additional information was developed by various amateurs regarding the family and a description of the car. At 1543 PDT, W8FQ reported that he had located the car and family at Oroville Dam, Cal. He advised the family of the danger and accompanied them to the hospital. Fortunately, the child was given only a single dose and was located just prior to the second scheduled dose. The child recovered quickly, and the parents were extremely grateful to the amateurs who participated in the search — W8EIJF.

The following additional services were performed by the West Coast Amateur Radio Service during the period from Aug. 28 to Oct. 8: On Aug. 28, WA6ROU used WCAR to find a station in Santa Ana who could contact W6OIN in order to obtain information concerning a very ill relative in Santa Ana for the missionary in Peru. W6OIN responded and completed the communications on 15 meters,
On Sep. 15, X611DDP used 7255 kc to report that W6AVN had become critically ill while visiting Mexico. With the aid of W6BTP and W6ZOM, arrangements were made to have W6AVN transported to San Diego and notification made to his wife and brothers. Eight other amateurs aided in the various relays. W6AVN was covering nicely at latest report. Twenty-six amateurs furnished communications for 7 different accidents, 3 cases of stalled vehicles, two vehicle fires and traffic hazard during the period from Sep. 2 to Oct. 8 using the coverage of the WCARS on 7255 kc. — W6BIZF.

On Aug. 11 to 20, eight amateur furnished communications for the Ill, State Fair by deploying units at the fair grounds, emergency first aid station, hospital and the chapter house. This setup, utilizing 75 meters, proved very satisfactory. During the 1966 fair an announcement of an accident on local television promptly jounced the telephone lines so that all communications were cut. This year the amateurs had communications available but an emergency situation did not develop.— W8PRN SCM Ml.

On Aug. 13, ten Quebec amateurs used 2-meter f.m. equipment to furnish communications for the Three Rivers Expo Annual Canoe Race Organization. Starting times and position reports were made available for public address use and reports to news media. All activities were conducted very well during the operation which lasted for nearly five hours — VE2AJD EC Three Rivers, Quebec.

On Aug. 16, KG8MA called in the Inter-Continental Net in order to locate his brother who had recently been transferred by the Navy. All relatives had been contacted except the brother and planned to be in Chicago because their father was to have a serious operation, W6JUT assisted by W6ZVID and KH9RE, spent several hours and made numerous telephone calls, finally getting the message to the brother. The father survived the operation and all concerned appreciated the efforts of the amateurs in locating their brother — KG8MA.

On Sep. 2 to 4, The AREC of Cuyahoga County, Ohio, provided 6-meter communications for the Cleveland National Air Races. A link was set up between the Red Cross first aid station and 6 mobile units as key points within the airport grounds. Seventeen amateurs participated in this activity — W8PIQF EC Cuyahoga County, Ohio.

On Sep. 16, Disaster Exercise "Phantom II" was held in the Washington, D.C., area. The network utilized 50.4 Mz. The authenticated oricinations were sent via four different services (CAP, MARSH, CB, AREC) and elaborate systems were used to be sure that the radio messages were authenticated. The radio unit was designated to place fictitious messages in the system and attempt to operate the system. This resulted in a few messages being diverted from the addresses and some false messages getting into the networks. The widespread exercise, covering D.C. and parts of Md. and Va., presented the amateurs opportunity for many of the participants to handle formal messages and work in a net. During the exercise, weather summaries of Hurricane Dora were sent at regular intervals, and if an emergency situation had developed, the units in the exercise would have been able to do something. The joint effort worked to the advantage of everyone participating — W8TSE.

From Sep. 15 to 17, during the hurricane Dora threat, we received the following reports: The Maryland Emergency Phone Net was activated with 14 net control stations checking 123 stations into the net, which operated for 17 hours. The Virginia Widespread Net reported daily watch for nearly 15 hours, logging 75 stations and maintaining contact with the capital at Richmond and the Red Cross headquarters at Alexandria. W8ZAD/EC for Cape May and Atlantic Counties, N. J. organized the AREC/RACRS systems using 6-meter f.m. Several amateurs represented the Atlantic Ocean effort and eight in the county of Cape May. W8PM was very helpful in the Delaware section. The hurricane turned away, and an emergency situation did not develop. — W2ZJ, W8ZAD, K4ZTY, W8DKN.

On Oct. 1, The Catamount Ham Radio Club of Bennington, Vt., and the Mount Greylock Mobil Fars CB Radio Club of North Adams, Mass., joined forces in providing communications for a foliage parade which enmeshed nearly 65,000 spectators. The CB crew worked with the parade proper, while the amateurs coordinated the police units for traffic control. A fixed station was at the police station and both 11- and 6-meter units were at the reviewing stand. Four amateur mobile units were covering the main routes into the city. The 6-meter circuit provided skip-free communications for the police units — WA1DSY.

On Oct. 7, at the request of the Dauers County Civil Defense Director, seven amateurs handled 17 practice messages during a shelter exercise at the city hall of Chadron, Neb. The communications were from the shelter to points outside including Lincoln and North Platte during the eight hour test — K9QAL SFC Neb.

Forty-five SGC reports were received for the month of August representing 19,902 AARC members. This is three fewer reports and 2,817 fewer members than a year ago. Sections reporting are: Ala., Alta, Ark., BC, Colo., Conn., Del., Fila., E.Mass., E.Pa., Ga., Hawaii, Ind., Ill., Iowa, Ky., L.A., Mar., M.D.C., Me., Mich., Miss., Mo., Mont., N.C., Neb., Nev., N.J., N.M., Ohio, Ore., Que., Sask., S.Bar., S.C.V., S.Dak., S.N.J., Tenn., Utah, Va., Wash., W.Fla., W.N.Y., W.Pa., The Oregon Section should have been listed for June in Oct. QST and also for 100% reporting for the first half of 1967.

**National Traffic System**

When the NCS knows his people, it is sometimes possible to greatly shorten procedure without in any way being illegal. And let's face it, most NCS on NT8 nets have a pretty good idea just who is going to report in and what traffic they are going to be able to handle or are there for the purpose of handling. The question which arises is, why should it be necessary for "receive only" nets stations to report into traffic nets at all?

Obviously, the answer to this is: so the NCS knows that they are there. How will he know if they don't QNI?

Well, let's take a fictitious example. Suppose W1IUSN is NCS for the Connecticut Section Net on a given night. On this particular night he knows that W8H1 knows that WQI wants to take "thru" traffic, and will later take that traffic. (Continued on page 148)
Emergency Communications Preparation

Organize — Then Make Your Facilities Known!

BY IVAN H. LOUCKS,* W3GD

During the several years that I served as Chief of the Amateur and Citizens Radio Division of the FCC, I seem to have acquired quite a reputation of telling the amateurs and the citizens banders at their respective meetings, my impressions of some of the things which they did or failed to do in the operation of their radio stations. The emphasis naturally was on the ways in which their operation, or lack of operation, failed to meet the basic requirement that it be in the public interest, or was in fact in direct violation of that requirement. At this late date, it hardly seems appropriate to change my basic approach although I no longer speak as a representative of the FCC. With that explanation, if you will bear with me, I would like to discuss something which to my mind is of extreme importance to all of us as amateurs, in fact something which I feel has a direct bearing on whether we continue to have an Amateur Radio Service and to enjoy the privileges we now have.

As you all know, the Federal Communications Commission is an arm of the United States Congress, set up by the Communications Act of 1934 for the purpose, among other things, of licensing non-government radio stations whose operation it finds to be “in the public interest, convenience and necessity.” The Amateur Radio Service is just one among the many service categories which it has set up and administers. All are required to meet those criteria if the services are to be permitted to continue. Some doubt may exist with regard to the Citizens Radio Service, but it is my firm conviction that the usefulness of that service far outweighs the nuisance value of the highly-vocal minority who want to make it a hobby service. Whether the Commission agrees remains to be seen. As for the Amateur Radio Service, its value has been demonstrated in the past but must continue to be demonstrated if we are to hope to retain our frequencies, and we have quite a few, against the demands by many other services such as International Broadcasting, for more spectrum space in which to operate.

Spectrum Pressure

I should point out that it is not only the International Broadcasting Service which is clamoring for more spectrum space in which to operate, although the stations in that service in other countries are the ones we frequently observe intruding into our amateur bands. In this country particularly, the broad category of radio stations in what we call the Land Mobile Radio Services are finding the frequencies available to them more and more loaded in the major metropolitan areas. Those of you who have contact with the non-government use of two-way vehicular radio communications are undoubtedly already aware of the problem. To the others, I will merely say — imagine, if you will, trying to contact a police car, a fire truck, a delivery van, or even a railroad locomotive by radio to give its personnel important information or instructions when to do so you must share the use of a single frequency on which there are as many as twenty other licensees operating in the same area trying to do the same thing. This is not the extreme case, but it does illustrate the situation in some of the Land Mobile Services in many areas.

All of the services which make up the so-called Land Mobile Radio Services have justified their existence and their frequencies to the FCC with the

At the Kentucky State ARRL Convention W3GD, formerly head of amateur matters at FCC, pulled no punches in dealing with amateur emergency communications. There is a lesson here for all of us.

*Engineer, Communications and Signals, Association of American Railroads.

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Now, I would like to come to one of the other reasons for having an Amateur Radio Service in this country. It is the first one listed by the FCC in Section 97.1 of the Rules, and it reads as follows:

"Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications."

The emphasis here is on enhancement of the amateurs' proven ability to provide emergency communications. Such enhancement by the FCC has taken place in the past by changes in its rules to permit more flexibility in amateur operations in an emergency, and by the setting up of a Radio Amateur Civil Emergency Service (RACES) to serve as an auxiliary to Civil Defense communications. Other changes may be under consideration, but they have not been announced. On the other hand, the amateurs have a responsibility in this regard. The best of FCC rules on this subject are of no value if the amateurs and their stations are not ready, willing and able to provide those emergency communication circuits when needed. Let me give you an example.

As you probably already know, I am now living in the Chicago area. As you also probably know, Chicago has been plagued during the past year by extremes in weather conditions; snowstorms, ice storms, floods and tornadoes. Shortly after one of the major visitations by tornadoes, which wreaked havoc in two of the Chicagoland communities and did extensive damage to many other parts of that area, I attended a meeting of one of the local radio clubs, a club which actively participates in the operation of a 2-meter "repeater" station which makes possible 2-meter mobile-to-mobile or mobile-to-fixed point communication over the entire Chicagoland area. When the time came in the proceedings of the club meeting at which point the club mobiles and the repeater had played in providing needed communications to and from the disaster areas, this was the report:

"When the tornado hit we wrote a letter to the Sheriff (or maybe it was the Chief of Police) offering our services but we have not had any reply."

Let me repeat that:

"When the tornado hit we wrote a letter (to some official) offering our services but we have not had any reply."

That, my friends, is on a par with the proverbial case of locking the barn door after the horse has been stolen. It demonstrates a lack of forethought, of prior organization so as to be able to take an active part in coping with the emergency which we hope never occurs but which may occur without notice.

SOME DISASTERS ARE PREDICTABLE
Be Prepared

For many years I have been associated from time to time and in one capacity or another with an organization with which you are all familiar; namely, the Boy Scouts of America. The motto of that organization is: "Be Prepared." That motto is drilled into the thinking of every one of us who takes any part in scouting, but somehow we seem to forget it or ignore it when we grow older. Certainly few of us would start on a 5000-mile vacation auto trip without a spare tire and enough cash or credit cards to see us through, but how many other contingencies are we prepared for? I'm afraid that we all develop the same basic philosophy of "What's the use, it can't happen to me." In Amateur Radio, our radio stations may be perfectly capable of providing emergency communication facilities and performing a distinct and valuable public service but are we prepared to render that service? Are we fully prepared to meet that basic obligation of the amateurs which is set forth as the first item of the Basis and Purpose of the Amateur Radio Service? Undoubtedly many of us are, but it is my urgent plea that more of us must be ready, willing, and able to act in the public service, to meet the basic requirement of operation in the "public interest, convenience and necessity" if we want the Amateur Radio Service to hold its position (and its frequencies) in the world of today. We cannot afford to sit back and "let George do it;" it just will not get done.

The Radio Amateur Civil Emergency Service (RACES) was set up by the FCC as a branch of the Amateur Radio Service, to act as a communication auxiliary to Civil Defense in all types of situations where Civil Defense operations become necessary as a result of man-made or natural disasters; local, regional or national. To those of you who are not participating in the RACES program and drills, I recommend affiliation if possible, so that you will be prepared to serve your community when needed. Your local RACES radio or communication officer will be glad to see you and to talk over the possibilities; if you cannot locate him, just get in touch with the local Civil Defense Director through your local police officials if necessary. But this is not the only way by which you and your station can be prepared to take part in public service activities. There are many other ways and more are possible; the prime requisite is that you be a part of a known organization which is prepared to act in an emergency. Let me give you a few other examples.

ARSPC

The Amateur Radio Public Service Corps (ARSPC) is an organization of amateurs sponsored by ARRL. Nominally it includes RACES, but the ARRL Implementation extends only to the Amateur Radio Emergency Corps (AREC) and the National Traffic System (NTS). Among its functions is organization of amateurs at local levels for emergency preparedness in peacetime disasters and the handling of long-haul traffic both in normal times and in times of disaster. But even the networks comprising the ARSPC cannot be activated on the spur of the moment; they must be organized and ready. This includes being known to the local authorities and representatives of the respective relief organizations so that they will know how and where to channel their traffic. Let me emphasize again that being prepared to provide emergency communication service does not mean simply having an operating station, perhaps even with an emergency power source. It means this plus being known to the people who may need your services as one who is ready, willing and able to provide them. Who you will be able to serve is dependent on your individual circumstances or preference; it could be Civil Defense, the Red Cross or, yes, even a railroad.

As you all know, my present employer is the Association of American Railroads, but my interest and contact with railroads and railroaders has extended over many years. During that time I have frequently been amazed at the speed with which railroad service has been restored when interrupted by floods, hurricanes, tornadoes and snowstorms. One of the little-known factors of such service restoration has been the matter of dispatching trains and repair crews when the railroad communication circuits were disrupted by ice storms, hurricanes, etc. It may come as a surprise to some of you, but many railroads have long had an informal, unofficial network of railroaders and their friends who are amateurs, ready to step into the breach and handle essential train information and orders by amateur radio even on their own time, when all other methods failed. It seems to me that this present and potential aid to our basic national transportation system should be better recognized, organized and placed on a permanent basis, as a communication auxiliary to our whole land transportation industry. It will certainly be needed if the flow of essential goods and personnel by rail and motor carrier is to be quickly restored after one of our overseas "friends" decides to loose a few ICBMs with atomic warheads in our direction.

Public Service

These that I have mentioned are but a few of the many possibilities for amateurs to provide voluntary non-commercial communications, on an emergency or possibly a routine plus emergency basis. To list them all would be impossible but I will mention a few: the MARS networks, the Weather Neta, and the Eye Bank Net. All are organized and operate on a regular basis, ready to spring into instant action in case of emergency. Any of these and many others could profit by your affiliation. Being known as ready, willing and able to provide emergency communications. Such affiliation and readiness would be in keeping with the highest

(Continued on page 184)
December 1942

K. B. Warner, W1EII, appeals to stay-at-homes to get into some useful and worthwhile activity to help with the war effort. Hams with a ticket can teach theory, code and shop practice. The government is looking hard for personnel to help in the rapidly expanding communications field.

The front cover shows a flock of meters received from hams in response to an appeal in the November issue. The boys are responding to the military need for such gear. Many have sold their communications receivers to the government already.

WERS is under way but the service badly needs more operators. It is not too difficult to get the necessary WERS permit.

The first city with a WERS license (Akron, Ohio) is well launched on its program. Rex T. Brown, W4LUL, and D. L. Moody describe the activities and show a number of pictures and diagrams. It looks like a well thought-out program. Resonant line MOPAs are used in all the control centers and many mobiles are active. Other cities are sure to keep up the good work.

T. A. Gadwa, W2KTM, discusses standing waves on transmission lines and presents graphic methods for matching such lines to antennas.

See here that RCA has just announced a new rectifier, the 5R4GY which of course is still popular at this writing. Didn't realize this tube was introduced so long ago.

Nice article, copiously illustrated, on field activities of the Signal Corps. Gear ranges from a paratrooper's "Handle Talkie" to powerful truck-mounted rigs.

In order to find out what a "Swosse" is, you have to read the piece by C. B. Wolfe, W6LJO. He's got one all right. Made almost entirely from pieces of gear salvaged from the junk box, it is useful adjunct and contains a superhet receiver, together with power supply and some test equipment.

Dawkins Eaton, W6UBT, takes us through a review of some fundamental mathematics. You get led real easy like into a little algebra, geometry and trigonometry. Logarithms are also explained. Altogether, this is well worth going over. Nothing too way out.

John Huntoon, W1LVQ, is now Chief Radio- man USCIG Reserve and is stationed at Atlantic City as instructor in the CG School. He will be away for the duration. Charlie Service, Jr., W4IE, is Senior Assistant Secretary. In Ed Handy's absence, George Hart, W1NJM, is Acting Communications Manager.

John Bailey, WSUJB describes his 25-watt, 2½-meter mopa. This is a real good rig adapted to control stations in WERS.

COMING A.R.R.L. CONVENTIONS

August 3-4, 1968 — Central Division, Springfield, III.
October 12-13, 1968 — Hudson Division, Tarrytown, N. Y.

Hamfest Calendar

Louisiana — The Lafayette ARC will hold its annual banquet and program on Saturday evening, December 2 at the campus of the University of Southwestern Louisiana in Lafayette. More information is available from the Club President, W1NQR, 308 Kenon Drive, Lafayette, La. 70501.

From the Museum of Amateur Radio

Danzier-Jones multiple pancake variometer. This item is presented to show one of the early constructions of this type device. This unit was used by Armstrong in some of his early experiments. From the Richard S. Perkin (Armstrong) collection.

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NEW RSGB HEADQUARTERS BUILDING

The Radio Society of Great Britain has recently acquired a new headquarters building at No. 35 Doughty Street, London, W.C. 1. Its former headquarters building on Little Russell Street had been occupied for many years. Considerable growth resulting in the present 13,500 membership presented serious problems with the small rooms and limited facilities at Little Russell Street. To solve this problem, a search for a new location as well as a building fund was established, resulting in the acquisition of the Doughty Street facility. Additional expenses will be met through the sale of redeemable debenture stock.

The new building is located in a section of London rich in historical interest and populated largely by the legal profession. Two thousand six hundred square feet of accommodation as compared with the 1,200 square feet of the former building are available to house all headquarters offices as well as meeting space for Council and Committee meetings.

TRINIDAD RECIPROCAL NOTES

The first license issued under the U.S.-Trinidad reciprocal operating agreement announced in July QST was to WB4DWB, now 9Y4TW. Trav reports that U.S. amateurs seeking to operate in Trinidad should apply well in advance, since a security check must be made on persons who are not known to the authorities. Application should be made to the Government Wireless Officer outlining plans of operation, including location, power level, and proposed operating bands. With this letter and a copy of the U.S. amateur license, the Wireless Officer will certify the applicant’s fitness to operate, and the Customs Office will issue the license after payment of the required fee. Fees are based on power level and number of bands to be operated, but will typically be less than $10.00 U.S. for one year. Receiver licenses are also required by the calendar year.

AUSTRALIAN INTRUDER WATCH

The Wireless Institute of Australia is currently organizing an Intruder Watch, to be manned by VK amateurs and to report intruders in the amateur bands to the Central Administration in the Australian Post Office, according to WIA Federal President VK3ZS. To effect liaison in this and other IARU matters, representatives of ARRL and WIA are again maintaining schedules on 14 Mc., with VK3OR being on the Australian end.

QLS BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately may be mailed to the bureau in the parent country: e.g., cards for VP8 go to RSGB in Great Britain, W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARLRL. See “HOW’S DX?” for QSL information on specific stations.

For service on incoming foreign cards, see list of domestic bureaus in most QST’s, under “ARRL QSL Bureau.” Bold face listings indicate corrections or additions.

Algeria: G. Deville, TX2RW, 21 Blvd. Victor Hugo, Alger
Angola: L. A. R. A., P.O. Box 184, Luanda,
Antarctica: KC4A cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to KINAP, CONOBBLANT, USN, CBCES, Davisville, E. Greenwich, R. L.
Argentina: R.C.A., Carlos Calvo 1421, Buenos Aires, RA
Austral/Antarctic Freeh Lands: via Malagasy Republic.
Australia: VK1, VK2 QSL Bureau, WIA Box 1734, GPO Sydney, N.S.W.; VK3 QSL Bureau, WIA Box 36, East Melbourne, Victoria; VK4 QSL Bureau, Mr. J. Files, VK4JP, 18 Vanda St., Buranda, Sth. Brisbane, QLD; VK5 QSL Bureau, Mr. Geo Luxon, VK5RX, 27 Belair Road, West Mitcham, Sth. Aust.; VK6 QSL Bureau, Mr. J. Rumble, VK6R, Box F819, GPO Perth, W.A.; VK7 QSL Bureau, Mr. J. Batchelor, VK7TB, 39 Villwood Avenue, Lover Sandy Bay, T.A.S.; VK8, VK9, VK8, Federal QSL Bureau, 25 Landale Street, Box Hill E. 11 Victoria
Austria: Oe, V.S.Y., Box 999, Vienna 1/9
Azeria: via Portugal
Bahama Islands: Bahama Amateur Radio Society, Box 6004, Nassau
Bahrain: (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Avali
Barbados: Amateur Radio Society of Barbados, Highgate Signal Station, Flagstaff Road, St. Michael
Belgium: U.B.A., Postbox 834, Brussels 1
Bermuda: H.S.B., P.O. Box 277, Hamilton
Bolivia: I.R.C., P.O. Box 584, Sucre
Burma: B.A.R.T.S., P.O. Box 800, Rangoon
Burundi: via Congo (965) QSL Bureau
Canal Zone: Ralph Harvey, KZ5RV, Box 407, Balboa
Cape Verde Islands: Radio Club de Cabo Verde, CR4AA
Paraná, Rio Tiarane
Cayman: GSWTP, P.O. Box 907, Colombo
Chagos: via Mauritius
Chile: Radio Club de Chile, P.O. Box 19360, Santiago
Colombia: L.C.R.A., P.O. Box 584, Bogota
Conga: (TN8) QSL Bureau, P.O. Box 2230, Brazzaville
Congol (Q9S) F.C.A.R, QSL Bureau, B.P. 3748, Elisabethville
Cook Islands: ZKI QSL Bureau, % Radio Station Rarotonga, Rarotonga
Costa Rica: Radio Club of Costa Rica, Box 2412, San José
Cuba: ANRAC QSL Bureau, P.O. Box 6996, Havana
Cypurs: C.A.R.S, QSL Bureau, P.O. Box 210, Famagusta
Czechoslovakia: C.A.A., Box 69, Prague
Denmark: K.D.R., QSL Bureau, OZ0OH, Instrup
Dominican Republic: R.C.D., P.O. Box 1157, Santo Domingo
Ecuador: Guayaquil Radio Club, P.O. Box 5767, Guayaquil
Salvador: Club de Radio Aficionados de El Salvador, QSL Bureau, P.O. Box 517, San Salvador
Ethiopia: Kagem Station Amateur Radio Club, ET31SHA, APO, New York, N.Y. 09843
Faroas Islands: P.O. Box 184, Torshavn, or via Denmark
Filip Islands: P.O. Box 184, Suva
Finland: S.R.A.L., Box 10966, Helsinki 10
Formosa: (BV1US calls only) Taiwana American Radio Club USARCAT, Box 8, APO, San Francisco, California 94115
All other BV stations: QSL Bureau, C.R.A., Box 2007, Koollung, Taiwan, Rep. of China
France: R.F.E., Boite Postale 70, 75 Parts 12
France: (PT only) P7 QSL Bureau, % Base MARS station
APO, New York, N.Y. 09083
French Oceanie: Radio Club Oceanien, P.O. Box 374, Papeete, Tahiti
Germany: (DL4 & DL5 only) MARS Radio Station, Hqtrs. 1014 Sfc. Bn, APO, New York, N.Y. 09175
Germany: (Other than above) D.A.R.C., Box 99, 8 Munish 27
Ghana: C.A.R.S, QSL Bureau, P.O. Box 3723, Accra
Gibraltar: R.A.F. Amateur Radio Club, New Camp, RAF
Great Britain (and British Empire): R.S.G.B. QSL Bureau, CW1NI, Bromley, Kent
Greece: George Zaralis, P.O. Box 064, Athens
Greece (SVS only): Signal Officer, Hqtrs. JUSMAGG, APO, New York, N.Y. 09225
Greenland: via Denmark
Greenland (KGI, OK1 and OK5 calls only): KG1A-KGIE (OK5) to MARS Director, OK5XX, APO, New York, N.Y. 09023, KG1F-KGI (OKX) to MARS Director, OK1FR, APO, New York, N.Y. 09121
Guam: M.A.R.C., Box 415, APO, USPO 96910
Guatemala: C.R.A.C., P.O. Box 115, Guatemala City
Haiti: Radio Club d’Haiti, Box 943, Port-au-Prince
Honduras: Jacobo Zelaya, Jr., HRIIZ, Bo. Buenes Aires, 13 Calle 508, Tegucigalpa, D. C.
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541
Hungary: H.S.R.L., P.O. Box 214, Budapest 5
Iceland: Islenskur Radio Amatuer, Box 1058, Reykjavik
Indonesia: A.R.I.S., QSL Bureau, P.O. Box 654, New Delhi 1
Iran: Amateur Radio Soc. of Iran, APO, New York, N.Y. 09020
Ireland: I.R.T.S. QSL Bureau, 24 Wicklow St., Dublin 2
Israel: I.A.R.C., P.O. Box 4099, Tel-Aviv
Italy: A.R.I., Viale Vittorio Veneto 12, Milano 401
Jamaica: Mr. Lloyd Alberse, Jamaica Amateur Radio Association, 70 Arnold Rd., Kingston 5
Japan: (JA only): J.A.R.L., Box 377, Tokyo Central
Japan: (KA only): J.A.E.R.A.-M., APO, San Francisco, Calif. 90520
Kenya: RSEA QSL Bureau, Box 3077, Nairobi
Korea: Korea Amateur Radio League, Central Box 102, Seoul
Korea: (H10) H1 QSL Bureau, Signal Section, USFK/EUSA, APO, San Francisco, Calif. 90301
Kuwait: Alhafiz Nasir H., Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Lebanon: R.A.L., QSL Bureau, P.O. Box 1217, Beirut
Lesotho: Libyan Radio Amateur Ass’n, Post Box 1477, Monrovia
Libya: SA QSL Service, Box 372, Tripoli
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber, roh sur-/lone
Macau: via Hong Kong
Madagascar: via Portugal
Malagasy Republic (Madagascar): P.O. Box 557, Tananarive
Malaui: 7Q7RM, P.O. Box 472, Blantyre

During September, ARRL Hq. staffer WI1KE travelled to a number of West African countries promoting the League’s DARE program (Developing Amateur Radio Everywhere). Here he is seen with U.S. Ambassador Ryan in the latter’s office in Niamey, Republic of Niger. Ambassador Ryan was presented with a copy of the entire report, which he in turn passed along to the president of the Republic of Niger.

Malaya: QSL Manager, M.A.R.T.S., Box 777, Kuala Lumpur
Maldives: via Alden
Maltia: R. F. Galea, 9H1E, “Casa Galea,” Railway Road, Birirkirra
Marshall Islands: via Guam
Marshall Islands: OK6X QSL Bureau, via KX5BU, Box 414, FPO, San Francisco, Calif. 90555
Mauritius: Paul Caboche, VQ6AD, Box 407, Port Louis
Mexico: L.M.R.E., P.O. Box 907, Mexico, D.F.
Midway Island: KM0BI, Box 14, FPO, San Francisco, Calif. 90555
Monaco: Pierre Anderhal, SA2CN, 49 rue Grimaldi
Montenegro: 7.K.R.M., QSL Bureau, P.O. Box 812, Laurencio Maques

(Continued on page 160)

December 1967
INCENTIVE LICENSING

As of August 24, the most talked about subject on the bands seems to be incentive licensing. And why not? It's just about the most important decision, dealing with amateur radio, from the FCC. In our QSOs at the State Fair it seems very ironic that "everybody is against Docket 15928," yet everybody I talked with was going for a higher license! Isn't this exactly what the FCC intended? One fellow was already pounding out letters to his senator and the FCC, but when I asked him if he was sticking with his general, he said, "No sir, if you think I'm going to lose those 290 kc, you're crazy." See my point? Let's do our best and not only accept incentive licensing, but let's make it a smashing success! The theory class this year is just the thing to help us get started. - Dave Doris, W1QKK, St. Paul, Minnesota.

Even with the new incentive licensing regulations, the Extra Class license will still provide no incentive for the so-called "phone men.

In order to regain most phone privileges, the "phone man" has only to pass the Advanced Class test, and does not even have to improve his code ability at 13 w.p.m., let alone twenty. This does not seem to be in keeping with the FCC Public Notice which says, "The object of the program is to provide an incentive to amateurs to upgrade their licenses."

Methinks I see the work of "phone men" at FCC. - Robert J. Lucey, WBJLDX, Old Tappan, New Jersey.

In my opinion, amateur radio was in great danger of falling into a state of mediocrity for lack of a strong, disciplined approach to the technology of the art. It was in grave danger of becoming just another kind of CB operation. Now, we have an ordered system of progress with rewards for excellence which will encourage all operators to not only just keep abreast of the time, but to achieve greater technical understanding than "appliances operating."

From this date forward the ARRL code practice sessions and License Manual are for me - that Amateur Extra license means something now!

Congratulations to ARRL! What kind of hobby would we have without you? - Norman W. Pinney, Jr., W7EMP, Langley ABF, Virginia.

I support the ARRL and the FCC proposals to upgrade amateur radio 100%. I feel like the new licensing plan is certainly a step in the right direction. I was a new Novice when the incentive licensing issue was first brought up. There was a good deal of uncertainty regarding the frequencies available, etc. when I got a higher class license. I continued to study and went from a Novice to a Technician, and during the month of May I passed the General Class exam in St. Louis. When I first got in amateur radio it looked impossible to get the General Class ticket. I kept working daily at the code by listening to WIAW, and worked on the theory and read the study guide religiously. I passed the General Class exam on the first try, and since that time I have continued to study, and now the General Class exam looks just as easy as the Novice once did.

I am real happy the Advanced Class license will be made available. All I am waiting for is to get started studying for this is the new ARRL study guide. When this is available you can bet my station will be upgraded to an Advanced Class license just as quickly as possible.

I am glad to know that a set procedure has now been adopted. The period of uncertainty has been a barrier probably to some prospective Novices, so now they will know just where they will stand.

Once again, thanks, for the code practice, and all the other fine ARRL helps that are made available to the radio amateur and the prospective amateur.

- David L. Ewell, W4GLK, Cabool, Missouri.

...You have succeeded in your drive for "incentive licensing." Good luck to you! Because, you're going to need it. I have been a member of your organization since 1961, although today I'd be ashamed to admit it in public. During this period I somehow became convinced - no, brainwashed is a better term - that the ARRL had as its main purpose the best interests of amateur radio at heart. And then you dropped the "bomb" - incentive licensing. I will make three predictions for the future of amateur radio; a vast waste-land of unoccupied choice frequencies that will ultimately be allocated to the commercial radio interests due to lack of use by the amateurs; a continued decrease in the number of new amateur radio operators; and last, but this may well occur first, a marked decrease in membership in your organization.

"Of, by and for the amateur" - really, just who do you think you are kidding? - John L. Hooker, Jr., W1MDO, Whitman, Massachusetts.

For your meddling in band allotment, you splinter heads should be exported to some remote deserted island. - Lt. Col. James C. Richardson, W3CLO, Charleroi, Pennsylvania.

In Sept. QST the third paragraph of the "Happenings" text on p. 78, and in the chart on p. 81, reference is made to a Technician Class license being required to take exam element 3. That requirement is valid for this class of license if it was received from an amateur examiner, but the words used might lead some to think it must be retaken, even though passed before a Commission examiner, as they were originally.

In order to forestall future queries it might be well to place a subscript in any chart included in the revised License Manual. - Francis M. Strait, W1VGI, Summit Station, Ohio.

The Newton Amateur Radio Club should, within the next 30 days be 100% AREC.
Also they voted to hold classes for the Advanced license. We are hoping to advance all Technician, Conditional and General to the Advanced Class license, sometime this coming spring. Of the 22 members present this vote carried 100%. I feel the incentive license should have come about several years ago.

I think there will be more of these classes over the State of Kansas. — N. P. Starchhouse, KEOBN, Newton, Kansas.

I have not been in ham radio long enough to have enough knowledge for an opinion as to incentive licensing. However, it seems to me that the new FCC ruling on incentive licensing is going to provide Novices with an opportunity to perform a public service.

A whole group of single prefix O'T's have appeared in the Novice bands in the last week or so. It appears to me that these fellows are looking to us "kids" for some practice in their long-unused c.w.

I even had one ask me to QTH. What a boost for my morale! You see, I have blown the FCC General code test three times, the last being just last Friday.


At the first meeting of the Montrose County Amateur Radio Club since June (Field Day), we had one of the best (and most enthusiastic) turnouts in several years!

Very little bitter criticism was heard; practiced no one declared a foul! Only one friend said he wasn't going to try to advance himself, and he later changed his mind. The club is going into a program of instruction designed to upgrade the entire license structure of the organization. The club is even going back to two meetings a month (from one) for the first time in about four years, in order to get the job done in the shortest possible time! Now, this is in an organization of about 4 Advanced, 12 Conditional, and 2 General, which ain't too bad.

Just thought that you might be interested in the reaction from the sticks, where a Conditional can still be had. — Walter Altson, KEOBN, Montrose, Colorado.

I believe this new law will hurt amateur radio more than it will do it. — James B. Smith, WJ4CQQ, Jacksonville, Florida.

Incentive licensing is here. I understand. Hurrah and congratulations on your part is it. Sure I will sweat some to get the Extra Class license, but without a challenge is ham radio or much else worthwhile? No, not to me. — H. J. Paino, W7DVQ, Tucson, Arizona.


I do not condone your proposals to stife the future growth of amateur radio by limiting its operation to a few electronic experts. — Paul Barnes, WA8PUI, New Ringgold, Pennsylvania.

I support the incentive licensing bill 100% and think it will help amateur radio immensely. — Richard Gogdell, WA8NOH/2, Overland, Missouri.

I think the whole idea of an incentive is great. I suppose you will get quite a few letters telling you guys to drop dead but please don't! — Charles Collingwood, W4SPVY, Findlay, Ohio.

FB on the incentive licensing. For so many of us, once we've passed the test, all books and study are put off for some future day which never arrives. I like the idea of having these meaningful stepping stones to the Extra — and having the Extra something in terms of privileges. It might take me a few years to get it, but maybe, someday. — Thomas Carlin, WA1DJS, Gloucester, Massachusetts.

I am personally pleased with the incentive licensing regulations just released by the FCC and want to congratulate the ARTL for its support in this matter. I hold a General Class ticket and may find the time to advance myself but at least the incentive recognition is available. In my event, I look at the incentive licensing as a challenge particularly as my occupation (pharmacist) is far removed from my primary hobby (amateur radio). — R. Paul Baumgartner, Jr., WB6XPF, Williamson, West Virginia.

TECHNICAL ADVANCEMENT — CONTINUED

Your September editorial said: "Incentive licensing ... brought out our art to its peak of accomplishment, its "Golden Days" if you will. I contend that the incentive licensing program did not bring amateur radio to its so-called "Golden Days," but it was the relative (note the word relative) rate of amateur advancement in communications technology and the public respect. The "Glory" of the "Golden Days" had to come to a peak at the time that it did, and incentive licensing had nothing to do with it. At that time the art of communication, without which was relatively new, and the practitioners of this mixed science and magic, we looked upon with great respect. Hence, the "Glory" of the "Golden Days."

Now for the level of accomplishment; the "Golden Days" were times of peak accomplishment in the fields that were open (easily) to amateurs because the technological advancements were inevitable. In other words, the things that were discovered had to be discovered by someone. That the someone was most likely a radio amateur was because he was in a position to experiment. After all, what's an amateur license for? The public respect (in general) has declined because, with the modern advancements in trans-continental and intercontinental television and radio for the unlicensed public, when you tell them that you can talk to Germany they will say "so what?" They can get a television picture from there via a satellite no less!!!

Let's have more articles on transistor and integrated circuit projects for the bands from 2-meters up. Face it, that's the new frontier; the place where the amateur can make those new advances in the state of the art!! Out a up!!! If we do not make use of our large areas in those bands, we only stand to lose those wide open spaces. — Thomas L. Davenport, WA8SOP, Ann Arbor, Michigan.

Mr. Wright's criticism of OST in the August issue may not have pulled any punches, but I must say, it is quite accurate. I can understand that not every amateur is an engineer or even employed in electronics. There will always be all kinds of professions and backgrounds in amateur radio operators,

December 1967
HAMMING ON THE HOPE

The article "Hamming on the Hope" in the August QST crystallized my thoughts concerning amateur radio and its public service aspect. As a ham operator on Kwajalein in the Marshall Islands, activities have been necessarily different and much more rewarding than any operating I had ever done in the States. Over the years I found my stateside operating diminishing: ragchewing had its limitations and little time was available for experimenting. Upon arriving at Kwajalein with a new sideband station I was literally propelled into the most rigorous and enjoyable operating schedule you can imagine.

Personal-message traffic was the order of the day with 5-10 hours a week being devoted to this activity. While many hams push more traffic than my limited time will permit, the whole affair has been most rewarding for me. H. Morgan's description of his Hope operation has been similar to my experience, and "a clear channel" is appreciated. I find ragchewing to be more enjoyable now, and the hobby itself one I am quite proud of. I have never seen an open and hearty "thank you" offered the many Stateside hams who have willingly given their time to make these personal messages possible. So, to the fellows who have made "a clear channel" possible as well: Thanks to you all!

For those hams who have never run this type of traffic, try it! You will find it an experience you will never forget. — Stan Flordian, K9GJP/WI6DJ, APO, San Francisco, California.

Let me congratulate you concerning an article which you recently published concerning the hospital ship Hope.

I had the pleasure in the fall of 1966 of directing their Anesthesia Department during working hours and serving as part time radio operator during off-duty hours.

The cooperation of the ham fraternity was always of the highest caliber, and the personnel aboard the ship appreciated more than words can convey the communication which was provided back to the States from a rather isolated area.

A clear channel was truly appreciated and more often than not was forthcoming when requested. —Dale D. Morgan, M.D., W9DJV, Cedar Rapids, Iowa.

TXN OMs

This letter is being written to the "unsung heroes" of The North Jersey DX Association, who with WA2D1G, Victor Ulrich and his wonderful crew of workers, get out those many thousands of QSL cards that we hams receive most every month, in W2-K2 bands. At a recent picnic given by the North Jersey DX Association (ARRL W2-K2 QSL Bureau), I talked to Vic WA2D1G and many of his hard workers who attended this picnic. They told me that for a recent month they handled over 36,000 QSL cards for the second district. Each QSL card has to be handled many times until it gets to the last person who mails it to the section of letter he handles. Each card is separated by letters, starting from A all the way down to Z. Each person has a letter to work with and to separate them accordingly and then mail them to the QTH of the ham. I was very impressed with their wonderful work and am taking this way of showing my gratitude. — Raymond T. Van Handle, W2B1A, Passaic, New Jersey.

80 QST for
Big signals don't necessarily come from big antennas, but one thing is for sure: the antennas shown here are really big. We thought you would like to see a few samples of some behemoth beams. (Top left) 11-element 20-meter Yagi, 127-foot boom, 127-feet high, W3VBE. (Top right) 7-element 40-meter Yagi, 120-feet high, W3MSK. (Bottom left) 15-meter 6-element Yagi, 80-feet high, W4BVV. (Bottom right) single-boom tri-band beam: 5 elements on 10 meters, 3 elements on 15 meters, and 2 elements on 20 meters, 120-foot high, W3GRF.

Feedback

Belated discovery: In Fig. 3 of W3IYH's article on r.f. clipping, July 1967 QST, two switches were mislabeled. $S_{1n}$ should have been $S_{1n}$ and $S_{2n}$ should have been $S_{1n}$. The switch in the grid lead of the 6FAB pentode section is a single-pole unit for introducing 30 db. attenuation as required, and is independent of the in-out switching.

In the article "Antenna Switching For The Beginners," page 38, October 1967 QST, in Fig. 2 there should be no ground connection between $CR_{2}$ and the transformer secondary winding.

Recently, the Hobbs, N.M. Explorer Post 45 gave the public a look at amateur radio during Scout-O-Rama. WASP0K (1) and WNS5RG1 made contacts and answered questions. All participating Explorers helped with the various chores, from putting up antennas to setting up the booth.
CONDUCTED BY ROD NEWKIRK, WSBRD

Humm, a missive from the mailbox penned in the clear precise style of an old Cooper Union grad. What, already? . . .

Dear Young Squirt:

Thanks for using my amateur crack about three-ringed ham. But you're trying to catch Niagara in a thimble, a wireless Don Quixote tilting at steel-panced printedeircuit windmills. And you're badly in need of some background for your November comments on homebrew.

Almost from the birth of the art well into the 1930's professional radio apparatus looked like professional apparatus, ham gear looked like ham gear, and hams were deamed proud of it. Commercial stuff, built on the off-sale motif, trended up and down, for one thing. Amateur style was adhered strictly about the shaping, often table-top along two or three walls. This ensured plenty of space for display of trophies of the hunt, one's best DX QSL's.

More important, it facilitated troubleshooting and experimentation induced by attractive (and simple) circuit and construction suggestions certain to arrive with the next issue of "QST." DX men rarely missed a hot band opening though their soldering irons ran hot.

More than a quarter century of this ruggedly individualistic practicality, a sudden sophistication raised its airen head, Ham magazine "cover rigs" and feature articles began to mimic professional paraphernalia. Thereafter how "commercial" a ham's rig looked tended to become as important as its QSO's; it evokes more admiration, just as one from some of the signals emitted by those steel-clad monsters. No, BCI-TVY factors weren't involved at all in this shift. "Twas a fad of pure imitative styling that mushroomed into a mania.

Our homebrew artists, till then a vast majority blessed with constructional and experimental freedom the envy of all the radio world, lavishly commenced cable-lacing, crackle-finishing, terminal-strapup and steel-paneling to the point where attempting the odd work-end fun re-builds kept them off the air for a month or more — if they ever got back on. Fun? Those murderous steel chasms and panels alone quickly turned many a soldering bug into a confirmed cripple and operator. Their favorite defense: "Just don't have the time anymore," was logical surrender. "Just don't have time anymore" is the epitaph of any pastime that ceases to be fun.

Then after World War II, hams who had forsaken the building art with bloody thumbs and empty logs found steel panels and chassis conveniently punched for them in military surplus equipment. This kick, while hardly "progressive" in the factory-minimizing sense, at least warmed up dormant soldering irons, and everybody loves a bargain. Sure, we hauled away on make-do clunkers twice as long as it would have taken to build old-style non-compromise non-marked items from scratch. It was fun, though, and reasonably educational, and it dented our commercial-improvising temporarly. Amateur publications, for a pleasurable period, put aside their cosmetic compulsion to reflect the commercial state of the art, and FCC's exam rooms were jammed with pleasure-hunters, Hams had fun just being hams and hamdom thrived. For a while, anyway.

Well, here it is, almost 1968. Thank goodness beating and gouging thick metal plate is old hat, but what have we now? The latest commercial kick, miniaturization, takes increasing toll of our would-be do-it-yourselfers. Go ahead, try to build "The Wristwatch Case Killervatt" or "The Snuffbox Linear." One try may be enough. OT's who didn't have enough money to make their youth to duplicate recommended commercial blacksmith and power-press techniques now find their eyes too far gone to compass four etched stages of r.f. and three of audio into a cigarette lighter (or coffee can). No wonder appetites for this sort of "fun" steadily diminish.

Yet, as in that box of Pandora's, perhaps hope still remains. Today's professional stampede toward electronic invisibility may be just the thing to snap us out of it. We can dubly strive to emulate the new communications microcosm to the point where only a handful of ham jeweler-builders battles complete extinction. Or we can awaken to realize that the necessity for weird styles in commercial manufacture, from steel paneling to ultra-miniaturization, is hardly our own. Then we amateurs will relax, spread things out, play chassis chess like old times, enjoy the workbench or kitchen table again, familiarize ourselves with the functional bases of radio as we're supposed to, and still have time for DX.

— An Old-timer

Strongly put, Mr. Old-timer. We weren't proud — our first steel panel drove us right back to quick-and-easy tinfoilied masonite. But have you priced good breadboard lately?

What:

Sensational multiknob developments on 10 and 15 meters shouldn't cause us to forget old friend 20 where the DX elite still meet to ideal. Let's sample the 14-Ma, voice view from vantages far and wide . . .

20 phone dipoles, described by "how's" correspondents. We 2DY 3VZD 6HNA 27ZJ 3LIE 38VJ 4NXD 4YOK 12SM 8AEM 8YR 9LNO KS 8MNN 4HPB 4HQP 4TVJ 5VTA TINE 7VXZ WS 1CTY 1TCU 1OGN 2LOR 2VHL 3GRO 6PQT 8MCG 8SSL 9MQL 98XQ 9THB WB3 RRJZ 2ZTQ 6KRA DL1PV and N9L P. Kibrow, feature folk like AP2s AD (11109) ka 1990 GNIT AX* (173) 14, MR (117) 19, N9K (202) 21, CCA 1AQ 3DM 3TS 6AE (202) 3, CNA SY (319) 21-22, MR 6, CDE DL (190) 2, G2 12-17, CPEFT 2, CRs 4WR (102) 7, 4BC (208) 18, 5SP (195) 6, 6BX (193) 23, 6FY 6HL 23, 6K1 (203) 16, 7AQ (192) 15, 7CI 7CO CDS (203) 14, 7IM 7GO 7DI, GTS 187E 2AQ (195) 0-1, 2AQ (201) 18-23, CXs 3SBG (210) 5, 7AB 8AAN 9CO (1100) D2L E (224) 14, DMS 28UD 29L 4LOL 5, DMS 1F 175 16, 10X 55L 6FB (215) 10, EAK 652C (200) 0, 8CB (227) 9,

*7892-9 West Lawrence Ave., Chicago, II., 60656,
More merry-makers in this year’s ARRL DX Contest, from left to right beginning at top: Brazil phone vendor PY1BYK/T7; YV4NS who placed third among Venezuela’s bug-bangers; KP4AST, safe P.R. mikes applicant with 4190 QSOs; CE6EZ, narrow winner over CE5EF on 3256 phone contacts; HK3BAE who pressed HK3RQ with 3133 code exchanges; and the layout at HPI8R, popular Panama perennial. (Photos via W1YMM)

It has been twenty years and 210 issues of QST since Rod Newkirk, W9BRD, was introduced to the DX gang as the new editor of the “How’s DX?” column. In Rod’s own words in his first column he said, “As everyone knows, you fellows really write this column; we’re merely around to agitate us, so to speak.” And agitate it he has — and superbly, too.

Rod has been connected with radio operating since his first job with the government at WAR in 1912, followed by a 3-year stint with the Army Signal Corps during WW II. Currently, he’s a communications operator-technician with the State of Illinois Highway Police (see photo), a post held off-and-on since 1916, with continuity broken only by full-time hitches with ARRL in Connecticut, and some radio schooling. Rod revisits the building homebrew from the-junkbox gear for himself and others (see his “coffee-can rig” on page 93, November 1967, QST) and operates 160 through 10 meters ... mostly c.w. but some a.m. and d.s.b. Although he’s earned his share of certificate awards, the principal on-the-air pursuit is ragchewing, coupled with sorties into the DX pile-ups, contests and traffic nets.

The W9BRD station is in a constant state of flux, but presently the home-snap rig runs 100 watts into an 813 final and a varied assortment of long wires and dipoles. Rod’s family, XYL Carol and four harmonics Doug, Dave, Betsy and Amanda, are as proud of father as we are. On the twentieth anniversary of his handling of the DX column, we salute Rod for his job: well done!
...next month, space permitting, we'll inspect the 14-Me e.w., some courtesy Wa 1HNE 3J2X. 9XG 3P2R. 242HD 7VCB 8YRG 9C6Y. Ka 3INJ 1HOB 4HEX 7TFW. 150TH KSJ 102G. 151K. W3FJ 60P. 3ME 4KBC. 7OBA. 89GK 3BL 3QX1. 9OXQ. The next issue will be from 1000.

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...Ve's 6GQG/SU and 3FJ/SU, shown (l. to r.) co-operating in the 67 ARRJ DX Test, helped write a chapter of DX history from Gaza Strip. Just before QRT they had moved from the small hamshack to the larger model at left. VE5FJ now may be found mobilizing around Ontario on 75 phone. (Photos via W1YTM)

Where:

ASA — TA1AM says any TA1 can be QSLed through a Turkish Radio Amateur Club, P.O. Box 990, Kadikoy, Istanbul, Turkey. He's hand-producing QSLs for H4AS, formerly K1YBE/VE5V; X5V5A and 72XV6X, writes letter. W4UFU: "I have been on hard covering Bill's operation as K1YBE/VE5V which ended April 14, 1987. "Arrived back in the U.K. after 1700 QSOs as H21AT," records G3LIV. "All QSLs were posted by mid-September."

AFRICA — I'm QSL manager for ET3REL/Asmara," advises W4LLE. "Cards without tags can be answered via the QSL bureau mail train."

"Apologies to all who patiently await my QSLs through the good offices of friend WTVRO," notes W4UEH. "My log transcriptions were delayed by urgent family and business matters..."

"Living in ET3 is a wonderful experience, building a new home, I've been unable to get to my logs, QSLs, etc." reports VE5FJZ, recently VE5FJZ/5-5C5FJZ/7 at Gaza. "I received some 2000 cards while taking care of as soon as I'm settled down." This from Jack via W4UFU.

"In the usual QSLs for SOUTAL, declares KH5MV. "That call apparently has been released."

P.O. Box 800, Las Palmas, may reach some of the newer SAS licenses..."DX News-Sheet indicates that F20HI can control FBSX QSLs solicited in 1968. According to LIDX'S DX Bulletin, CT1SO may be called for extraction of TR2AG and TUG2D QSOs..."

E48FV, plus in part of each day trying to keep up with QSLs," applauds K5OH. "As of September 20, 1987, I am QSL manager for W4WJU. North America only," affirms W4WJU. "Your customaries are always appreciated."

G1RANIA — QSLs are still being forwarded to me from Uganda," writes ex-VR2FF, now ZLITU. "They will be answered as quickly as possible. Anyone who missed

...
Among the record-breaking number of rollickers in your 1967 ARRL DX Competition were (left to right beginning at top) VP5RB whose 2935 phone QSOs gave VP5RS a battle, VP7NH, 2126 voice contacts, KX6R with (son) representing the Marshalls on c.w.; OY2H, sole Faroes code entrant; OD5EJ whose 694 c.w. QSOs nosed out OD5FC; and Z9BUD (K4DEN), Ascension c.w. runner-up to ZD8J. (Photos via W1YYM)

December 1967
top hand. VQ2J of the Aldabas and W5SCW (DL9KRA) gave another LS-Mc, goodies on tap. "‘The big switch in October after 200/215 countries worked/confirmed’ states ex-LS-Mc. ZS1BE, still active daily on 14,570 kc, at 2000 GMT, by H. J. Dieks. ZS1BE also uses 30, 14,050 kc, at 0600 GMT, signed ZS1BE/00. 14,290 kc, on 200/215 countries, More Africans via Literature of aforementioned clubs and groups: 5UFAL hopes to reutilize TVYATE now and then. WS6 DOD and KU, latest P5FSE, will try a California Christmas. Marion isle's ZS2MI schedules ZS5BFW at 1700 QM, 20 a.m., Ex-VS8PVS tries his DX luck as 92WJN next month. W4ZBF with his P86-XX, and/or ZBI, to borrow P86WV's sideband sender... ST2PO, 14,040 kc, at 2100 GMT, helps ST2SA supply Sudan. OCEANIA: VIC5N and W2AUNP scored their 1000th 7-Mc contact, October 10th after first contacting in May of '63. VK2NS writes WY2YM of Ho. ‘No skeds were missed through QRM, QRN, storms, mistakes, etc.’ Although it did take off on two of them. Ho can hardly blame us, as we met 0800 GMT and he must have had long 1400 hours of sleep over the period.” W2AUNP uses a kilowatt and ground-plane, VK2NS 150 watts and a sloping twistind dipped. The pair are occasionally joined by s.s. V2AUS, K66YH, K6EX, 4XHFFY, WB9FPR. V2A ZGN, 2B1JX 2XQ and 3B1H, especially on such occasions as QSO No. 1000, May 10th. Trevor’s PC connection to the 200/215 club is too much in common to chat about how that few contacts are much shorter than half an hour... VK5XK, who’s justly 29-watt man in October, none before. Kawabata KJ2WJW reports that KJ2WJK lost his beam in a recent rench trophe... ZR2A0 slays mainly on 20 and 15, phone or cw, and since then... "In my eleven months on Fiji I had a great many contacts and was happy to give a new country to a lot of guys, giving us a chance to make new contacts and new friends..." W20RZU, 1400 kc, at 1400 GMT, his favorite frequencies. "K08MY on 6300 kc, 15200 kc, etc., makes a popular call sign..." ZB8MY, 35 watts and a s.s. through 14,035 kc, much preferred... W20RZU moves to VK2ADY/10 in October after a Rodriguez comp as VQ8CHR. VK8M, 14,140 kc, at 0600 GMT, keeps Thursday's alive. W20RZU’s 100 watts and a s.s. through 14,035 kc, much preferred..." -

while in the service,” comments DL1PY (WA1DID). "1X is great on 10, 15 and 20 with an SB-101/501 and 75-k. high TA-35..." Also very active is DL1PY (WA1DID), who is 9X1Q, G2HOT No. 10, my first G2HOT. W1AIFH finds old-timer G20GO going strong as ON5QZ, Jim regular, 1X36A. We should keep this one more..." ‘You'll find me on 15 and sideband as well as 15 and 40 a.m.’, informs G54AJLW (WARRPF). Another arrival in the U.K. is vacationing G54AJLW, franchised as G54AJLW/GW5AJS. ‘K5GHS says DL7FT/7 is determined to sign a ZA call in 68. Lock, OMM...’ According to K41EX, Hawaii, Nev. and Wyo. will work on 1600/1920 W4FTF’s WAT project... Check with Delegation URE, Andito, 89, Zaragoza, Spain, for details on a certificate available by confirming QSOs with one Zaragoza station plus 60 IARU countries since October 31st. and before 2000 GMT, December 31st, 1967. The shipwreck is sponsored in conjunction with the IARU convention due in that city next May... K7COV/1 reminds us of the availability of Russia's R-15, R-10, R-100, R-1600, W10R, R-145 and R-150S certificates, details available from Central Radio Club, Box N-88, Moscow, Continental mailings from club periodicals; UP2KNV's gene sign H7A from the Georgian S.B.R., during the DX contests... 9H1AS and AM manned exhibition station for the last in October... WX2Z1H and 8VQG supplement J39AI's DX output on 20 sideband..." W1AKI calls bear surveillance, for KAE radiates from Antares... Day of Franz Josef, and K7E1 and K7GZ on 15mc... CT2PA makes the American vessel on 21250 and 23250 kc at 1200 and 2300 GMT, straight a.m... W4VHR displays a varian Russian label on 40 c.w. HEBARD, Wyatt, W1AIFH, says: ‘About those Slinky antennas, remember the marks on mine refer to the form of a very way back in '66. With two parasites I had 500 and 600 watts and a QSL from W2OUB/C7, Tainan...’ W1AIFH discovered that a "9X39, 2XQ and 3B1H, especially on such occasions as QSO No. 1000, May 10th. Trevor’s PC connection to the 200/215 club is too much in common to chat about how that few contacts are much shorter than half an hour... VK5XK, who’s justly 29-watt man in October, none before. Kawabata KJ2WJW reports that KJ2WJK lost his beam in a recent trop..." ZR2A0 slays mainly on 20 and 15, phone or cw, and since then... "I am active from Germany as a civil technician using the same call I had in 1955-56..."
Reflections and Kudos

As we rapidly approach the end of yet another year, it is fitting to pause and recall some highlights of 1967 and to recognize those leaders responsible.

Moonbounce and scatter occupied the time of many vihers. The e.m.e. path was covered on 144 Mc. by W6DNG and FS0DO and on 432 by W2IMU/2 and HB9RG and G3LTF, W2FZV/2, using the same Crawford Hill V.h.f. Club station as W2IMU, worked OZ3EME and G3LTF. There was comment that the Crawford Hill effort wasn’t ‘fair’, because of the use of a commercial array, but the fact remains that those gentlemen put forth real effort in utilizing available resources for the benefit of amateur radio. Remember when a similar situation existed with KF4BPZ? Who would deny amateur radio the benefits that such work offers?

Interest in 50-Me. scatter increased, and a healthy number of stations took up chasing meteors on 144 Mc. It is indeed pleasing to note so many employing weak-signal techniques for scatter communication.

Correspondence indicates a goodly number are becoming interested in space communications and are either building or planning such projects. This next year could well be most interesting if even a small percentage of those actually put stations on the air. The likelihood of at least four well-known stations being active on 432 e.m.e. during 1968 with large antennas should lend encouragement to those with less means.

And it is hoped that the problems surrounding the ham satellite program can be resolved so that a flight or two may become a reality.

Before leaving 1967, let us recognize the following for their contributions during the year.

WOBBR: First to work 45 states on 144 Mc.
WDQY: Experimentation with s.s.b. techniques for meteor-scatter communication.

3CHO, W3VXO, W8GMYT/KB9G, W6PZUZ, K8EDX: 50-Mc. propagation observations.

K8MYC: Continued interest in e.m.e. and promotion of that means of communication.

W9ENC, W9DRL: Outstanding accomplishments from less-than-favorable geographical locations.

*Send reports and correspondence to Bill Smith, WB4HIP, ARRL, 225 Main St., Newington, Conn. 06111.

W3GKP, W3ORH, K7ICW, W3QIV: Contributions to this column of general interest.

K0MQS: Dedication to v.h.f. and good sportsmanship in accord with the amateur’s code.

Also during 1967, W6DNG and VK3ATN were named winners of the ARRL Technical Merit Award, and W4HHD and W4WNI wrote full-length articles for QST. There are, of course, others deserving of recognition, and each of you could draw your own list.

OVS Program

A considerable portion of this column is built around the League’s OVS program. The rest comes from personal contacts and mail. W1HDQ has kept records on our OVS program. In a year of reports just tabulated, there were contributions from 270 different stations or only about one-third of the OVS

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David Macy photographed this Geminid meteor over East Norwalk, Connecticut. He used Tri-X film, ASA 400, f11, for a 45-minute exposure. The curved lines are stars streaked by the earth’s rotation. The barrier in front of the fireball is air being heated to incandescence.
appointees, even though in accepting the appointment, the operator agrees to report monthly. Of the 270, 19 reported monthly, and an additional 79 were reasonably consistent reporters. The call district breakdown looks like this: first, 27; second, 48; third, 27; fourth, 40; fifth, 12; sixth, 38; seventh, 12; eighth, 25; ninth, 24, and tenth, 17. Five reports were received from Canada.

Some of the reports are excellent and contribute a great deal to the interest of the column. The work of Al Oelcott, K7ICW, is a superb example. Others would be more valuable if they were more factual. In July, one OVS brushed off the month with: “6 was open to all call areas several times this month.” If he had given dates, hours, and perhaps a few details about the signals heard and the nature and duration of these openings, many of us would have been able to compare notes with him. And then there was the chap who reported: “Well, I finally cleaned up my v.f.o. note.” He left us wondering how he achieved this objective that has been all too elusive for many v.h.f. men.

Sharing with others of like interests is one basic objective of the OVS program. If you don’t hold an OVS appointment, perhaps you will want to contact your Section Communications Manager. His address is on page 6 of any QST. Or, if you are an OVS, won’t you report monthly?

The copy deadline for the column is the 22nd of the second month preceding publication—e.g. this material is being written in mid-October. If you have an item you believe to be especially noteworthy, send it directly to me. But be sure to also make a note of it on your OVS report so your SCM can reconcile your annual appointment.

Have a fine New Year, and I hope to hear from each of you in 1968.

**Attenuator Ideas**

The most practical road to v.h.f. s.s.b. is probably with a high-frequency signal source, such as a transmitter/sooter or transceiver. It is not practical to modify that piece of equipment to obtain a low-level signal for mixing to v.h.f., leaving it useless for other operation such as the Sunday night v.h.f. nets. Here is how OVS W3GKP swamps the output from his 180-watt transmitter.

The attenuator in Fig. 1 is made from a Heath “Canterina” and three additional parts. The modification takes only a few minutes. Another possibility is to use the Cannetina in its original form and insert it, through a “T” connector, between the driver and mixer. The disadvantage of this method is a fixed amount of attenuation. The Cannetina costs $10 and is therefore more economical than other methods when large amounts of r.f. must be attenuated.

**OVS and Operating News**

50 Mc. operators are on the alert for F-layer openings. While some sources say we are either near or at the peak of solar cycle 20, K7ICW says he is encouraged by hearing numerous South American and Japanese commercial stations as high as 45 Mc. LUSEF in Buenos Aires, Argentina reports his first opening this fall was in mid-September when he worked into Puerto Rico, Brazil, Columbia, Peru, Costa Rica, Surinam and Mexico. K6EDX reports the following active in the Pacific: KS6UC, American Samoas; K766JW, Wake, and K76HIS, Hawaii. VK9CN is operating between 52 and 52.3 Mc. from the Territory of New Guinea and is tuning 50 Mc. for U.S. stations. On Okinawa...

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Fig. 1.—Adjustable attenuator for h.f. sideband exciters used in heterodyning to v.h.f. bands by W3GKP. C1—10 pf fixed or small trimmer. J1—SO239 fitting. R1—50-ohm power type resistor. R2—56 ohms, 1 watt. J1 and R1 are part of the original Cannetina. Remove all the parts from inside the mini-box on the top of the can and install C1, R2 and J2. Increasing C1 increases the drive to the mixer.

KR6TAB has a 30-watt beacon on 52.975. The beacon identification consists of the call, KR6TAB, followed by a 314-second dash, repeated seven times per minute. While the frequency may be too high to be heard in the U.S., it may be useful in Australia, New Zealand and Japan. Reception reports of KR6TAB should be mailed to Albert Edwards, 498th TMG DWR 754; APO San Francisco, 96239. VS6CJ is reported active in Hong Kong.

Alaska will be represented this winter by W7CNK, who has moved to Anchorage. He also plans to be active on 144, 220 and 432 during auroral disturbances. We understand that WT0AB has moved to Hawaii.

Numerous late season Es reports have been received, indicating fairly good openings through September and into October. XE1PY was worked by WA6WKF, W6PUZ and K4FO, Tennessee. V36CUI in Ottawa, Ontario reports VP9WB and WB6SEW/VP6 continue to be active in Bermuda. WA9FVH, near Chicago, reports working VP7DD, Bahamas Islands.

Dick Allen, K11GY/WA5KPU, Bellaire, Texas, is one of those who prefers his six-meter contacts on a “closed hand.” Dick schedules W4UWM in Roanoke, Virginia, and says scatter signals average 5 to 10 db. above the noise over the 845-mile path. Other schedules are successfully kept with KS8MM, Ohio, 112 miles; W9EYE, Colorado, 914 miles, and VE2HW sports this impressive antenna system in Quebec, Canada. At the top is a 12-element 432-Mc. collinear, and below is a box of W2CCY 13-element Yagis.

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This fine array belongs to W6DNG. Bill Conkel’s e.m.e. antenna is a 32-element collinear with 16 directors added. The gain measures 19.8 db over a dipole.

WA5CZM, New Mexico, 750 miles. WA5KPU says schedules with W5OAR in Louisiana, and W5WAX and W50RH in Oklahoma do not exhibit a residual scatter signal. They are heard only on meteor-scatter. Dick believes there is a “dead” range in 50-Mc. scatter between 300 and 600 miles. He is interested in exchanging notes with other 50-Mc. scatter operators.

144 Mc. continues to be the most popular e.m.e. band, although activity on 432 is growing, as we shall see later. However, with the exceptions of W6DNG and K6MYC, most of the recent activity is overseas. SM3AKW in Sweden is running schedules with W6DNG and has been heard in California. He is at work improving his receiving with a post-detection system. In Denmark, OZ2CR is preparing for e.m.e., after having done considerable satellite tracking. OZ2OL and OZ2OR are reported involved in a joint e.m.e. project with a rhombic, and another team, OZ2PL and OZ2AC, continue work on 432 as OZ2SEM.

K6MYC is running schedules now with ZL1AZR in Auckland, New Zealand, who has a large LaPorte rhombic and a special-licensed kilowatt. K6MYC says he believes a contact with the New Zealander is not far off.

SV1AB, Athens, may be back on the air by now if difficulties there are resolved. During time off the air, SV1AB has entertained himself by tracking various satellites and improving his receiving system. F8DO is reportedly at work on another detection system and perhaps some antenna changes in favor of the K6MYC collinear arrangement.

Stateside, WB6VYM, with the assistance of K6MYC, is preparing for e.m.e. with an 80-element collinear which will probably be expanded to 160 elements. K6IJN in Minneapolis has mounted a 160-element collinear array some 60 feet in the air, and is probably scheduling K6MYC by this time.

I have received numerous requests for information on how one goes about getting started in e.m.e. This is encouraging and certainly a healthy indication that v.h.f. amateurs are still experimenters. K6MYC has learned e.m.e. the hard way, by making mistakes and then correcting them. Beginning next month, he is going to pass along his guidelines for getting a proper start and avoiding the pitfalls. I’m sure his remarks will be well read.

Several states are conspicuous by their absence on 144 Mc. We have the following suggestions, but no guarantees, from K1OJQ, W5GVE/4, W5UGO, and K7ICW. W1YTW in Maine is accepting e.m.e. schedules. Alabama is now represented, in addition to W5GVE/4, by K4ZAJ in Montgomery with a kw. W4HYO has moved to Georgia. His new address is unknown, but a letter to his Alabama address will no doubt reach him. He also has a kw. For Idaho try W6JX/7, Keith Armstrong, P.O. Box 92, Boise, who is also on six meters. Victor Rivers, W6CPS, Hatton, North Dakota has recently added 500 watts on six and two, and might be interested in some schedules. He is building a 4CX250B rig for 482. Leonard Gordon, WN7GQT, is interested in 144-Mc. DX and wants schedules. His address is Box 808; Rawlins, Wyoming. Welcome to 2 meters, 6M, and I’m sure the DXers will encourage you to stay.

Jack Woodruff, WSPT, has moved to Greenville, South Carolina and will be starting over, probably as K4GL. And in Nova Scotia, VE1AFB is quite active and looking for schedules. His address is: Charles W. Adams; 43 Edward Laurie Drive; Wedgewood Park; Rockingham, Nova Scotia.
This is the 4½ foot dish antenna built by WA2VTR after a design of the late K2QWE. The antenna is primarily built from aluminum ground wire and has about 18 db. gain.

Now, briefly, around the country. Aurora was reported on several nights, the best of which at the time of this writing, were September 20th and 21st; effects being observed as far south as Texas on 50 Mc, K3CFA, Lemont, Pa., and as far north as Maine on 10 Mc, N2NRA, New York. K3JYJ, Salisbury, N. C., says he heard W5HPE near Tulsa, during the September 21st aurora, but signals faded before an exchange could be completed. WA9DST worked K0GJX, K2YCO, VE3EZC, KS6DE, K0CJX, WB2KYQ, W0DQY and W0NXF on Oct. 9.

At Nashville, K4TAX has a kw. on c.w. and s.s.b. He will schedule and mentions that WA4VRK and K4QDT are active in Kentucky. WA4HGN is active on c.w. and s.s.b. from Memphis.

What was probably one of the finest tropo openings in recent years occurred the evenings of September 10th and 11th. Although old news now, the range of the tropo is noteworthy and was widely reported. K4EJQ at Bristol, Tenn., provided many contacts for the midwest - 90 in six hours! And he even managed two new states for himself: K0GJX in South Dakota and K0J3N in Minnesota. WASTYF in Cincinnati worked 10 states during a two-hour period.

WA5MFZ and K5TOP say they will run their beacon transmitter again next summer from Tijeras, New Mexico, for Eos observation. Negative results were reported this past summer, although numerous stations reported the 144.073 signal via meteors. K5TOP is running weekly schedules with K7NN in Arizona, W0FNU scheduled WB0NNT/KH6 in Hawaii this past summer and early fall but heard nothing, W0LER and W0LWN, both in the Minneapolis area, are active with good power and will schedule those needing Minnesota. K6MQS at Cedar Falls, Iowa, has improved his well-heard signal. He now has four 15-element Yagis spaced 21 feet apart in the conventional box, 100 feet in the air! The array weighs 200 pounds. He and K4XCO should tear each others receivers apart! Dick suggests that those running the 15-element Yagi check page 19, July QST, for W4KAES method of matching, for a considerable improvement in performance.

VE3EZC reports working K4LXC on October 11th during the Giacobinida shower. Did anyone else have good results on this one? The Orionids shower proved disappointing, and the peak aparently came on October 20th instead of the predicted 21st. K9UIF, Indiana, and K1HTY, Connecticut, made a two-way s.s.b. contact, the first s.s.b. for both on m.s. The shower produced numerous pings and bursts of a few letters, but not enough for c.w. exchanges. On showers of this type, the information exchange rate of s.s.b. is most valuable. The general opinion of the m.s. clan was that the Orionids was very poor.

320 Mc. may not be the most active v.h.f. band, but K1YON, Connecticut, reports contacts with W1AWE, New Hampshire; W100P, W1QXX, K1SFF and W1EBU/I, all Massachusetts; W2CNK and W2E0U in New York; WB2BCQ, New Jersey; and W1AJR in Rhode Island. K2DNJ, Hopewell Junction, New York, is running schedules with W1AZK in New Hampshire, and reports working K1IJX, Massachusetts; W3ARW, Pennsylvania; W2DLT, New Jersey, and W3HF in New York. In Florida, K4LXC is preparing for meteor scatter and is interested in schedules.

332 Mc. interest is definitely on the upswing. VK3ATN says work on his 50-foot dish has slowed while he moves. Ray purchased a site 3 miles east of his former location near Birchip. He is relocating his e.m.e. rhombic and other low-band antennas. VK3ATN has revised his target date for completion of the 1750-pound dish to mid-1968. While continuing to work on his 144-Mc. e.m.e. system, ZL1TFE is now working on a 160-element collinear array and kw. transmitter for 432.

The Hughes Aircraft Amateur Radio Club, K6QEH, is working towards 432 and 1296 e.m.e. They have a 30-foot dish, and the rest of the system is being readied. WA6SNC is project director. And in Colorado, W9EYE has made some preliminary e.m.e. tests with a 128-element collinear.

Recent auroras produced at least one reported 432 contact. WA2EMB, New Jersey, worked W2CNS, in New York on September 29. WA3EMB was running 400 watts and a 32-element collinear. His receiver is a K2AOP converter and a 75A3. W2CNS runs a 4CX250B, an array of four 5-element Yaquis and TIXMO5 converter into a SB300. WA2EMB says W2CNS was the only auroral propagated signal he heard during the session, and that the signal sounded like a soft hiss through a 500-cycle filter.

WA6IQN, who is employed by ESSA and not NBS, as I reported in October, would appreciate receiving reports on any 432 aurora heard or worked. Don wants to know station parameters, time, date and all observed signal characteristics. His address is Donald Lund, U.S. Department of Commerce, Environmental Science Services Administration, Boulder, Colorado 80302.

Several good DX contacts via tropo have been reported. W1QWJ in Springfield, Massachusetts worked VE3GR in Quebec. VE2GR in Quebec. VE2PH and VE3HR in Quebec regularly. On September 10th, K2UYH and VE2LI connected for the first known 432 contact between New Jersey and Quebec. K2YH also schedules K2CBA, K2YCO and W3RUF. He runs a 4CX250B and a 24-element collinear pattern after the K6MYC 3-meter collinear. Earlier in September, on the 10th and 11th, in Tennessee, worked K3UTU and W9BRD in Indiana, W8PT in Michigan and W9AG, Illinois, with 7 watts! K4EJQ wants 432 schedules for his new 4CX250B rig.

In Minneapolis, W9LER is working on a kw., and WA4HGN in Memphis has a 32-element collinear and wants schedules. VE2BMQ has completed a

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The Door

Two of the best known YLs in fiction had their own ways of attaining their desired goals. One sat and wished wistfully, in the best fashion of the fairy tales, and, for a brief period of time, her wish came true. When the other saw all the fascinating delights of her “Wonderland,” she started on a long hunt to find the right way to go through the door and be a part of it all. She found, in her search, that the only way to open the door to the garden was by having the correct qualifications.

The YL who wants to become an amateur radio operator is in much the same spot. Suddenly, she discovers amateurs on the air, and for her there is just one goal from then on: to get on the air and enjoy the “Wonderland” that is amateur radio. She may wish wistfully, like the girl in the fairy tale, but there is no fairy godmother to make it happen in a single instant. Like “Alice,” the key is within reach in the form of the operator’s license, but she must first measure up to the specifications for entrance.

One requirement is the Code, and instead of being an obstacle that may give her pause, actually it is the same as learning a new language. She will find that what is an incomprehensible blur of sound at first will, with the assistance of training aids, such as ARRL’s Learning the Radio Telegraph Code, and working with commercially prepared code records, change into the short and long sounds that are the binary code. From that into letters, then words, and suddenly she finds she is speaking a new language, haltingly at first, as is true with any language, but with practice and use, developing into another way of talking to people. When she has acquired this skill, she has one of the necessary qualifications that are required before she can pick up the key to that door.

While she is gaining facility with the code and adding another language to her talents, she is also finding another world, the fascinating, and at times almost as baffling as the code, words and terminology that are a part of radio theory. Suddenly she discovers that her radio has become a “receiver,” and she begins to learn and talk about resistance and voltage. She finds that the receptacle where she plugs in her iron is an “a.c. outlet,” and she begins to learn the laws of electricity and electronics, as well as the other laws governing their use on the air. She discovers propagation, and antennas, and that radio involves far more than the mere turning of a switch. To meet the final requirements for her qualifications, she must not only be aware of these things, but must learn about them, and, with the help of the Radio Amateur’s License Manual, she does learn and again finds that she has acquired the beginnings of more education that she will apply to her actual operation.

With the carefully acquired knowledge of the theory and the painfully learned code, she is now ready to turn the key and walk through the door into the amateur radio “Wonderland,” a whole new world of exciting people.

Now, with the new licensing regulations in effect, she is about to be facing another door with the same lure and enchantment as the first, but this time she has in her possession the means to open it safely. She may remain where she is without any desire to enter. But the wider benefits, or the incentives may be so great that again she will work with the advanced code and theory so that she may join the other members of the amateur fraternity who felt the added privileges were well worth the effort.

**YL-OM Contest**

**PHONE:**
- Sat. February 21, 1968 1300 EST (1800 GMT)
- Sun. February 25, 1968 1300 EST (1800 GMT)
- C.W.:
- Saturday, March 9, 1968 1300 EST (1800 GMT)
- Sunday, March 10, 1968 1300 EST (1800 GMT)

**ELIGIBILITY:**
All OM, YL, and XYL operators throughout the world are invited to participate.

*YL Editor QST. Please send all news notes to WB6BBB’s home address; 1036 East Boston St., Altadena, Calif. 91001.*

92 QST for
OPERATION:
All bands may be used. Crossband operation is not permitted. Net contacts do not count.

PROCEDURE:
OMs call "CQ OM," YLs call "CQ YL."

EXCHANGE:
QSO number, RS, or RST report, ARRL section or country. Entries in log should show band worked at time of contact, time, date, transmitter and power. (ARRL section list available in any issue of QST, page 6, or available from the YLRL Vice president, send s.a.s.e.)

SCORING:
A. Phone and c.w. contacts will be scored as separate contests. Submit separate logs.

Janice Punta, WA9AGW, was crowned first "Honey Queen" of Manitowoc County, Wisconsin on October 5th. She is a student at Holy Family College, working for a baccalaureate of science in elementary teaching.

B. One point is earned for each station worked YL to OM, or OM to YL. A station may be contacted no more than once in each contest for credit.

C. Multiply the number of QSOs by the number of different ARRL sections, and/or countries worked.

D. Contestants running 150 watts input, or less, at all times may multiply the results of (C) by 1.25 (low power multiplier.)

E. S.s.b. contestants running 300 watts p.e.p. or less at all times may multiply the results of (C) by 1.25, (low power multiplier.)

LOGS:
Copies of all phone and c.w. logs showing claimed scores, and signed by the operator must be post-

First YL-OM couple of South India, OM Pan, VU2FC, and Leela VU2CPZ. Leela is the first YL "ham" of the Madras state.

marked no later than March 21, 1968, or they will be disqualified. Please file separate logs for each section of the contest. Send copies of logs to:
Clair E. Barton, W1TVT
2238 Morgan Lane
Dunn Loring, Virginia. 22027

AWARDS:
1st Place Phone: YL-Cup, OM-Cup.
1st Place c.w.: YL-Cup, OM-Cup.
The winner of the phone Cup is also eligible for the c.w. Cup. Certificates will be awarded to high place phone and c.w. winners in each ARRL district and country.
No logs will be returned. Please be sure the copy of your log is legible. Please note postmark deadline

Velma Sayer, WA0GHZ, acquired and built her equipment and then discovered she had to have a license to operate it! She is active on most of the nets, both phone and c.w.
date: March 21, 1968.
K2DDK (OM) writes: "If there is any way you can, via your column, encourage those gals in the rarer States to join the fun, please do so. WAS/YL is a long time coming with the contest periods once a full year apart!"

**WA6ISY**

When Myrtle Cunningham, WA6ISY, isn't busy as an electronic laboratory assembler at Hughes, she is active as an organizer in YL activities on the west coast. Her activities are as varied as amateur radio itself. She has met and entertained DX YLs who arrived in the area; assisted in bringing a child from Peru for eye surgery; with OM, Tom, W6PBF, spent New Year's Eve of 1959 working with the fire crews in the Malibu area; and has just finished planning and carrying out the women's activities of the Joint Southwestern and Pacific Division ARRL convention. Another activity that kept her a bit more busy than usual was acting as west coast chairman for the 15th Annual Powder Puff Derby just completed.

A member of the YL Radio Club of Los Angeles and ARRL, she is also a member of YLRL, Business and Professional Women, and RACES. OM, Tom, is vice director of the Southwestern Division.

For those who are interested in space research and follow closely the many spectacular achievements that have been made, we might take a second look at both Surveyor 3 and 5 and note the feminine touch, for it was WA6ISY who made the final modifications on both these spacecraft.

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**Strays**

**The WEFAX Satellite Experiment**

John V. Goode, Jr., W5CAY, was one of five participants recently awarded certificates of appreciation for outstanding support in a satellite weather facsimile transmission experiment.

The experiment, called WEFAX (for Weather Facsimile), has been conducted jointly by the National Aeronautics and Space Administration and the Environmental Science Services Administration (ESSA) since January 1, 1967.

Amateurs who are capable of receiving direct pictures from weather satellites now operating (Nimbus II, ESSA 2 and ESSA 4), can receive WEFAX transmissions by making the following modifications to their sets:

- For APT crystal tuned receivers, a crystal is required to receive the WEFAX transmission frequency of 135.60 Mc.
- If an antennas filter is required to reduce local noise and interference for the reception of APT transmissions from Nimbus 2 (136.95 Mc.), ESSA 2 & 4 (137.5 Mc.), and ATS 1 WEFAX (136.5 Mc.), the following options are available:

A frequency tunable bandpass cavity filter capable of being tuned in the range 135.6 to 137.5 Mc.

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A three-channel crystal or cavity bandpass filter assembly.
Three separate bandpass filters with the appropriate one either inserted or switched

(Continued on page 146)

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This is an artist's concept of the Applications Technology Satellite (ATS-1) employing gravity gradient stabilization at the medium altitude of 6,000 miles.
I t certainly was a warm feeling to know that I would soon be back on the air. Eight years had passed since my last QSO, thanks to the University and Uncle Sam. Everything was dusted, checked, and apparently in good working order. I flipped the big switch. It loaded just as sweet as pie. I flipped down to the good ole c.w. portion of the band and began to listen and monitor a small segment of the band, a habit picked up from the OT who got me started in ham radio.

How about that, “CQ test, CQ test, CQ test,” all around me. A contest weekend and a beautiful opportunity for me to catch up on all the latest operating procedures and techniques. Boy, what strange new methods and gimmicks were being used to collect those juicy DX points. I realized that I had a lot to learn.

I pressed the earphones closer and observed way down in there was a PY5 masterfully spewing forth the required data to a W3. He turned it back to the W3 and all was silent for a few seconds. Then, things began to happen! Stations began to “DE” and sign their calls while the W3 was transmitting! “DEs” from a J56 and JS2 had me scurrying through my foreign Call Book. Must be something very recently assigned? I was unable to learn the effectiveness of this approach since another operator was using his formula for bagging the PY5: tuning up on frequency! I jotted that down as an innovation in attention-getting. This signal finally disappeared and I thought I heard the PY5 transmitting but . . . no I must have been mistaken, at least two stations were giving him a long call. When they signed again, heard or thought I heard, the weaker PY5 signal “QRX QRX PSE BK QRM DE PY5 — ,” but then I realized that the PY5 must have QRT because one of those JS4 guys who had previously been calling the PY5 was now calling CQ Test on the frequency with a wallopingsignal. I listened to see who would dive into the pile-up for this tasty new tidbit, but to my surprise no one picked him up. Must be these JS stations are on the banned countries list. Just then two Ws came on to compare notes with each other as to whether or not the PY5 was still on frequency and how each was making out in the contest. They cuffed to each other that they weren’t doing too well and agreed to move up to 20 meters with the pack. If one of them got a DX response he would ask the DX station to listen for the other W9. I noted this as a trend towards teamwork in the jet age, and since someone else was tuning up on frequency I moved down a few kc. and listened a kc. or two on both sides of my signal. All quiet. I retuned the rig on the dummy load. Very shortly I heard a weak “dah,” “1-kc. lower. Then a short “CQ test” and a concise sign by a VPS. I broke and called twice to let him draw a bead on me and signed twice to insure that he would have a chance to jot my call correctly into his log. He came right back to me! I was thrilled to get his 549 ITT and shot back my 549 KS. I don’t know if he QSL’d my exchange because an 88 signal was tuning zero beat with him and another station zeroed on my frequency and was calling an SPS with the same call-letter suffix as my VPS! The frequency quickly became clogged up.

The XYL was tapping my shoulder, reminding me of an early morning commitment. I closed down my station with the happy knowledge that the 61-46s were still getting out. Probably “just luck” on my first 40-meter VPS contact I thought as I stumbled towards the stairs and wondered if this old dog would be able to adjust to the modern way of DXing.

ARE YOU LICENSED?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur operator license. Please state your call and/or the class of operator license held, that we may verify your classification.

* 9030 Metcalf Ave., Shawnee Mission, Kansas 66212

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The degree of acceptance of GMT has really been astonishing, especially when you consider that most people have to "convert" to their own local times in order to understand it, just as most people who speak languages other than their own have to translate into their native language to achieve understanding. Some QST readers grumble about it, some vigorously condemn it, but most go along quietly and tacitly approve the necessity for it.

As the world shrinks in effective size, the necessity for universal standards becomes more and more apparent. The early days of isolation, when people in one part of the world didn't know what was going on elsewhere and didn't care, are on the wane. Both communication and transportation today are so much faster that universal adoption of a time standard by the general public will soon be commonplace.

One argument we frequently hear is "Why should we use English time? Why not adopt our own standard?" Well, why not? Why don't we also adopt our own standards in measurements, in weights — yes, even in language? We suppose that Greenwich, England, was established as the zero longitudinal meridian centuries ago when England was mistress of the seas and most of the maritime maps were made by Englishmen. It really doesn't make any difference which standard we use, as long as we all use the same one. Since Greenwich Mean Time has already achieved worldwide use as a standard, it makes sense to adopt it rather than to set our own. After all, a standard is not a universal standard unless everyone uses it.

But if you think of GMT as "the time in England," you are defeating its purpose. It's the time everywhere. What confuses most of us is that GMT separates the position of the hands on the clock from the position of the sun in the sky. Midday and midnight are no longer "twelve o'clock" — in fact these two terms, along with such terms as "morning," "afternoon" and "evening" do not apply to GMT times. If you say, for example, that 10:00 p.m. EST is 0300 in the morning GMT, you are missing the entire point. Ten p.m. EST is 0300 GMT all right, but it is evening here, midnight on the Atlantic high seas and early morning in Europe. It is also about suppertime in California and late afternoon in Hawaii and mid-morning in the Far East; but it is 0300 GMT everywhere.

We are accustomed to changing the date at midnight, and when traveling at near sonic speeds we get all confused because the local time changes every few minutes and after you pass a certain point the date changes too! Whether it becomes tomorrow or yesterday depends on which direction you are going. But if you use GMT, the time and date are the same everywhere, and all change at the same time. All it takes is a little getting used to.

Probably not too many amateurs are bilinguial or multi-lingual, but one of the best ways to learn to speak or read a foreign language is to learn to think directly in that language, without having to go through the extra mental step of translating it to English. The same principle applies to GMT. You forget, temporarily, what time the local clock says and get used to thinking.

<table>
<thead>
<tr>
<th>OPERATING EVENTS (Dates in GMT)</th>
<th>ARRL-LARU-SCM-Affiliated Club-Operating Events</th>
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<td>December</td>
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<tr>
<td>1 Qualifying Run, W6OWP</td>
<td>4 Qualifying Run, W6OWP</td>
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<td>2 LO Time (League Officials only),</td>
<td>6 LO Time (League Officials only),</td>
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<td>2-3 Alexander Valsa RTTY DX Contest (p. 89, last issue),</td>
<td>6-7 VHF SS</td>
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<td>9-10 QSO DX Contest (p. 96, last issue).</td>
<td>6-8 Virginia QSO Party (p. 132, this issue),</td>
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<td>9-10 Boy Scout QSO Party (p. 17, last issue).</td>
<td>11 Qualifying Run, WIAW</td>
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<td>13 Qualifying Run, W1AW</td>
<td>13-15 CD Party, phone*</td>
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<td>10-17 West Virginia QSO Party</td>
<td>20-22 CD Party, c.w.*</td>
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<td>27-28 Simulated Emergency Test</td>
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<td>27-28 Arizona QSO Party</td>
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directly in terms of GMT. For example, if you live in the Midwest you start thinking of rising time as 4:30 (instead of 7 A.M.), or lunch time as 1:30 (not twelve), of bedtime as 0500. Your on-the-air schedules are made and kept on the same basis. If the people around you change their living schedules and require you also to do so by arbitrarily moving the hands of the local clocks, you let your GMT clock alone and simply move your living schedule one hour earlier — which is what everybody else is doing, except they're trying to kid themselves into thinking they're not doing it. But, if you insist on trying to convert your local time to GMT, or vice versa, you're going to be a confused kid, kid!

Yes, it takes some getting used to. Give it time, let it jell. So what if the date does change at what you have always considered seven o'clock in the evening? In time, you'll get used to mentally changing the date at 2100 (0000) GMT, regardless of what time your local clocks say, even though it may be daylight. Sure this seems strange, at first, but is not the achievement of a single standard in place of 24 of them worth it?

Station Activities. Each issue of QST devotes from 12 to 13 pages to the reports of the 74 SCMs of our Field Organization, detailing the activities of members, appointees and clubs within their areas of jurisdiction, which are called ARRL Sections. Most sections are states, or Canadian provinces, or U.S. possessions. Some states of high amateur population are divided into two or more sections (Mass., N.J., Pa., Fla. and Texas have two, N.Y. has three, California has nine) ARRL full-membership population is far from being evenly divided, the smallest section from that standpoint being Canal Zone with 28 members, the largest being Ohio with almost 4,000. The “average” section has 1087 members, but there are fifty sections below this figure, only 24 above it — so the average is hardly the median.

With this kind of inequity, it is a real problem arriving at an apportionment of space for each SCM's column which is fair to all. If we stuck to a strict proportion, if Canal Zone got three lines (just barely enough for the heading), Ohio would get 360 (about a page and a half). But this is not practical, so the space is apportioned on the basis of a minimum number of lines for any section, no matter how small, and a maximum number for the largest sections, no matter how large, with various gradations in between.

The last time such apportionment was made was in 1947. It seemed about time for another look, and some time was devoted to a study of the matter. Various inequities have been uncovered and corrected, and the space reapportioned. A new “manual” for SCMs has been issued, in which each is advised of the amount of space he may use.

There is some rubric in this arrangement, of course. For example, if an SCM does not use all his allotted space, this makes room for excess copy from another who perhaps went over.

BRASS POUNDERS LEAGUE
Winners of BPL Certificate for September Traffic
Calls
K4WPM 5638
K5UDL 392
K8T 1205
K8YJ 1573
K9S 1222
K8VRX 1203
K8IF 1230
K8WA 1293
K8AA 1225
K8GGM 1202

More-Than-One-Operator-Stations
Calls
W4B 611
K4BG 595

BPL for 100 or more installations plus deliveries
K7NOX 215
K6RGL 213
W4DYY 127
W4TYY 8 797
W4BZC 193
W4VZC 185
W4A 172
W4AAW 170
W4M6Y 160
W4AYT 159
W4A 149

More-Than-One-Operator-Stations
Calls
W4A 128
W4AAW 103
W4A 99

BPL medallions (see Aug., 1944, p. 54) have been awarded to the following amateurs since last month's list: W4B, W4BZ, W4AM.

The BPL is open to all amateurs in the United States, Canada and U.S. Possessions who report to their SCM a message total of 500 or a sum origination and delivery points of 100 or more for any calendar month. Each message must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

Sections with relatively sparse population but many activities can often be granted extra space thereby. There are a few editorial rules also which sometimes result in an SCM using less space than he had figured.

The study mentioned above brought up the matter of possible redivision of the Field Organization of ARRL (i.e., U.S., possessions and Canada) into sections — primarily because of some of the inequities mentioned above. If, for example, we set 500 full members as a standard for the smallest section and divided each state by the average-per-section figure now existing to determine how many sections it should consist of, we would find California with 8 sections, New York with 6, Pennsylvania, New Jersey, Ill., Ohio and Canada with 3, etc. — while many presently-separate adjacent sections could be combined and still be under the 500 minimum if we disregarded divisional boundaries.

Just a little doodling on the side. The world is full of inequities and we can't resolve them all, but we ought to be thinking about them and sooner or later start chewing away on getting things back into some sort of reasonable perspective. — W4NMA.

Planning to enter the VHF SS, Novice Roundup or DX Test? Request your log forms early and avoid the holiday mail pilesup. Brand new forms are ready for both the Jan-

December 1967
article

ARE YOU READY?

Meade M. Padgett,* KH6GHZ

Our late President John F. Kennedy once said "The ultimate objective of our non-military emergency planning is the development of a capability at all levels of government to manage our resources, both human and material, so that we can meet essential human needs, successfully support any required military effort, and survive as a free and independent nation.

History records public service by amateur radio operators in every type of emergency, disaster, and even war. In the early days of WWII, we saw amateur radio equipment placed in military service and many amateurs responded to the call, serving as radio officers, radio operators, engineers, signal corps company commanders, and various other communications or electronics roles. These we now call the "old timers".

With reemption of amateur licensing and operation in the days that followed WWII, a new generation of hams was born. Also, a new concept of preparedness came into being and, today, we look back upon many programs and developments with which our local, state, and national governments have measured our preparedness at various levels.

Most of us have become individually or collectively involved in these local and or national programs. References to such designations as the Amateur Radio Public Service Corps (ARRC), Amateur Radio Emergency Corps (AREC), Radio Amateur Civil Emergency Service (RACES), National Traffic System (NTS), Military Affiliate Radio System (MARS), Emergency Operating Center (EOC), "Hardware", "Software", and the many others relating to emergency services have, in fact, become a way of life for us. Many of us are members of various organizations which are dedicated to public or emergency service. Unfortunately, however, as with any organization, each has its percentage of non-productive "joiners" whose main purpose appears to be to criticize other organizations, often when they know nothing of the doctrine or principles of that group. Fortunately, these persons represent at best a minority group and the source of their harassment is usually considered.

But have we, as individuals, geared our actions and accomplishments to the successful implementation of emergency and disaster planning? Have you taken stock of your preparedness percentage lately?

I challenge you to honestly answer these questions for yourself.

Are you mentally, physically, and psychologically prepared for the job you may be called upon to do at any time? Have you taken steps to ensure that your friends, associates and fellow-hams are cognizant of any disability or physical impairment you may have? Are you aware that the lack of such knowledge could impose unforeseen requirements and impede plan implementation? Is your thinking clear on the mission to be performed, and void of petty prejudices, jealousies, or gripes?

Are you a well-rounded ham, interested in many amateur radio activities, or have you withdrawn to the QRM-free quick frequency of MARS? Are you active in your community VHF club? Are you a member of the AREC, RACES, or other emergency communication groups? Are you, by this, stuck in one spot on one band, in a world all your own, or do you change bands and frequency often enough to remain alert to changes in band conditions, propagation conditions, meteor conditions, and other factors, etc. Will the amateur bands be strange to you when the chips are down? Do you have the ARLC c.w. proficiency award? Do you regularly use c.w., checking into scheduled amateur c.w. nets? Have you passed traffic on c.w.? Do you proudly display the BPLT medalion? And, do you seriously believe we have no requirement for c.w. in our operations, on our FCC examinations, or in emergency or disaster traffic? If your answer to this last question is "yes", read no further. You just flunked the test!!

Do your interests extend to 160 meters, v.h.f., and teletype? You may not have it in the shack but your interest in the subject may fit you to help others in a critical, emergency situation.

Are you proficient in the operation of many of your own equipment and, do you stand available to assist others? Would you be willing to work for short periods of communications/electronics if you were asked to do so?

Are you ready for unscheduled field operations? Is your equipment with spares and emergency power, ready to go? Is your key or bug included? Have you included a list of emergency numbers and names for the area in which you are most likely to operate? Are you drilled for this exercise? Did you prove it on this last field day or simulated emergency test? Were you satisfied?

How about the geography in your area? Have you driven or hiked out to likely operating positions, inspecting areas, inventorizing resources, and documenting your findings for shared use with others? Have you listed emergency fire, police, c.d., hospital, utility company, and other data for emergency use? Are these posted at your fixed operating position? Have you contacted the local authorities to notify them of your location and capabilities and assured them of your willingness to be of service whenever needed?

Are you registered in the ARRL? Do you know your SCM, SEC, EC, and other appointees? Have you let them know of your willingness to serve? Do you have the League's operating aids and other printed material which is yours for the asking?

Do you attend amateur radio meetings with an open mind and in a spirit of cooperation? Do you participate actively? Do you accept, or look for reasons to decline, nominations for elective offices? For any reason, do you sharpshoot the speaker or interrupt discussions of general interest with unrelated questions of your own? Do you willingly handle committee jobs when requested to do so?

How about attitude? Even though you may have elected to stand with a particular group or publisher, do you respect the position and opinion of others? Have you "closed out" competitive groups whose policies and doctrine are not in agreement with the group to which you relate, or do you analyze their work and seriously study their findings? Is your criticism constructive? Is disagreement or dissension on your part accompanied by reasons why? Do you share your ideas and thoughts with others? On paper? Do you identify yourself or do you use the sneaky, unsigned "letter to the editor" technique?

* 1504, Holapa Street, Honolulu, Hawaii 96818.
How are things at the operating position? Do you strive for accuracy and completeness in reporting and traffic handling? Do you check your counts and questionable spelling before you QSL? Do you originate traffic? In an emergency, will you be the polished traffic handler or will other operators have to bear with you? Are you an A-1 operator? Would you like to be an A-1 OP? If you rated yourself, would you be eligible? When the last emergency test was conducted in your area, did you participate? Are you now, or have you ever been NCS? For a c.w. net? Are you proud of your phone operating? How's your rate of delivery? Are fills usually, or rarely, required by the stations you work? Do you continually monitor your modulation percentage? Is your equipment geared to one-switch operation? Do you automatically use maximum legal input or do you use only the power required to communicate? Do you respect scheduled net frequencies or "I'll call you later" when asked to "key up?" Do you stumble over phonetics, or insist that Adam, Baker, Charlie, etc., is the set to use? How are you on Q signals? Without looking it up, what is the meaning of "QSO?" Are operating aids on hand in the shack? Does your QSL card bear all the essential data? Do you QSL 100%, only when requested to do so, or only in answer to one received? Are you proud of your QSL and the story it tells? Do you have a technical reference library in the shack? Does it include FCC rules and regulations, a License Manual, ARRL Handbook, Antenna Book, Countries List and other useful material?

So much for questions. In your opinion, how do you rate?

We all have our preferences and, admitted or not, our prejudices. Pros and cons are found in every issue and the wide variety of opinions adds zest to our projects and, ultimately, knowledge in our ranks.

We are fortunate in being citizens of a nation which permits the pursuit of a hobby such as ours. As a group, we share the enjoyment of a hobby that has extended to "family plan" licensing with joint use of community property and with "his" and "hers" rigs as well as towels in the house. Uniquely, our hobby is one which still turns us on even the members of our rank are gainfully employed in the commercial electronics field. It is a hobby which attracts young and old alike. No other organization offers greater person-to-person contact and international public relations. It is the perfect vehicle for personal development and relaxation.

We take pride in individual opportunities to render public service which reflects upon personal abilities and equipment capabilities. The ARRL or other public service certificates are milestones in the life of the hams receiving them. Yet, there is a certain sympathy noted where organized emergency planning is concerned.

In the AREC, success is again measured by the willingness and cooperation of its interested members. Your emergency Coordinator (EC), Section Emergency Coordinator (SEC), and the League must have your interest and full support if the job is to be well done. Support all appointees, regardless of the organization, and emergency programs will be successes.

Preparedness is something no emergency should be without!! As I near the end of my first quarter century of amateur radio, I have asked myself these things to determine whether I'm ready for emergency action.

Are you ready?

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**CLUB COUNCILS AND FEDERATIONS**


Foundation for Amateur Radio, Granville Klink, Jr., W3AFW, Soc'y., 1013 Noyes Dr., Silver Spring, Md. 20910.


Ohio Council of Amateur Radio Clubs, James W. Benson, WB0OUU, Soc'y., 2103 Kinnepad Dr., Cincinnati, Ohio 45231.


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**ARRL AFFILIATED CLUB HONOR ROLL**

Each year, from the data given in or supplementing the annual affiliated club questionnaire (CD-18), we send out special certificates and make a special listing of those clubs all of whose members are members of ARRL. The first such listing appeared in June QST (p. 105). We are happy herewith to present the second listing of clubs who qualify as "100% ARRL Clubs."

Next February we plan again to forward to every affiliated club on the "active" list a questionnaire form for filing new data. How about putting your club on this honored 100% list?

Anderson Radio Club, Anderson, S. C.
Bandhopper Radio Club, Inc., Ferguson, Mo.
Blue Ridge Radio Society, Inc., Greenville, S. C.
Central Iowa Amateur Radio Club, Marshalltown, Iowa.
Chattanooga Amateur Radio Club, Housa, La.
East Kootenay Amateur Radio Club, Cranbrook, B.C., Canada.
Friendship Amateur Radio Club, Luther-ville, Md.
Hedley Tidwell Amateur Radio Club, Misenon, Ohio.
Maydale Amateur Radio Club, Silver Spring, Maryland.
North Alabama DX Club, Huntsville, Alabama.
St. Louis Amateur Radio Club, Inc., St. Louis County, Mo.
Southignton Amateur Radio Assn., Inc., Southington, Conn.

Washington Radio Club, Washington, D. C.

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DX TEST FEEDBACK

That 484-K c.w. score in Los Angeles (leading off page 63 of the October DX Test results) belongs to none other than W6TZU. Sorry about that Genel W6ERS at San Francisco obviously lead the section on c.w. although his score was out of order in the tabulation. Oh yes, if you’re in the mood to congratulate, try out PY2DZI who shared honors with PY2RMF for highest score on 50 MHz single sideband although we initially received the log for W1U multipurpose/single transmitter c.w., the summary just made its appearance. The Yale Club did a fine job on 5 bands for a total of 658,026,300 points, of which 554,026,300 points are c.w. With the inclusion of c.w. operators namely K7AAW W9RDJ KH6DRE K6KII and W4SH IC.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificates. The next qualifying run from W1AW will be made Dec. 13 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on listed c.w. frequencies. The next qualifying run from W6OPP will only be transmitted Dec. 1 at 0300 Greenwich Mean Time. Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening preceding the date given. Example: In converting, 0230 GMT Dec. 13 becomes 2100 EST Dec. 12.

Any person can apply. Neither ARRL membership for 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 on one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate.

If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code practice is sent daily by W1AW at 0030 and 0230 GMT, simultaneously on all listed c.w. frequencies. At 0230 GMT Tuesday, Thursday and Saturday, speeds are 10, 15, 20, 25, 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sunday, speeds are 7 w.p.m., 10, 14-19 and 25 w.p.m. For practice of both modes of work, see method of work may be reversed during the 5 through 13 w.p.m. tests. At 0030 GMT daily, speeds are 10, 15 and 25 w.p.m. The 0230-0300 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your data by sending in data with W1AW (but not on the air) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and tests to be sent in the 0230-0320 GMT practice on the dates:

Day Subject of Practice Text from October QST
Dec. 4: "It Seems to Us," p. 9
Dec. 12: "Some These Ferrometers," p. 25
Dec. 15: "Antenna Switching For Beginners," p. 36
Date Subject of Practice Text from "Understanding Amateur Radio, First Edition"
Dec. 20: Oscillators, p. 77
Dec. 29: "Oscillator Tubes," p. 77

4 Speeds will be sent in reverse order, highest speed first.

DXCC Notes

Announcement is hereby made of two operations which will not be accepted for DXCC credit:
At IABISO, Bishop’s Rock, because it has not been shown that the operation came within Rule 7 of the DXCC Rules, 10 IABWNY, Blenheim, Reel, because of inability to establish actual presence on Blenheim Rock.

Ready for QSLs? The DXCC application/endorsement? The recently revised CD-161 (K1607) will make it easier for you to submit the needed information and will speed up processing of your cards. The form will permit you to list your cards, furnish all calling addresses, note required postage and make the necessary membership statement (new Rule 14). The ARRL Communications Department, 225 Main Street, Newington, Connecticut, 06111 can supply you with this convenient application sheet.

WIAW SCHEDULE, DECEMBER 1967

The ARRL Maxim Memorial Station welcomes visitors. Operating visiting hours are Monday through Friday 3 P.M.-S.A.M. EST, Saturday 7 P.M.-2:30 A.M. EST and Sunday 3 P.M.-10:30 P.M. EST. The station address is 225 Main Street, Newington, Conn. about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate you must have your original operator’s license with you. The station will be closed December 25, 1967 and January 1, 1968.

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<th>GMT*</th>
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1 C.W. OBS (bulletin, 18 w.p.m.) and code practice on 1,935, 3,355, 7,080, 11,463, 20,790 and 51,780 M. C.
2 Phone OBS (bulletin) on 1,882, 3,295, 1,882, 14,288, 1,411, 507 and 1,882 M.
3 RTTY OBS (bulletin) on 3,925, 7,063, 14,093 and 21,065 M. 170/300 cycle shift optional in RTTY general operation.

4 Starting time approximate. Operating period follows conclusion of bulletin or code practice.

5 Operation will be on one of the following frequencies: 21,075, 21,111, 21,414, 23,803 or 24,274 M.

6 W1AW will listen in the novice segments for Novices on band indicated before looking for other contacts.

7 Bulletin sent with 170-cycle shift, repeated with 850-cycle shift. Maintenance Staff: W1s Q8 VPR NPO. Times/day in GMT. General operating frequencies approximate.
ELECTION RESULTS
Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Delaware  John L. Penrod, K8NYG  Oct. 10, 1967
Alberta  Harry Harrolld, W8TG  Oct. 10, 1967
Manitoba  John Thomas Stacey, VE8JT  Oct. 10, 1967
Virginia  H. J. Hopkins, W4SN  Oct. 11, 1967
Vermont  E. Reginald Murray, K1MPN  Oct. 17, 1967
Hawaii  Lee B. Winal, K8H8Z  Nov. 11, 1967
Wisconsin  Kenneth A. Ebachet, K9GSC  Dec. 10, 1967
Western Florida  Frank M. Butler, Jr., W1RKH  Dec. 15, 1967
Illinois  Edmond A. Meinzer, W5PPN  Dec. 18, 1967

In the Indiana Section of the Central Division, Mr. William G. Johnson, W8RBU, and Mr. Hewitt C. Mills, W8LTI, were nominated. Mr. Johnson received 453 votes and Mr. Mills received 267 votes. Mr. Johnson's term of office began Oct. 14, 1967.

ELECTION NOTICE
To all ARRL members 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 meet the following requirements prior to deadline date listed below:
1. Holder of amateur Conditional Class license or higher.
2. A licensed amateur for at least two years immediately prior to nomination.
3. An ARRL full member for at least one year immediately prior to nomination.

Petitions must be received at ARRL or on or before 4:30 p.m. on the closing dates specified. In cases where no valid nominating petition were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, zip code and station call of the candidate and signatures should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signatures uncertain or ignorant of their membership status, etc.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates. The following nominating form is suggested. (Signers should be sure to give city, street address and zip code to facilitate checking membership.)

Communications Manager, ARRL 225 Main St., Newington, Conn. 06111

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

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.

— George Hart, W1NJM, Communications Manager

Strays

WWVH Radiation Pattern Modified
To improve Pacific and Far East reception of signals, WWVH has installed parasitic reflectors on its existing antennas. The change affects the radiation patterns at 5, 10, and 15 Mc.; the 2.5 Mc. pattern remains omnidirectional. Radiation is now concentrated in the direction of Manila, with no degradation toward Alaska and New Zealand. However, there will be a decrease of about 6 db. in the direction of the continental United States.

The Post Office Department promises faster mail service with the new zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
(Act of October 23, 1962; Section 4309, Title 39, United States Code.)
1. Date of Filing: September 25, 1967.
2. Title of Publication: QST.
3. Frequency of Issue: Monthly.
4. Location of known Office of Publication: 225 Main Street, Newington (Hartford County), Connecticut 06111.
5. Location of the headquarters or general business offices of the Publishers: 225 Main Street, Newington (Hartford County), Connecticut, 06111.
7. Owner: (If owned by a corporation, its name and address must be stated and also immediately thereafter the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual must be given.) The American Radio Relay League, Inc., 225 Main St., Newington, Connecticut (an association without capital stock).

December 1967
DX Century Club

The following list contains the call letters and country totals of holders of the DX Century Club Award who have submitted confirmations to ARRL for the period from October 1, 1965 through September 30, 1967. New Members in DXCC for the period from September 1, through September 30, 1967 also appear in this list. DXCC members qualifying for the Honor Roll appear in the Honor Roll list below. Since the necessary space to run the complete DXCC Roster is not available (the total number of DXCC certificates issued as of September 30, 1967 was 13,107), this list contains only the calls and totals of those who have shown an active interest in their DXCC rating over the indicated 14-month period.

Honor Roll

The DXCC Honor Roll consist of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given including deleted countries. All totals shown represent submissions received through September 30, 1967.

Radiotelephone
Station Activities

• All operating amateurs are invited to apply 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

DELAWARE—SCM, John L. Penrod, K3NYG—RM, W3EEF, Delaware nets:

Sat. 3005 kc. 1800 EST
Sun. 3005 kc. 1300 EST
Mon. 145.260 Mc. 2300 EST
Tues. 3050 kc. 1800 UTC

Renewals: K3BOU as OVS; W3FJP as OBS; W3RZD as OQ; 3005 kc. as OVS.

EASTERN PENNSYLVANIA—SCM, George 8. Van Dyke, Jr., W3ELI—SEC, W3EAS, RM 2, W3EML, W3FLL, W3JKN, W3KAE, W3LPM, K3MYS, W3MX, W3RA, PAM; W3QFQ, EPA, QNI 403, QTC 432, FTCN 511, PTTN QTC 279; EPA V.H.F., QNI 208, QTC 145; EPA PATN, QNI 456, QTC 327, OQ reports were received from K3RJD, W3NMC, W3QFQ, K3MYS, K3PSW, W3AXXY, W3KEK, K3NQG; obs report from W3AFP, OVS report from K3VAX. A report was received from W3AFP; W3AXA is back from a West Coast vacation. W3AXXY reports working 4 CEABP on 6. W3NXL has new 50-watt SWL setup. W3AXY is not going back to the Vega 94 VHF.

Baltimore W3MBV has passed the 25-meter bus and is running a 2-meter station from the ground up. Traffic: W3EEB 95, W3DXK 14, W3AIGY 7, W3JUMJ 6, W3HIK 1, K3NYG 1.

MARYLAND—SCM, Carl E. Anderson, K3JZY—SEC, W3LDD.

Net Frq. Time Days Sec. QTC QNI Mgr.
MDD 3043 0000Z Daily 30 195 K3OAE, RM
MDDS 3043 0100Z Daily 30 195 W3ENW, RM
MESP 3020 2300Z M-T-F 22 99 27.5 K3NCS, PAM
MTM 3020 2300Z M-T-F-S 18 10 8.1 K3KNO
CVTN 3045 0100Z S 7 11.0 W3AFP

New appointments: WACCN as OPS; W3TXQ as OQ Class IV; W3DJP as OQ Class IV. Renewed appointments: K3GZK as OBS; K3CNM as OPS. MMDN turned in reports for a QNI of 411, total traffic 298; W3CGI has been running 15 minutes with 125 stations QNI and passed 5 messages. The ARRL Booth at the Washington, D.C., Foundation HamFest, August 16-17, was a success as well. A new W3AE was operated by W3QMC, W3DJS, W3MTE, W3GQF; W3KMD was by W3CQC, W3DJS, W3MTE; W3JLM was by W3CQC, W3DJS, W3MTE. W3GQF has been enjoyed by all, W4ZM, pres.; and W3TMJ, vice-pres.; have mapped out the moves for the FVRO to remain main and possibly be located in a new building.


SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZL—Asst, SCM; Charles B. Travers, W2YQ, ZEC; W3LZ; RM: W3AFL, W2HLV, PAM; and NJPFP Net Mgr., W3ZL, EC WARANL has moved from Burlington County and is now located in Bridgeton. We will take over as EC for Cumberland Co., but we now need a volunteer to take the Burlington Co. assignment. NJPFP has increased in members and traffic reports for a QNI of 577, total traffic 125, 100 sessions. We have just heard of the passing of W2B1N, who became a familiar name in the Sci-SCM quarterly.

SCM promptness. The New Jersey Phone & Traffic Net has some problems since a 5-wk. broadband station moved within 5 miles of Trenton. I have been meeting with the FCC to try to find a solution. The group is aware of the problem and is working to find a solution.

NATIONAL—SCM, W2UZ—RM, W2VX, W2YQ, ZEC; RM: W2ZL; OBS: W2HLV, PAM; and NJPFP Net Mgr., W3ZL, EC WARANL has moved from Burlington County and is now located in Bridgeton. We will take over as EC for Cumberland Co., but we now need a volunteer to take the Burlington Co. assignment. NJPFP has increased in members and traffic reports for a QNI of 577, total traffic 125, 100 sessions. We have just heard of the passing of W2B1N, who became a familiar name in the Sci-SCM quarterly.

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December 1967 105
The 75-Meter Interstate Single Sideband Net had a traffic count of 617, W7IWF is the next most active replacing W9NWK, who retired after many years of service. This continued sympathy is extended to the family and friends of W9NWK, who passed away. He was one of the early organizers of the IKN, K0JAC is continuing after a four-week stint in the hospital. The Sterling-Rockport Radio Society is outfitting a donated truck with necessary gear for emergency communication.

The starved Rockford Radio Club has announced that June 3, 1969, will be the annual hamfest, W8LPY, W6FXR, W9VOC and K9-RLZ will be officers of the Glenbard East Radio Club. W9FOY is the new Director of the Rockford Club, Inc. (springfield), will be W9UPY, K9LV, W6Ali and W9LPX. W9GUM received his A-Operator award.

For news from the Hamfest, W6Ali is on the air as W6Ali, W9WEP is being stationed at Guam, W9TPA, W9TDJ and W9KHF are now W9s, W9-1971 has a new Galaxy IV NK7 forfixed and mobile operation. K0UY has moved to Galena, Ill. A 430-MHz moon bounce group is being formed by W9PO, W9WYY and KL9V, W8S8N’s new QTH is Lakefield, W9-1971 has a new low-band station. K9LMD has all the single bands and was ranked in Sept. W9QXT is interested in shortwave listening and would like to contact him. W9NEX (ex-W8N5N) is standing by 20 meters. W9ICP, of ARRl Headquarters, spoke at the W9XCC dinner on Sept. 10 at Allesro Park. W9PCC and W9WEE are receiving/operators.


W9PFI, urger of the v.f.h. nets, reports Sept. traffic of 71, K9PYF, urger of IPON, reports Sept. traffic of 110, W9RAC, urger of K9FL, reports Sept. traffic of 4, W9LDE, urger of the Gr. W9QX, reports Sept. traffic of 36, K9YIT, urger of the W9YVQ ARQ, reports Sept. traffic of 13. The Randolph Co. Co. call is K9WAC, with club meeting monthly. W9JDKP as instructors. W9UPJ and K9QX are enjoying new Swan transceivers, Congrats to W9YWE and W9JDU on testing off W9VPEX. W9YAC is following for his Milwaukee friends on 2 meters, W9APD walked off the HT top prize at the Warren Hamfest. K9JJ6 is mobile with an H4-A1, K9JOY has a Swm 350 now, K9HZL has a four-element 20-meter beam. W9L3D has a new Cushcraft element-five meter beam in his ARI-limited setups. W9MFB, HM WPA, reports a nice increase in 403 plus 5 visitors but a decrease in traffic for Sept. with only 403 total. W9XSF has been heard on W9GPG, W9LPV, W9IDY, W9K1Z, W9K6B, W9WQ, W9GUM, W9QXT, W9KVM.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PFP—A, K9WJW, W9GKC and W9JZP, W9LPL and W9BGB (V.h.f.s.), Cook County SEC: W9-HPG.

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QST for
RACES and PON again. He also collected a WAC on s.s. WORTK and KOTTY/9 provided communications for the annual cross country races held at Medora. WAPQ-HW has s.s. now with the addition of an SB-10 to his Apache, WOOGF has a new Henry 2K-2. WOTUP is dealing for an SR-156, WODM came out of retirement and is teaching radio classes after school in his old school, Valley Junior High. The Grand Forks 2 meter area is back in business. KOPY 7 reports that the theory and classes being held have come up with two families with three in each. RRSN explains that the second session of check-ins are in progress. Traffic 66: PON, 3 sessions, 130 check-ins, traffic 7; CW, 4 sessions, 21 check-ins, traffic 7. Traffic: (Sept.) WADLO 14, WQHM 12, WQMI 12, WODW 12, WQHM 10, WQHM 9, WQHM 9, WQHM 8.

December 1967

107
Most new high-power 20 kW FM transmitters use the EIMAC 4CX15,000A tetrode for service as a Class-C amplifier. The tube features a new internal mechanical structure which minimizes rf losses, and is capable of operation at full power ratings to 110 MHz. EIMAC also recommends the 4CX15,000A for 220 MHz operation at lower power levels for VHF-TV transmitters. EIMAC's long experience in tube technology and ceramic-to-metal sealing leadership have combined to produce a tetrode of optimum design and structural integrity. That's why the 4CX15,000A is used in more new transmitters than any other ceramic tetrode with similar characteristics. For more information write Product Manager, Power Grid Tubes, or contact your nearest EIMAC distributor.

### RADIO-FREQUENCY POWER AMPLIFIER OR OSCILLATOR
Class-C Telegraphy or FM Telephony (Key-down conditions)

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EIMAC
Division of Varian
San Carlos, California 94070

109
A question
only serious hams
should answer...

by Jack Quinn, W6MJG

How come you are still asking for our obsolete book? The one called "The Care and Feeding of Power Tetrodes." Look, we've already mailed out over 100,000 copies of the thing. It's just got to be in the hands of every amateur who ever went on the air. Don't get me wrong, I'm happy you find it useful. But now you should be asking for our NEW book, "The Care and Feeding of Power Grid Tubes."

It so happens that right now on my desk is a pile of these new books. They're really pretty interesting. You see, one of the fellows on our staff—Bob Sutherland, W6UOV—took it upon himself to incorporate the answers to over 400 questions asked of us in a year's time. In fact, he has spent just about every spare moment away from his shack, preparing this new pocket-size book. I couldn't believe that it has almost 200 pages. Bob said he just got carried away. He has expanded the original book, which we published back in '46, so that in its new form it covers all types of power grid tubes in RF and AF service. Even has graphs and things like that.

Now you're probably wondering, where can I get it? Thought you'd never ask. Right this minute there is another pile of these books at your nearest Eimac/Varian distributor, or your favorite technical bookstore. Figuring all the time we've spent in getting them ready for you, they're really a bargain at $3.95 each. If it's inconvenient to get to the distributor or the bookstore, write me, and I'll send your request along to the book retailer.

In fact, if you are among the first 50 hams to write me, I'll send you one free. Can't beat that.

Jack Quinn
Division Marketing Manager

Division of Varian
San Carlos, California 94070
Hudson Division

Eastern New York—SCM, George W. Tracy, W2FU-SEC; W2ZGC, KGM; W2ASB, PAM; W2LGC.

New York City and Long Island—SCM, Blaine S. Johnson, K2D2B—Ass't SCM; Edward J. Brueckel, K2D1G, SEC; K2QN, PAM; W2EWM, Traffic nets.

New Jersey—SCM, K3ZRI, K2F7X—Asst SCM; Edward F. Erickson, W2CVW, SEC; K2ZFE.

Northern New Jersey—SCM, Louis J. Amoreno, W2LQP—Asst SCM; Edward F. Erickson, W2CVW, SEC; K2ZFE.

All time shown is local. Please note the change in frequency for all 27-meter phone nets. The ECTN time also changed. New appointments: W2VEB as OBS, W2B2Q as OBS of the New Jersey ARRC Net. W2QCK is looking for a 27-meter phone net and invites all to join. If you are on 6 meters, join in endorsements: K2K2D as OBS and OBS, The Knight Riders V. Our Club will have more endorsements in the future. Contacts K2K2D if interested. Net reports: NJN ARFC 190 QNIs with 30 traffic. ECTN, 285 QNIs and 140 tralls. Report: W2KFV, W2S2V submit reports to the officers at the CTRA are W2A2AM, telex: W2SDT, vics.; W2OTE, rec.; W2UUEJ, tri.; W2AKK, rec.; W2ARL, rec.; W2VYD, rec.; W2VYF, rec.; W2VEB, rec.; W2B2Q, rec.; W2B2QI, rec. Congratulations to the TRA members making the ARRL national report. W2B2QK claims over 71,000 points in the recent W&Y Test. W2A2AAM reports he is over last year's score. W2UYD passed the General Class exam and is on with a DSH-100 and an SC-140, W2NCPW is a new ham in Englewood. W2UUF has his 500 counties confirmed, new net mgr. for the NaveNet is W2B2XK. W2ARL reports a 4th place in the four-element beam on 20 meters over the Tri-Bander. His DXXC score is now 2175 OZ. W2EWM recently completed QSO No. 20,000 and hit a new high of 220 meters. W2EBAP is on s.s.b. W2CCF applied for DXXC 140, W3S SSB. DXXC is now 90 CQ. W2UEHM is trying a Mechanical Mark-Hold circuit using a Mercury relay in RTTY station. W2VEW, W2CWV and W2A2AM became life members of the ARRL. K2HFE is up to 97 for DXXC. The W2QCK's helps to amateurs with over 100 stations working all locations. W2BURG and W2B2QW are active at W2BSC, W2B2QMP reports W2VWZQ was the 271-meter station of the N.Y.M.L.A. N.Y.M.L.A. 1252 7th Ave., New York 19, N.Y. W2B2QK will be in New York in November. W2TET will be in Buffalo in December. The N.Y.M.L.A. 1252 7th Ave., New York 19, N.Y. W2B2QK will be in New York in November. W2TET will be in Buffalo in December. W2TET will be in Buffalo in December.

"Section Nets. All times shown above are local. W2BQIL, who is over at Post College, is looking for a commer-
cial outlet. W2AEQ and W2B2QW are all going to the Harry Lincoln Hamfest. W2ZGZ reports that the W2ZTJ of Chautauqua HSRC is being pumped up to 1 kw. s.s.b. with a rotary and a 3-element beam. W2B2QZ is the ham of Suffolk County RC Extra Class cramming like a Dickens for Nov. 22. Bet they make it 'cause he's a lose old crock over 70 years old. W2B2QQ is the ARRC net mgr. for W2UIZ. W2B2QW became a semi-finalist for a National Merit Scholarship and helped W2CAE start a radio club at Great Neck North senior. W2BUJU trudged off to William and Mary but his dad, W2B2JUW, allows that he'll have to get his W4 call soon in order to chop the prodigious family tree. W2ALJS relates that the Mid-Island RC did a fine job making out our FCCs. The new Manager for Florida, W2AZUW has announced that the Queens 6-Meter ARRC Net opens up each Mon, night on 50.32 Mc. at 8 o'clock with a 1 kw. s.s.b. in emergency traffic; and a 6-meter ARCSS Net opens up at 20.15 Mc. on the same frequency. W2B2DXX told to all summer on the basement stove and when it was finally ready to light off it set the whole house on fire. A FCC forward motion of the family bunga is rarely impended by W2B2BBA at the helm but, alas, the machine has an affinity for silicon when it's not working. While passing through Vermont this summer, W2B2EAK stopped at the Burlington Hamfest and you know that real ham won't stand up to a rook. W2A2AAM remarked that the Amateur Radio Luncheon Club meets the last Thurs, of each month at the Engineers' Club, 22 W. 40th St., 7-15. W2ARL in his ECTN Engineer-In-Charge, New York office, wrote at the Sept. meeting, W2B2TN is wondering where W2B2NFL, W2B2ALX and W2B2DK are. W2AKK reports he finally got the full v.h.f., RTTY setup with tape, keyboards, multiple page printer, the works. W2B2SC tells of DXXL's visit with the Carroll Hayes HSRC guys at W2THB and how pleased DJW-1L was with the club station from which he worked back into the homeland. Old W2A2JU writes that he spent the summer upstate at R.P.I. taking a few interesting courses of which one turned out to be a W2FMU name of Lindal! Hey, Merry Christmas and a Happy New Year to you all. W2AKK.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, WTOBJ—Asst, SCM; Bertha V. Willits, WOLLG, SEC; KOHRLE, PAM;
WONGS, RMA; WOTU, WSORA, WAOJIO; WOTU now has a
new tower, 500 watts, 2 meters, 277 MHz; KHOWL has
and KOVB have taken down a heavy duty 75-ft.
tower from atop a Marshallsburg building. Looks like
one of those 200-watts-on-the-ground type. WAOJMB
and WOTUB have 120 volt a.c. motors. WAOJMB and
KOVB operated some portable and mobile on his vacation
through the Southwest. WOBDZ and his XYL vaca-
tioned in southern Arizona. WOGUQ has a new 36-hr.
tower and a TH-6 beam. KOBND received 81 UX cards
in September from the QSL Mail, many of them 15s.
XCC WAOJMB is now off the air. WOBUD, KOJB
operated and was on the air. WOTAQU operated in Iowa
4-3000z in his hotel, also a kw, on 2 meters. The Tri-
state ARC now has classes for prospective Novices.
WTRI, WOTU, WOBUD, ARC Bulletin Mon., Wed, and Fri.
at 1732z on 2795 kc.

Traffic: WOLGG 1089, WOLGG 152, WOVAU 146, WO-
CO 65, WAOJSD 44, WAOJMT 42, WAOJIT 19, KO-
RLE 18, KOQAK 15, KOJIO 15, WOJPU 10, WONGS 9,
WAOJU 6, WAOJVI 7, WAOJU 5.

KANSAS—SCM, Robert M. Summers, KOKP/-
SEC; KOEBM, PAM; KOMIB, RAI: WOAJLE, WIFL.
PAM; WOCI, WAC, WAOJQ, WAOJU, WAOJIE, WAOJ-
K2, WAOJQ, WAOJQ, WAOJQ, WAOJQ, WAOJQ, WAOJQ,
Kansas PI Net is about to go into a two- or three-night
operation. All V.H.F. looks close 145350 kc. more regularly
at 150, 153, and 157 kc. WACS has joined the Forks Radio
Club, 1500 Preston St., Winston-Salem, N. C. 27103, would
like to exchange Bulletins with several clubs in the Mid-
West, especially WOKM, Interests. Member of the Mo-
Ne-Chat Club, Wichita, visited a Titan Missile site Sept.
17 for a very interesting program. WOJYK lost some Call-
ing gear when lightning struck his QTH recently.
WAOJII now is in college in Manhattan. KOMZ was
elected pres. of the recently-formed Mo Kan Amateur
Repeater Conference in operation. 2 meters was
5-1280z out-20-08 in. Other officers are KOKP, vice-
pres.; WAOJUE, secy.-treas.; WAOJQ, treas. Zone 7 AEC
Net 75 meters reports QNI 23, 4 sessions; Zone 9 AEC
Net 10 meters, QNI 26, QTC 2; Zone 13 AEC Net 75
meters, QNI 80; Zone 14 AEC Net 75 meters QNI 47, 4
sessions; Zone 15 AEC Net 75 meters QNI 21, QTC 1; Newton
V.H.F. 2-Meter Net, QNI 16; Zone 7 AEC Net, QNI
58, NCK V.H.F. 2-Meter Net, QNI 46, QTC 6.

Traffic: WOAJLE 140, KOHBI 105, WOCAZ 65, WAO-
LC 92, WAOJAD 57, KOKP 57, WOACW 53, WO-
FJ 44, KOJEM 38, KOJDD 30, WOAJOG 29, WAOJ-
KIE 18, WOYXV 14, KOOGK 9, WOJOSH 9, WOJU 7,
WOHMM 5.

MISSOURI—SCM, Alfred E. Schwandke, WOFMK
—SEC: WOBUL, WOALM renewed membership for EC as
for Audrain Co. WAOFF is the new EC for Clay Co.
WAOJPW, WOAJN and WAOFF are new OP's, WAOFF
is a new 100-watt Call, Cl. at Hous-
ton. WOBUL has a permanent TCC EAN assignment.
WAOJBY (Ritenour Sr. HS ARC), Overland) now has a
DXCC and an NC-128 for Novice and 820 and TX-36 beam
for Gen. Cl., WAOXOS, trustee, reports 11
students in the full code class. KOJPH is the new
pres. of UAIR RC (WOJKE), WAOFF was named
pointed manager, WOJLE (UMC RC), WAO-
KUH reports that the PHD Net on 6 meters has regular
clubs. WOJPH, WOJPH, WOJPH, CHAP, City,
Grandview, and from Kansas stations in Law-
rence, Overland Park, Chsune, and Uniontown in ad-
dition to the usual WOJPH and WOJPH. WOJPH
has commercial 2m rig to 6-meter f.m., and has conversion
data if anyone needs it. KOJPH/WOJKJ got married
Sept. 21 and also changed their calls. KOJPH is back to
the return to Standard Time. Net reports for Sept.:
the only "no compromise" six meter SSB transceiver

You Can Work "Six" With A Truly High-Performance Rig . . . get lowband stability, 1 kHz dial calibration, linear tuning, and a backlash-free dial mechanism, plus all of the other standard "built-in" features found on the Heathkit 80 through 10 meter SB-Series equipment. The SB-110 runs 180 watts P.E.P., SSB input, 150 watts input CW . . . considered the ideal transceiver power level by most ham radio communications operators. It is one unit of the famous Heath SB-Series, matching availability of matching low-band transmitters, receivers, and transceivers, plus accessories such as the SB-600 Communications Speaker, SB-630 station console, and SB-610 Signal Monitor. And the SB-110 goes fixed or mobile with the appropriate power supply . . . the same versatility you experience with the famous Heath SB-101. Call it the one "no compromise" six meter SSB transceiver.

PARTIAL SB-110 SPECIFICATIONS—RECEIVER SECTION: Sensitivity: 0.1 μV for 10 dB signal-plus-noise to noise ratio. Selectivity: 2.1 kHz @ 6 dB down, 5 kHz max. @ 60 dB down. Image rejection: 50 dB or better. Audio output powers: 1 watt. A.C. characteristics: Audio output level varies less than 12 dB for 50 μA change of input signal level (0.5 μV to 150 μV). TRANSMITTER SECTION: DC power input: SSB, 180 watts P.E.P., CW, 150 watts. RF power output: SSB, 100 watts P.E.P., CW, 90 watts (50 ohm non-reactive load). Output impedance: 50 ohm nominal with not more than 2Ω SWR. Carrier suppression: 55 dB down from rated output. Unwanted sideband suppression: 55 dB down from rated output & 1000 Hz & higher. Distortion products: 30 dB below rated output PEP output. Hum & noise: 40 db or better relative to rated power. Keying characteristics: VOX operated from keyed tone with grid blocking keying. GENERAL: Frequency coverage: 45.5 to 54.5 MHz (500 kHz segments 50.0 to 52.0 MHz with crystals supplied). Frequency selection: Built-in LMO or crystal control. Frequency stability: Less than 100 Hz drift per hour after 20 minutes warmup under normal ambient conditions. Less than 100 Hz drift for 40°F temperature variations. Dial Accuracy: Electrical, within ±50 Hz on all band segments, after calibration at least 100 kHz point. Visual, within 200 Hz. Dial backlash: No more than 100 Hz. Calibration: 49.5 MHz ± 115 v. DC at 10 ma with 50% max. ripple Voltage, ±250 v. DC @ 100 ma with 50% max. ripple, Linear, ±115 v. DC @ 10 ma with 50% max. ripple. Filament voltage, 12.6 v. AC/DC @ 4.355 amps. Dimensions: 14.5" W x 9.4" H x 13.5") D.
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R F Communications is located in metropolitan Rochester, New York State’s third largest city. This progressive community enjoys one of the highest standards of living and headquarters some of the country’s finest companies, e.g. Xerox, Kodak, Bausch & Lomb. Rochester is conveniently located within easy reach of such cities as New York, Buffalo, Detroit, Boston, Montreal, Pittsburgh and Washington. Educational, cultural, and entertainment facilities rate with the best in the country. Sports enthusiasts can enjoy baseball, boating, swimming and fishing in the Finger Lakes nearby and hunting, skiing, etc.

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FOR FULL MILITARY APPLICATIONS. The RF-301A can operate under severe shock and vibration. It is designed for use at extreme temperatures and high humidity. The unit is fully splashproof and can be used in vehicles, transportable shelters, or in fixed station applications.

FULL FREQUENCY FLEXIBILITY. RF-301A transceiver includes a fully transistorized synthesizer that can be set to any frequency in one kilocycle steps between 2 and 15 megacycles. Standard stability is 1 part in 10⁶ which is suited for normal voice SSB, AM, CW and wideband FSK communications. In addition, continuous tuning with resolution of 100 cycles over the entire 2 to 15 Me frequency range of the transceiver is provided.

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119
moved to Florida. WAIDEK, KINFW and WIMGP are on 15. WIAAU was the only tower not getting out fine, WJUT was here on a visit, WIFEKS is a new tower and beam. The T9 Radio Club, met at Dot Savage’s QG on the 7th, with 44 members getting settled in Plymouth, Wis. AOUK, SRRN, AQY and WADNIX stood by during a bad fire in Medford as AREC members. \n\n\n""
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F.O.B. Marlboro, N. J.

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check in WTDNZ plans to build a new linear. The Lewiston-Clarkston Club has 40 students in the Novice code and theory course and 15 students in the Advanced Class course, WTDNZ, WATEVY, and WATZSF, and 5 constructors. The club set up an amateur radio booth at the Nez Perce County Fair complete with KTJTY, WTDNZ is operating with a 100-Watt and has earned his WAS award. WTV7-BBD has been appointed OSH. Your SCM spoke at a meeting sponsored by the Spokane Dial Twisters Club and attended the S.W. ARRL Orientation meeting at the Walla, FARM Net report for Sept.: 23 sessions, 497 check-ins, 37 traffic handled. Traffic: WATBDZ 122, WTEVF 35, WTVB 18, K7QG 19, WTVZN 10, W7- GGV 8, WATEVY 6, K6AB 5, WTVY 2.

MONTANA—SCM, Joseph A. D'Arce, WTTYN—

Ast. SCM/SEC, Larry Reynolds, W7RZY.

Montana Traffic Net 3900 kc. 1600 MDT M-F
Montana K7ARF Net 3960 kc. 1600 MDT Thu.
Montana PON Net 3965 kc. 1600 MDT Sun.
Great Falls AREC Net 3960 kc. 0900 MDT Sun.

Endorsements: K7DCH, K7MRZ, K7ZUZ, WATAEX, K7EGI, K7UPF as ECs; W7FJS as OO; K7PH as QM. The Pacific Division Meeting of the ARRL was held in Seattle, Sept. 30. SEC W7RZY gave a report on the ARRL and in Montana, Montana AREC is now fifth in the nation in participation. Your SCM discussed traffic and v.h.f., problems in the state. The NTIS people reminded that Montana is not as well represented as it should be by W7DMA at Missoula. We still need more c.w. stations in this net. If interested, please drop your SCM a note. K7DCH has been very active in Navy M-V. W7QIO, or Butte, is in the General Hospital at Butte. W7FLB presented a paper at the VME meeting in Denver, K7ARF, K7QG and K7RGI did very well at the ARLL DX Contest. We are in need of some OPs in Montana. Traffic: WATDMA 255, K7DCH 44, W7FLB 21, WTTYN 12.

OREGON—SCM, Dale T. Justice, K7WWR—

RM: W7FZFL, PAM: K7RQZ, Section net reports: WATAEX reports for Aug., sessions 40, check-ins 355, maximum number of counties 15, traffic 16, contacts 68, For Sept., sessions 30, check-ins 725, maximum number of counties 15, traffic 22, contacts 192. W7FZFL reports for Aug., check-ins 35, traffic 84, sessions 22, For Sept., sessions 22, check-ins 78, KTQPG reports for BSN for Aug., sessions 42, traffic 100, contacts 192, check-ins 1004. For Sept., sessions 60, traffic 105, contacts 170, check-ins 689. K7NTS has been keeping busy telephone relay for the USCG cutter Northernmost. WATCPI has his n.i.p. detector operating and has it on 24 hours per day. WATV-11 and W7FRK are now on 15-20 meter. KTQRO has a beam on a homemade 50-10, tower. W7FJX is finding more time to operate since his retirement from the post office. K7KZU and WMTMLJ have been hanging together for a while now. KTQRO has a 100-Watt on W7TVZ.

WASHINGTON—SCM, William R. Watson, K7JHA—

SEC: W7UWT, RM: K7CTP, PAM: W7BUN.

- **WSN Net**: 3375 kc, 1900 QTC 253 Sept., 30
- **NTV Net**: 3970 kc, 1600 QTC 420 Sept., 30
- **WARTS**: 3370 kc, 1900 QTC 253 Sept., 30
- **BSN Net**: 3770 kc, 1900 QTC 253 Sept., 30

The latest addition to the list of affiliated clubs in the Dial Twisters of Spokane. Note the recent change of WSN to 3970 kc. QTC 3433. The new AREC WATX-A is now on 3970 kc, and will function under SEC W7UWT. This will add the state c.d. frequency under the AREC and will have IARC and ales. The EOP appointment: W7BWN has been made official. W7JX is now the field agent for K7JHA, and will work the Pacific Area staff of NTBS. W7JQX is the new field agent for the WARTS, if you have any bulletins to record the WARTS, please submit them to W7JQX. SCM K7JHA met with the Pacific Area staff of NTBS.
Illustrated above is a complete Swan station for SSB, AM, AND CW. You can transmit and receive on all 5 bands with your 500 transceiver, and when used with the Mark II linear amplifier, you’re at the legal power limit. Switch in the Model 410 outboard VFO and you’re all set for separate transmit and receive operation. Yet this complete home station, with proven Swan performance, reliability, and craftsmanship is yours for substantially less than any other comparable equipment.

**SWAN 500 TRANSCEIVER**
5 BANDS—480 WATTS
This deluxe model offers many extra features including selectible upper and lower sideband, 100 kc crystal calibrator, automatic noise limiter, and factory installed accessory socket for addition of Model 410 external VFO. Features crystal lattice filter with shape factor of 1.2 and ultimate rejection of better than 100 db, providing excellent selectivity and superior audio quality. $495

**MODEL 410 FULL COVERAGE EXTERNAL VFO**
Eight tuning ranges of 500 kc each. When used with the Model 22 dual VFO adaptor, the 410 provides separate transmit and receive frequency control. Model 22 Adapter. $25  MODEL 410  $95

**MODEL 117XC MATCHING AC POWER SUPPLY**
Includes speaker and phone jack  $95
PLUG IN VOX UNIT  $35.00

**12 VOLT DC POWER SUPPLY**
MODEL 14-117  $130

**CRYSTAL CONTROLLED MARS OSCILLATOR**
5 Channels, Model 405X, less crystals  $45

**MARK II LINEAR AMPLIFIER**
5 bands, 2000 watts PEP input. Uses two Elmac 3-400Z triodes. With tubes  $395
MATCHING POWER SUPPLY  $235

See the complete Swan home station at your dealers today.

ELECTRONICS  Oceanside, California
As QSTs get older, they become more valuable. Have your 1967 copies been scattered about the shack? If so, why not file them neatly. The best way to accomplish this is to place them in sturdy, good-looking QST Binders.

Finished in reddish-brown fabricoid with stiff covers, each Binder holds twelve issues of QST, opens to any page and lies flat. Your copies are protected and always available for easy reference.

- Holds 12 issues of QST
- Opens to any page and lies flat
- Protects and preserves your copies
- QSTs always available for reference

QST BINDERS (POSTPAID)
Each—$3.00
Available only in the United States and Possessions

AMERICAN RADIO RELAY LEAGUE
Newington, Conn. 06111
GOTHAM'S AMAZING ANTENNA BREAKTHRU!!

How did Gotham drastically cut antenna prices? Mass purchases, mass production, product specialization, and 15 years of antenna manufacturing experience. The result: The kind of antennas you want, at the right price! In QST since '53.

QUADS

Worked 42 countries in two weeks with my Gotham Quad and only 75 watts... W5AZR

CUBICAL QUAD

These two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.


Dimensions: About 16' square.

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1½" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Steel wire, tempered and plated, .064" diameter.

X Frameworks: Two 12" x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping ½" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are much lower than even the bamboo-type:

<table>
<thead>
<tr>
<th>Band</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-15-20 CUBICAL QUAD</td>
<td>$35.00</td>
</tr>
<tr>
<td>19-15 CUBICAL QUAD</td>
<td>$30.00</td>
</tr>
<tr>
<td>15-20 CUBICAL QUAD</td>
<td>$25.00</td>
</tr>
<tr>
<td>TWENTY METER CUBICAL QUAD</td>
<td>$25.00</td>
</tr>
<tr>
<td>FIFTEEN METER CUBICAL QUAD</td>
<td>$24.00</td>
</tr>
<tr>
<td>TEN METER CUBICAL QUAD</td>
<td>$23.00</td>
</tr>
</tbody>
</table>

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect.

BEAMS

The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LV, S5IP9ADO, and 4U1KU. THAT ANTENNA WORKS! W4N4DYN

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ½" and 3/4" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

<table>
<thead>
<tr>
<th>Band</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 El 20</td>
<td>$16</td>
</tr>
<tr>
<td>3 El 20</td>
<td>$22*</td>
</tr>
<tr>
<td>4 El 20</td>
<td>$32</td>
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<tr>
<td>2 El 15</td>
<td>$12</td>
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<td>3 El 15</td>
<td>$16</td>
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<tr>
<td>4 El 15</td>
<td>$25*</td>
</tr>
<tr>
<td>5 El 15</td>
<td>$28*</td>
</tr>
</tbody>
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ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts. Here is a small portion of the stations he worked: VE3FAD, T12PGS, W5KXJ, W1WOZ, W2DII, W83DST, WB2FCB, W2YII, VE3FSD, W8CZE, K5YSB, K2RDJ, K1MVY, K8GKY, K3UTL, W3QIC, W2LVE, Y51MAM, W8ATS, K2PGS, W2OPJ, W8WJW, K2PSK, W8CGA, WB2KWY, W2WJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked K2J5KN, KZ8OWN, HC1LC, PY5ASN, FG7XT, XE2L, KP4 AOL, SM5BGK, GA2OB, VY5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15, 10, 6 meters

<table>
<thead>
<tr>
<th>Band</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>V40 vertical for 40, 20, 15</td>
<td>$14.95</td>
</tr>
<tr>
<td>10, 6 meters</td>
<td>$16.95</td>
</tr>
</tbody>
</table>

V80 vertical for 80, 75, 40

<table>
<thead>
<tr>
<th>Band</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters</td>
<td>$16.95</td>
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V160 vertical for 160, 80, 75

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<thead>
<tr>
<th>Band</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters</td>
<td>$18.95</td>
</tr>
</tbody>
</table>

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139
Big name in towers
ROHN TOWERS have become the accepted standard of excellence throughout the world — meeting the needs of the communication, broadcasting, transportation, oil, utilities, manufacturing, and other industries, including home TV and amateur needs.

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SAN FRANCISCO—SCM, Hugh Cassidy, W6AUV
—New officers of the Marin Radio Club are W6FVE, pres., W6BUJO, vice-pres.; W6GMO, secy.; W6BQPC, treas. W6CWR is working lots of Navy MARS nets. W6GCH is completing an all-band RTTY setup. K6M- ZHT is constructing a linear to cover all bands. At the evening high school in Santa Rosa W6BAGF is teaching the fundamentals of amateur radio. With the highest frequencies opening up, W6BPEVA is finding a lot of new and some exotic—DX on 10 and 15 meters. Up in Sonoma County, W6ARQ reports across country 10 and 15 meters with some find band openings. W6HSA is pres. of the San Francisco Club and editor of the club paper. W6BGTY is doing active duty with the Navy. W6BAP received a citation from the Navy for providing communication from Viet Nam. W6GQA, top OO in continuous FTM activity prepares to cover his fourth summer cycle. While home between voyages W6BQJ handled 193 messages in a short layover. W6BQJ is attending Cal Poly. W6GRV works c.w. every day. K6JER is active on the NCM training net, while W6JAE says his only activity is the Grandfather Net on 160 meters. W6WLV added an EICO 720 and a 20-meter dipole. W6AKL, Estelle, still is hampered by a leg injury but signed up with Navy MARS. W6NDDZ has returned from Chicago, k6JFJ, a standby on the Golden Bear Net, was in Hawaii for a month, K6CWS and XYL W6HPS have a new tower and tri-band for DX activity. W6BUJO and XYL W6BN were in Chicago and Montreal during Oct. The Marin Club held a successful auction in Oct. Some of the Marin Commute road-runners are trying 807 kc. for mobile operations. The W6AUV-W6- FTS tower is in use and has earned its volunteer week-end campaign the winter K6JCE lost all his gear when his truck went up in smoke. W6EZ continues what appears to be a 24-hour watch for DX—all bands and all hours. W6 OGD is building up his county count. W6BMYZ made the BFL. Traffic: W6KVQ 307, W6BMYZ 205, W6BQJ 191, W6WLV 155, K6FWF 55, W6AUD 17, W6BVV 10, W6BDP 5, W6CVQ 4, W6GVJ 3.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6FHP—Fr. R. Brabson is the new EC in the Stockton area. W6ASV retired and bought himself a Camper and a TR-3 and is going traveling. W6BLYZ is on 40 s.s.b. W6IK is operating from Big Creek on 40 s.s.b. K6JI is heard nightly. K6BJ is chasing DX on 15 meters. W6JUK is on 10 meters with a kw. W6SCE is busy handling traffic from an extensive vacation trip to Alaska. K6KOL is building a 30-element beam for 2 meters. The Turlock Amateur Radio Club meets the 3rd and 6th Tues. at the Turlock High School electronics room. Support your local clubs. K6OZL is attending a court-reporting school. New officers of the Central California singleside Band Association are W6PLX, pres.; W6WM, secy.-treas.; and W6MQD, editor. W6PLX has a Swan 500. W6NHP is really thinking about s.s.b. W6WVM has a new V.W. and is on 40 s.s.b. The Tuolumne County Amateur Radio Society is now affiliated with the League; W6BZT is secy. The Delta Amateur Radio Club also has affiliated with the League. W6WZM, W6ATQL and W6OONZ attended the ARRL Convention in Los Angeles. W6EOY is vacationing in Canada, and is on 14.300 kc. for skeds. K6JSA is handling traffic from Vietnam. W6TFD is having transmitter problems. To everyone, a Very Merry Christmas and a Happy New Year. Traffic: (Cont.) W6BHYA 204, W6ADB 105, K6KOL 125, W6AES-EC 18. (Am.) W6ABB 383.

SANTA CLARA VALLEY—SCM, Jean A. Gmein, W6BZJ—Asst. NCM; Ed Turner, W6VYO, SEC; W6VZE, RM; W6VQMO. SEC W6VZVE is now running a code practice net seven nights per week on 185.49 at 7 p.m. local time and invites any 2-meter stations in the area to check in. Speaker at the SCCARA meeting in Sept. was Lew McCoy, of ARRL, who gave a report on incentive licensing. K6DXY was busy making plans for around-the-world cruise. W6PLS reports that conditions on 10 meters are the best ever. W6AFLLO works NCM and ARRL liaison to RNU. W6AUC reports that QCWA held its Annual Picnic at the Sonoma Golf and Country Club with 65 members present. W6ACW also is active as NCM liaison. W6DIF reports activity in this work as well as the Mission Trail and MARS. W6BZJ and K6LEZ, EC for King City and Hollister, respectively, provide 2-meter communications for a fire control burn in San Benito County. Ed reports that he is active on W6CARS. W6BPT is back on MTN after a few years and is running a pair of 12-A5s. K6XJ’s NCS of the NCM Sat. evenings. W6XZT is active on 20-meter DX. The West Valley Radio Club meetings feature operation of club station W6FYPY. W6BMYZ made the BFL. The Santa Cruz Radio Club held an antenna demonstration. The club welcomes members from the Santa Cruz/Watsonville area. W6BVY is QRL with NTS operations. W6DEF is originating traffic on the 2-meter
NEW Drake R4B Receiver

Same specifications as R4A*

PLUS

- New tuning knob and skirt
- PTO indicator light
- Side-mounted head phone jack
- New scratch-proof epoxy finish
- New eye-ease front panel
- Improved audio (low distortion, high output)
- SOLID STATE circuitry used in PTO, Crystal Oscillator, Product Detector, AVC Circuit, BFO, Audio Amplifier, Crystal Calibrator.

25KC Calibrator has a sophisticated design, using integrated circuits and FET’s; permits working closer to band edges.

The R-4B RECEIVER is a model of design, using the best combination of transistors and tubes, printed circuits and hand wiring to give maximum performance and minimum maintenance, at the lowest cost.

NEW DRAKE ACCESSORIES

WATTMETER

W-4 $49.50

Reads forward and reflected power directly in watts (VSWR from nomogram). Two scales in each direction, 200 and 2000 watts full scale. Calibration accuracy ± 5% of reading ± 2 watts on 200 watt scale; ± 5% of reading ± 20 watts) on 2000 watt scale. Size: 5½” H x 3½” W x 4” D.

MATCHING NETWORKS

General: With integral VSWR meter and RF wattmeter. Matches 50 ohm resistive transmitter output to coax antenna feedline with VSWR of up to at least 5:1 whether resistive, capacitive or inductive. Covers ham bands 80 thru 10 meters. Has alternate output for tuning up into external dummy load. Meter reads forward power directly and VSWR directly, or can be calibrated to read reflected power directly in watts. Size: 5½” H x 10¼” W x 8” D. Matching network can be switched in or out with front panel switch.


Meter reads forward power directly: MN-4, 300 watts full scale with accuracy ± (5% of reading ± 3 watts); MN-2000, 2000 watts full scale with accuracy ± (5% of reading ± 20 watts), and 200 watts full scale with accuracy ± (5% of reading + 2 watts).

MN-2000 only: Up to 3 antenna connectors can be selected by front panel switch.

Prices and specifications subject to change without notice.

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Attn: Dept. 1127

Amateur Net $430.00

*Linear permeability tuned VFO with 1 kc dial divisions. VFO and crystal frequencies pre-mixed for all-band stability. Covers ham bands 80, 40, 20, 15 meters completely and 20.5 to 29.0 Mc of 10 meters with crystals furnished. Any ten 500 kc ranges between 1.5 and 30 Mc can be covered with accessory crystals for 160 meters, MARIS, etc. (5.0-6.0 Mc not recommended). Four bandwidths of selectivity, 0.4 kc, 1.2 kc, 2.4 kc and 4.8 kc. Passband tuning gives sideband selection, without retuning. Noise blanker that works on CW, SSB, and AM is built-in. Notch filter and crystal calibrator are built-in. Product detector for SSB/CW, diode detector for AM. Crystal Lattice Filter gives superior cross modulation and overload characteristics. AVC for SSB or high-speed break-in CW. Dimensions: 5½”H, 10¾”W, 12¼”D. Wt.: 16 lbs.
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TRI-EX

W-51

FREE STANDING TOWER.

SUPPORTS 9 SQ. FT. OF ANTENNA.

Shown with internal Ham M rotator and 2." mast.

INCLUDES

• FREE: RIGID BASE MOUNT
• PRE-DRILLED TOP PLATE — For TB-2 thrust bearing.
• HIGH STRENGTH STEEL TUBING LEGS. Solid rod, "W" bracing.
• EASY MAINTENANCE — No guys or house brackets needed.
• RISES TO 51 FT. — Nests down to 21 ft.
• HOT DIPPED GALVANIZED AFTER FABRICATION!

All welding by certified welders.

IMMEDIATE DELIVERY

$362.60

FREIGHT PREPAID INSIDE CONTINENTAL U.S.A.

Tri-Ex TOWER CORPORATION

7182 Rasmussen Ave., Visalia, Calif. 93277

ed.net as well as work on NCN. W5MYL is busy working DX. W6XYMX now sports a new quad. W6HVN is busy getting a pair of 452A's on the air. W6MAG reports that KB6ME is now active from the Reedwood City area on 16, 15 and 20 c.w. Traffic: WRSY 1580, W6BYB 201, W6DEF 97, K6DXY 86, W4LPS 47, W7VVE 20, W4LFA 14, W4ACU 12, W6RWG 13, W6OHI 12, W6QIZF 8.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst, SCM: James O. Pullman, W4FPM, SEC: W4WRM, WE: W4LVE, FK; W6KZ, PAM; W4VJ, TLF; PAM; W4HJZ, W4BEQW is the proud owner of a brand-new General Class license. W4JP has a new SH-101 on the air and has received his CF-15 certificate. W4ZLZ reports that W4RHZ has constructed and installed a 2-meter repeater for the Wilson area. K4HHR is now on 2 meters. W4FPM says that the Triangle ARC is having a ball designing and building solid-state, two-watt input, handheld 6-meter transceivers as a club project. W4BNU is now working some RTTY on 50 and 20 meters. W4NAP reports the Rockingham County AEO zone had a good turn-out for its picnic.

Net
Freq.
Time
Days
OTC
Mar.
THEN 3685 kc. 0000Z Daily 196 W4A1MRC
NCNE 3678 kc. 2200Z Daily 88 W4HE
NCNL 3678 kc. 0000Z Daily 0 W4UPN
Late (Aug.) reports:
NCNE 3678 kc. 2200Z Daily 148 W4HE
SSBN 3698 kc. 0000Z Daily 38 W4SLW


SOUTH CAROLINA—SCM, Clark M. Hubbard, K4LN—SEC: W4ECL, Asst. SEC: WA4WQX, RM; W4GLND, PAM; W4EKF. The attendance at Rock Hill was one of the biggest in over six years and it looked like old times again. The SSBN had a neat mixer out there. The night before at the Holiday Inn with 35 attending the supper, W4ACF was on 2 meters, W4BAQF, WB4OTU, W4WKB all have new masts, K4NNU is on RTTY. The Anderson Radio Club toured the FAA Omi-TAGAN station recently. W4KHI is back on the air. K4CVE is the proud father of a new operator. K4GVE is on RTTY now. W4JA had to give up OQG. We hope Gil can soon get back to it. Net traffic: SSBN, 102; SCN 9; Traffic: WB4DOXX 182, W4A1PD 89, W4AYW 79, W4BHA 49, W4NTO 37, W4AMY 38, K4LJN 32, W4PFH 21, W4JA 21, W4PPV 18, K4OUCI 11, W4BEA 9, K4LND 6, W4JDP 4, W4VVE 4.

VIRGINIA—SCM, H. J. Hopkins, W4S9J—SEC: K4LMB, RM: W4A4UL, K4MLC, W4B4AU and W4FUL are once more ECs. K4MJJ was appointed OQG for K4MJZ OPS. W4AUMX is off the air while away at college. The VSN and YFN, plus several local nets, were active during Hurricane Doris's thrust to the northeast. W4ZAU, W4AQWG, W4MWP and W4B4DOY are all college men who frequent our section nets. W4FPM, former PAM and active caller from West Florida, is now portable in Norfolk. New officers of the PVRC are W4ZM, pres.; W4TVW, vice-pres.; K4EST, secy.; W4PT, treas. W4B4QF reports scoring the W4J, and K4TJF is very near the DXCC. All sections of our membership are encouraged to sign up for ARES membership and to participate in the January Simulated Emergency Test. Contact K4LMB for the address of your SEC. Virginia section-wide net frequencies:

3935 2200 to 0300 GMT Daily
3930 2230 to 0300 GMT Daily
3925 2300 GMT Daily


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ONLY 17½¢ PER WATT

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- FULL 2000 WATTS PEP ALL BANDS
- BUILT-IN DIRECT-READING WATTMETER
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TUBES FURNISHED FOR $60 A PAIR IF ORDERED WITH KIT
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Size of Coupler: 2½” x 2½” x 3¼”
The Tube That Puts The Big Value In The Heathkit® SB-200

CETRON
572B/T-160L

Especially designed to fulfill the optimum cost and performance requirements of amateur radio KW SSB linear amplifiers, a pair of CETRON 572B/T-160L's in parallel provides all the muscle you need at a price you can afford. T-160L is one of more than 30 tube types manufactured by CETRON. Formerly Cetron-Taylor, Cetron Electronic Corporation has been a supplier of amateur radio tubes since 1931.

572B/T-160L SSB Grounded
Grid Linear Amplifier Service
Maximum Ratings Per Tube

| DC Plate Voltage                  | 2750 volts |
| DC Plate Current                 | 275 ma |
| Plate Dissipation                | 160 watts |
| Filament Voltage & Current       | 6.3 v @ 4.0A |

Typical Operation — Two Tubes (ICAS)

| DC Plate Voltage                  | 2400 volts |
| DC Grid Voltage                   | -2.0 volts |
| Single Tone DC Plate Current      | 500 ma |
| Zero Signal DC Plate Current      | 90 ma |
| Driving Power                     | 100 watts |

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When you work at a radio or TV station, you're where the action is. You're in on news as it breaks. You hear new records before they're released. You often know the behind-the-scenes stories of important events. You rub shoulders with famous people in show business, athletics and politics. And you may get to announce news or music and become a local celebrity yourself.

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You don’t need an engineering degree to qualify. You don’t need a high school diploma. All you need is a Government 1st Class FCC License. If you have one, most stations will welcome you with open arms. In fact, Radio- Electronics magazine says: "If you can’t get a good job with one...you'll starve to death in a candy store."

For some men, getting an FCC License is easy. For others it’s hard. It depends on how much electronics you know when you take the licensing exam.

Our specialty is making it easy. For over 30 years, we've been teaching men electronics in their homes. No lost income—no classes to attend. Yet our graduates learn their electronics so well, 9 out of 10 pass the FCC exam. Without our training, two out of three men fail! For this reason we can back our license-preparation courses with our iron clad Warranty: Upon completion of your course, you must be able to pass the FCC exam...or your tuition will be refunded in full.

What makes our course so good? For one thing, we use AUTO-PROGRAMMED lessons. You build your knowledge of electronics the way you'd build a brick wall—one piece at a time. Each "piece" is small and easy to handle. And it rests securely on the pieces that came before it. It's easy to learn this way, even if you once had trouble with your studies.

And you get more personal attention than you might in a busy classroom. Your instructor doesn’t merely correct and grade your work—he analyzes your thinking to make sure you are staying "on the right track." Then he mails back your assignment the same day he received it, so you can read his notes and corrections while everything is still fresh in your mind.

These 2 Free Books May Change Your Life

If you itch for a better-paying, more interesting job, the two books we offer may have your answer. One tells how to qualify for the many fabulous career opportunities in electronics. The other tells how to get your FCC License and break into broadcasting. Both are free. No obligation—just mail the coupon. It may be the turning point of your life.

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131
VIRGINIA QSO PARTY
January 6-8, 1968

sponsored by
The Roanoke Valley Amateur Radio Club

Rules: 1800 GMT January 6 to 0200 GMT January 8. No power limit or minimum time limit. The same station may be worked on additional bands. Call CQ VA. Virginia amateurs residing in independent counties will use a neighboring county in the contest exchange for the duration of the contest. Selected county must be used for the entire contest. Phone and c.w. are considered separate contests requiring separate logs.

Exchanges: Va. stations send QSO number, RS(T) and county. All others send number, RS(T) and state, province or country.

Scoring: One point per contact (Va. stations may work other Va. stations). Va. stations multiply QSO points by the number of states, provinces, counties and Va. counties worked. Others multiply points by the number of different Virginia counties worked.

Awards: Certificates to the highest scoring stations in each state, province or country, and stations will compete for 1st through 5th place certificates.

Frequencies: Suggested frequencies: c.w. 3565 7060 14,060 21,060 28,060; phone 3830/3930 7205/7235 14200/14340 21310/21410 and 28,800.

Logs showing dates, times, stations contacted, bands, modes and location and FINAL SCORE must be received no later than Feb. 1968. Send logs to the Roanoke Valley ARC, Box 2002, Roanoke, Virginia 24009.

\[to resign as OO because of moving to Nashville. WN8-YCD likes traffic work. W8YBB, instructor at W8ZU, is quite active. He also holds W8KRP and W8JAN. W8AGD has a new SB-101 and is active on 80 through 2 meters. W8TFG is active on 144 Mc. from Randolph Co.

W8N C.W. Net, 30 sessions with 98 messages (July)
W8N C.W. Net, 31 sessions with 154 messages (Aug.)
W8N Phone Net, 21 sessions with 69 messages (Aug.)

It is with regret I report the passing of W8BTU, of Princeton, and W8PRO, of Williamsbn. W8XZGA is building an SB-101 transceiver. W8M1 is building an HW-12A and mobile power supply. Director Vic Clark was guest speaker at the QCWA Dinner in Charleston. KSUBG and K5ACY are active on 6 m. from Huntington. Planning for the 1968 ARRL State Convention will begin with a meeting in Charleston in Dec., and an election of officers. You are ready for the NET, to be held in Jan. There is no appointing and W8AGD and W8DDB.


ROCKY MOUNTAIN DIVISION
COLORADO—W7H, Richard Hopkins, KO7DE—Congrats to W07ES on earning another BPL for his fine work with our Colorado Weather Net. The Hewlett Packard Loveland ARC, W0DKH, had a very successful outing during the Sept. P.T.P. Contest. Equipment was available for 20 through 1217 Mc, with contacts made on all but the 200-Mc. band. Club member participation and enthusiasm ran high, with about 20 of the 30 club members participating. Location was on a small mountain ten miles west of Loveland. Wyoming and Nebraska contacts were made on 2 meters. Ten-mile contacts were made on 1217 Mc, using a surplus AP6 for which the antenna was a 1-gallon oil can with a counter-wave aerial. The Colorado High Noon Net reported the highest activity for Sept., with a QTC of 79 and a QNI of 435 in 20 sessions. Traffic: W07ES, KO7XZ, W07MNL, W0DKH, K7HJX, W0KRY, W0KLS, W0KPP, K7XOA, K7DQ

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[Image of a certificate and text]

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☐ Electrical Appliance Repair

[Check box for facts on new GI bill]

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Address ________________________________________ 
City_________________________ State____ Zip_____

ACREDITED MEMBER NATIONAL HOME STUDY COUNCIL

NEW MEXICO—SCM, Kenneth D. Milia, W5YXZ—Astd. SCM; Marty Peterson, WAMXZ, SEC; K5KTO, P.O. Box 642, Alamogordo, N.M. Congratulations to WAMXZ and his XYL on the new harmonic born Sept. 13. The Mesilla Valley Radio Club had a booth at the Southern New Mexico State Fair and picked up over 100 amateurs for our state and nationwide, including Europe. Many of these were passed on to 20 meters, the operating band at the fair. Everyone seems to have settled into the new shack in Alamogordo. WAMXZ his been busy in his new shack and is building a new phono stages 707T. Trailing: K5HTS, HSN 16, W5M1G 16, WAMXZ 10, WABRU 9; W5WHY 8, WACXZ 4, W5NUI 3, W5BRL 2, W5MITY 2.

UTAH—SCM, Gerald F. Warner, WTYSS—SEC; W7WV, RAI; WTOCX, Traffic Net:

[List of call signs]

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4KHW—SEC; W4FPI, PAM; WACNL, W4ECEC; WAXMA. Thanks to the leadership of the North Alabama DX Club for the increased participation in DX activity and the fine showing made by Alabama in the DX Contest (Oct. 1976). The AENM is still setting the pace with the earlier DX race, traffic activity, followed by AENT and AENM. W4FZV will be greatly missed for the next few weeks while in Europe on company business. W4MVE has been doing some fine missionary work, speaking before civic clubs, with amateur radio as his chief subject. We are happy to have an increase in serious v.h.f. work, W4GVE/4, in Dothan, is a new Alabama OVS, working in a watts on 2 and 6, WBDWQ, in Montgomery, is doing a fine job on 6 s.s.b. ECI, starting making your plans for the SET to be held in January. The Alabama DX Club is asking members to attend the DX Contest (Oct. 1976).

[Further text]

CANAL ZONE—Acting SCM, Russell E. Oechsler, KZ5OB—SEC; KZ5YM, RAI; KZ5FPX. Be on the lookout for Canal Zone QSO Party rules. The Party is planned for Jan. 31 through Jan. 29, 1976. KZ5FPX is holding center and theory clinics with potential new blood. KZ5CT and KZ5NA moved to Margarita, KZ5AA is holding a week-day traffic net on 21 at 1600Z, KZ5TS
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Reported working CQXAJ on 6 meters, KZ5WR and KZ5MW report new harmonics at their QTHs. The CARC toured the ITT transmitter site. Welcome to new K2Z 7N and C, 7K. TRAFFIC: K2SEF 160, 7KZTS 128, 7KZAD 49, KZ5CY 14, KZ5M 14, KZ5OA 9, KZ5OB 9, KZ5WH 9, KZ5PG 6, KZ5GN 6.

EASTERN FLORIDA—SCM, Jesse H. Morris, WA4M4V—SEC; 65th, 1438 9th St., Cocoa, FL 32922, 772-562-2138. While RM RTTY: WA4RMW PAM 55 B.B.; WA4GQX PAM 10 4M; VS4DR PAM 25M; WTUB, Y.I.F.; PAM: WA4MBIC. I had two nice sales with clubs recently. On Sept. 21, I met with the Polk County Club and the Amateur Communications Society, President K4EBO had a nice meeting planned. This club is known for its self-taught classes. Many Polk County amateurs are graduates of these classes. On Sept. 25 I visited with the Lake Amateur Radio Association, President K4A4OB and his club has a town clubhouse and the club owns the land and the building. It was bought and paid for with club funds. This is an outstanding accomplishment and should serve as a model for amateurs who would like to do the same. W4KRC and the BEBA gang made p.p. during the week end they operated from AAA Headquarters in Orlando. Many of the traffic nets returned to school. WB2WHH is now W4HIKP in Miami. W4BZY is operating from Patriot ABP and W4RTN is operating from the Naval Hospital in Jacksonville. And then there is W4ATJ, who is building a home-brew steam-powered car! Traffic: (Sent) K3AEO 297, WA4MBIC 506, WA4SCE 239, WA4NEY 278, WB4HIKP 226, W4FCP 222, WB4AIW 206, W4YD4 99, W4ACFH 90, WB4SDP 33, W4NGH 78, K4ADY 78, K4ECO 75, W4SDR 71, WA4AIW 71, W4FP 64, WA4KFB 63, WA4ADH 55, WA4BME 53, W4HPX 52, W4MV 51, W4WAW 50, K4WIE 48, W4ATW 42, W4PPK 38, W4TAC 35, W4LWJ 34, W4SWJ 30, W4GEN 28, W4HS 23, W4KCY 27, W4GNO 27, K4KCU 25, W4E1 21, W4YPO 20, K4SSL 20, W4AVW 20, W4GDK 19, WA4BUY 17, K4LPB 16, K4A1 16, K4HJP 15, K4IAX 14, K4KNE 12, K4KCI 12, K4FNW 11, W4AVF 10, W4NFE 8, W4WYX 8, K4BLM 7, K4BEI 6, W4TML 6, W4WM 5, W4DOC 4, W4WFF 4, W4AIW 4, W4AOY 2, (Aug.) WA4BNT 40, K4CNW 21, W4DDE 15, W4KRC 14.

GEORGIA—SCM, Howard L. Schonber, W4ZL—Asst. SCM: James W. Parker, Sr., WA4KGP SEC: W4DDY, RM: WA4CZJ, PAM: K4PKK. K4QHJ reports continued good conditions with rain chances in the area. NCS for the G4 Tradewinds Net which meets Thurs. at 2000 EDT on 50.35. WB4GDQ now is a General and well along for W4T and 80 meter dipole. K4FV is returning to college. W4LRR reports work on RTTY and the one-eyed monster keeps him busy, WB4AJR is a new ORS and active on ENO representative. K4KQV now is on 2 meters. W4HRQ has a new v.h.f. amateur system, K4BEF has a Galaxy V for the low bands. W4AVWC is located in Texas now. K4PZS is building a new 2-meter rig, W4MBIF has an 80 meter mobile. JSX reports all 60 sessions are covered with 472 stations reporting 108 pieces of traffic, W4J3U. Sun. night net continues for the G4 Tradewinds Net. W4M reports 20 operations and 20 messages. W4BZL has new towers at 50 and 60 ft. level, with a haye quad for the low bands and plans a tower in the fall for 160 meters. As for DX, W4VB, W4GGH, W4BO, W4JDI, W4DIJ, W4DQ, W4BEC, W4BFF, W4AHP, W4BTF, W4BZH.

WESTERN FLORIDA—CQ, Frank M. Butler, Jr., W4KWR—SEC: W4KZP, PAM: W4GGE, RM: W4BVE. Section Nette:

Section Net

<table>
<thead>
<tr>
<th>Net</th>
<th>Free Time</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>WVPN</td>
<td>10047 ke.</td>
<td>293002</td>
</tr>
<tr>
<td>QPN</td>
<td>1061 ke.</td>
<td>2300082</td>
</tr>
</tbody>
</table>

Pea Island: Ten-meter net 600 MHz. Mondays is increasing. Both a.m. and n.a.m. stations are welcome. W4XAP has his receiver back from the factory and is looking for old friends. W4UFU sold all the h.f. gear and has two more meters, PEP and L.d. and trans are welcome. W4AXP is an amateur with an AM car radio and made the trip to Mobile and passed the General Class test. His dad, W4UNV, is building a 10-meter rig, W4ATW is operating with his friend W4WZU. The Elks Club, W4SRX now has a w.h.i.m. rig on 144.94 Mc. Dhamiak Springs, K4KIH is the new EC for Walton County. Sidney B. had his Operator's ticket with the call W4XHDD. Maudie WA4GHE is building a windmill tower to hold 75-, 40- and 8-meter antennas. Hans and Ums joined to
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Six meter specialists will delight in the M-171, with its big eight elements and nearly 25-foot boom. For those who don't need its wide capabilities, there's the four-element M-170, with more than half the M-171's gain in less than half the space!

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Stripes of Quality®
form a county-wide emergency communications group.
Cross City: WBAY/4, Dixie County FC, has been
transmitted, leaving WBZU the only ham in this
Traffic: (Sept.) KVYQ 257, W242AM 172, W4VE 61,
WBRR/4 34, WBQG/3 32, WA4BQO 15, WA4GHE 4,

SOUTHWESTERN DIVISION
ARIZONA—SCM, Floyd C. Colyar, W7FKE—PAM:
W7CA 4M; K8NH: Endorsement: KVYQ as OBS.
It is with regret that we report that prominent
WATCFX, K7QI is training director for the educational
classes sponsored by the Old Pueblo Radio Club of
Tucson, K8NH has a new Heathkit SB-411. OBS
W4GEG is *24 hours a day* with all officers and
K7HQ has added a Heath SB-101 transmitter and a
watt. Compact linear amplifier for his station, K7JDIJ is the proud New owner
of an SB-200 linear. The officers of the new Arizona
Repeater Association, inc., are K7FYR, pr., W7EAL, vice-pr.; W4RDL, sec., W4K7Z, treasurer,
and K7ZK, club trustee. The club meetings are held
the 4th job, of each month at the First Federal Savings
and Loan Building at 28th St. & Camelback, Phoenix,
at 0230 GMT. The new club is open to all interested
amateur radio operators. Further information on
the club may be obtained by contacting any of the officers.
Fine Official Bulletins have been transmitted by OBS
K7MTZ, Traffic: K8NH 200, K7MTZ 35, W2QDS 16,
W7FKE 8.

LOS ANGELES—SCM, Donald R. Etherege, K6-
UMY—ECC: CQ: "We have a new tower. Our
arrays are in order to W6GYH, WB6BBO, and W6GGL on earning BPL for
Sept. traffic, W6MUX is now in W-Land studying
at J.L. Best. W6ZTZ is happy to report that
W6BSF is happy to report that
Seattle, Don did an excellent job as both an OA
and OVC and will be missed. W6BEG is looking at
groups that are space communications operators, and
is a new member of the Paladines AWC. W6SAN now has an
XYL, W6HMW is building an ATC station, SG-
RRL's new tower, W6MTL, is moving to Portland,
while LARC ARC's W6BEGF has a new Arizona
QTH. Unfortunately two active v.h.f. hams, K6GBO and
W6MUR, are now silent Keys. Some improve found
W6FPC vacationing at Yellowstone Park, W6BBO was a
speaker at the Antique Wireless Assn. Conference
in Michigan. W6GGL requests a 36-hour day
for his traffic-handling duties. K6ASK is doing some
432-Mhz, antenna reworking. W6BTS is cutting
his teeth on traffic-handling and his first 65-city cast.
W6YRA now has a new keyer, W6BSKAY is the proud
holder of a 35-w.p.m. Code Proficiency certificate.
Thank you, Greg! W6BBO reports a new five-element
10-meter beam is up and working great, SEC K6POH
reports the following active Emergency Coordinators
(EOC) for our section: W6GOI, W6LQY, W6MLZ, W6J7T
and WB6QMF. A standing invitation to join the
AREC and/or traffic nets is extended. Club bulletin
is modified as above. As news and individuals about
be sent to K8UMY, c/o address on page 6. Season's
Greetings to all, Traffic: (Sept.) W6GYH 1250, WB6BBO
800, W6GGL 700, W6QAE 238, K6GW 100, W6MTL
224, W6S6C 127, K6K3A 63, WB6UG 41, K6H9S 55,
K5PC 34, W6YOA 50, W6BQMP 44, W6P7C 35, W6D-
KGE 19, K5ROJ 11, K5ROK 7, W6B6C 6, K86DG 12,
W6Q8W 5, K6HJU 8, CBET 7, W6BTS7 4, W6K6G 6,

ORANGE—SCM, Roy R. Maxson, WA5DEC-
WA5TAG is back in the desert after a short vacation up
North, OBS K6MGA's XYL had an operation and is
doing FB now. OBS W6BTF has changed his
OBS sked to 3725 on Mon. and 7165 on Wed. at
5:30 P.M. and Sun. on 3770 to 0330 C.S.T. legal time,
SEC W6T1C is working with WATKS in Independence,
K6QG, in Oxnard, as John was having a check-up at
the hospital in L.A. W6DQOM hopes to be back on the c.w.
nets soon. (Sept.) W6CQZ has added a new beam, V.
B6 5100B. OBS WB6BTO has a TCC sked on a new beam to
to show the folks in NTS, W6BTO is opening up on
SCN, K6TWE, of K6TCA, advises they have a
TV-1C Rf converter and a Clegg 22er with an
Antec TX52 with a Hy-Gain fifteen-element beam
for local 2-meter-man operation in the evenings. SEC
W6VHS and Ass, W6EBRYS and the AREC group are
holding communications for the Tunstall Tiller Days Parade.
WA5DEY/5W and W6ZC have a new pad. SECs
W6BTTZ 359, W6BJTO 152, W6AEQ 152, K6HTO 140,
W6GOTT 87, W6BTF 70, K6MC 63, W6CZ 58,
W6DNX 18, W6H9S 11 and W6BQMP 44, W6Q8W 8,
W6BQMI 8, W6MBW 7, W6T8JU 5. (Aug.) WA4IDN 1B.

SAN DIEGO—SCM, Don Stoetzel, WB6R/B/5:
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pression. Vinyl insulated with 
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able from 24 AWG to 12 AWG.

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Uniform quality control provides 
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Use as power supply cords and 
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remote control circuits, special 
press-to-talk microphone circuits, 
and other applications.

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microphone applications. Neoprene 
jacket remains flexible at low 
temperatures. Available with or 
without shielded conductors.

Ham Transmission Lines—  
RG/U Type  
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service life, and maximum depend-
ability. Cables are essentially flat 
with no peaks in attenuation to re-
duce signal on either high or low 
frequencies.

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1001 W. 19th Street - Erie, Pennsylvania 16502

LEADERS IN COMPACT ANTENNAS

APPLE DAYS PARADE. They were W6RTF, W6ALG, K9OQJ, W6QJO, W6SMT, K6QSE, and K6GOA. The Oct. meeting of the San Diego VHF Club missed films from the Air Force, The Six-Meter ARFPC News Item, and World News, but an hour, at 7:30, local times, on 50.250 Mc. The Palomar Club and perhaps the last meeting of each month at 8 p.m., at the South Oceanside School. Visitors are welcome. W6QSE retired to Reno and the Mammoth Lakes High Sierra resorts. W6SJO showed his European and African slides at the Sept. San Diego DX Club meeting. W6BPESE has retired to Cal Poly in Pomona. Congratulations to WS6QW, who made the BPL. Seasons Greetings to all from your QTH, for the past 4 years and 105 columns in QST. Support your new SCDL keep him informed of club and individual activities and be active in traffic. DX, AREC/ARPSC, v.h.f. or some amateur radio function. Adult Education classes for license advancement are being offered by the San Diego city schools. See W6EYYC in detail. Traffic: K6BQI 8032, W6EOT 501, W6QYF 410, W6WGF 396, W6BME 207, W6OSQZ 19, WB6UMT 8, WB6SSLG 8, K6CAG 3, WARKAR 1.

SANTA BARBARA—SCM, Cecil D. Hinson, W6OYK—SEC. W6GJV. The Estero Radio Club members handled all the communications and public address systems for the Rockamore Sand Dance during the Labor Day weekend celebration at Morro Bay. W6ATA was on charge of these activities and this is the fourth year that the Estero ARC has provided the service. A result of these activities and theory classes held by the Estero ARC, there are former Rockamore people in the area with the following calls: W6NYYF, W6VNRZ, W6WIKL, W6YBE, W6KVN. The key Kilt printed a rumor that W6KZO was up and out with a new radio. However, he has been checking in again on 3885, W6BOKD is busy with his recently acquired equipment on MARS frequencies and also is sportin’ a new hi-gain beam. Our SEC sends along a report and news that the ARC for Santa Barbara is W6TNA. Sept. at the Ventura County ARC was a special month when the always successful auction was held. W6VJTP has just passed 5 November trains from the Ventura Co. ARC. Traffic: (Sept.) W6EOD 7. (Aug.) W6DPV 3.

WEST GULF DIVISION
NORTHERN TEXAS—SCM, L. L. Harbin, WS6NB
—Asst. SCM, E. C. Pool, WS6NO. SEC: WS6PI. PAM: WS6NS. RA: W6JF. W6JF has been for many years to remember to wish you a Merry Christmas this time but for some reason I have failed to do it at the right time. Thanks to W6DVP for reminding me that it is only a short time 'til the New Year. W6JF has his XYL that it is time for her to order his new transceiver so that he will get it before Christmas. The KC Club reports a big time at its Christmas Supper recently. K6BHQ presented two films, "The Big Bounce—Project Echo" and "Talking to Tomorrow Communications in the Year 2000," both very interesting films from the library of the Tel. Co. W6STEK is a new Novice (not yet in the bell book) as a result of the efforts of the KC Club at Ft. Worth. W6NJN has been awarded a Life Membership in the KC Club for his donation of a complete QST magazine library. Please be reminded that the deadline for news is the 5th of the month. W6IM has sent a copy in by the 7th. The Arlington ARC reports great success from a rummage sale netting them about $1 44 to add to the treasury of the club. Try a rummage sale some time and you may be surprised. The Tarrant County 6-meter Emergency Net is making progress with its emergency van, which will be completed and equipped soon to take care of local emergencies. Traffic: W6NHO 11, W6GJ 106, W6GFS 85, W6PBZ 29, W6JXZ 11, W6JZG 4, W6JZU 4.

OKLAHOMA—SCM, Daniel B. Prater, KC5AY
—Asst. SCM: Sam Whitfield, W6AYX, SEC: K3ZCJ, RA: W6QQJ. PAM: W6QJL. I am glad to announce the new KC for Kay County, W6OEH, has been elected Kay County Radio Club secretary with W6CJZ, vice-pres.; and W6NRMJ, sec.-treas.; Ron is working with civil defense and county officials to get a RACES and ARRC group going. W6DZK, Pawnee County ECC is busy organizing an AREC net for the country W6S8ZS is a new Novice in Pawnee. W6DZK is under-going treatment at the Oklahoma City Hospital. K6MKR is back in Lawton after a tour in Vietnam. W6DZK passed the General Class exam and has a new TR-4 ready to go. W6QJL, who also has a new TR-4. W6YJ, Oklahoma State University amateur radio station, is operating on 2-meter Fm. Now, W6ASDB and W6ASDU of Chero- kies, have units working Wichita, Kansas, and Edin stations at 146.94 Mc. New officers of the Enid Amateur Radio Club are KC5AY, pres.; W6MEUJ, vice-pres.; and K6KIP, site-treas. W6QJL is holding code and theory classes in the AREC club room twice each week with
GIVE YOURSELF A CHRISTMAS GIFT THAT YOU WILL NEVER FORGET

the 2K-2 linear amplifier

The inspired simplicity of the 2K-2 design, its rugged reliable mechanical construction and the use of only the finest components promises a long, long life of dependable performance. The 2K-2's enormous power output, its exceptionally low distortion figure and attendant signal sharpness promises complete satisfaction with its quality of performance. You have probably heard the strong clear signals of the 2K-2 by now... why not put that BIG signal on the air with your own 2K-2. After all, you deserve the best. The 2K-2 console or desk model $675.00. Let us send you a descriptive brochure. 6% Finance Charge • 10% Down or trade-in down • No finance charge if paid in 90 days

Henry Radio Stores

Christmas Greetings from Ted (W6UOU), Bob (W9ARA) & Walt Henry (W6NRV)

Butler, Missouri, 64730 816 679-3127
11240 W. Olympic, Los Angeles, Calif., 90064 213 477-6701
931 N. Euclid, Anaheim, Calif., 92801 714 772-9200

East Coast Rep.: Howard Laughrey, 2 Elizabeth St., Chappaqua, N.Y. 10514, (914) CE 8-3683

"World's Largest Distributor of Amateur Radio Equipment"
ANNOUNCING HOTEL SAHARA'S 3RD ANNUAL SAROC Sahara Amateur Radio Operator's Convention Hosted by Southern Nevada Amateur Radio Club, Leonard Norman, W7PSV, Chairman

EXCITING ENTERTAINMENT... Congo Room Buddy Hackett and Sergio Franchi LUXURIOUS ACCOMMODATIONS... 1,000 beautiful rooms with a special SAROC ROOM RATE OF ONLY $10 single or double, plus tax (Jan. 5-6)

SAROC...Special Events
• Manufacturers' Exhibits
• Technical Talks
• MARS Seminar
• Ladies Program
• Technical Program and Presentations—Master of Ceremonies Ray Meyers, W6MILZ

REGISTRATION FEE: $10.00 REGISTRATION INCLUDES:
• Three Cocktail Parties Hosted Jan. 4 by Hotel Sahara, Jan. 5 by Swan Electronics, Jan. 6 by Galaxy Electronics
• Midnight Show and Dinners in the Sahara Congo Room
• Sunday Sahara Hunt Breakfast

MAKE RESERVATIONS NOW! Mail Coupon to John Romero Hotel Sahara • Las Vegas, Nevada Name ____________________________
Address __________________________
Arr. date and time Lth. of stay Accommodations desired (check one)

☐ single ☐ double ☐ twin

Registration fee of $10.00 enclosed (Please make checks payable to SAROC, HOTEL SAHARA)

(Deadline for advance reservations, Dec. 31, 1967)

ANNOUNCING HOTEL SAHARA'S 3RD ANNUAL SAROC Sahara Amateur Radio Operator's Convention Hosted by Southern Nevada Amateur Radio Club, Leonard Norman, W7PSV, Chairman

EXCITING ENTERTAINMENT... Congo Room Buddy Hackett and Sergio Franchi LUXURIOUS ACCOMMODATIONS... 1,000 beautiful rooms with a special SAROC ROOM RATE OF ONLY $10 single or double, plus tax (Jan. 5-6)

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MAKE RESERVATIONS NOW! Mail Coupon to John Romero Hotel Sahara • Las Vegas, Nevada Name ____________________________
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☐ single ☐ double ☐ twin

Registration fee of $10.00 enclosed (Please make checks payable to SAROC, HOTEL SAHARA)

(Deadline for advance reservations, Dec. 31, 1967)


SOUTHERN TEXAS—SCM, G.D. Jerry Sears, W5AIR—SEC: K5QQQ, PAM: W5KLW, RM: WA5EY, Oct. presented the Southern Texas amateurs with disaster upon disaster. First Hurricane Beulah slammed into the Rio Grande Valley, spawning more than 100 tornadoes as far as 300 miles away. Then the disastrous floods followed. With winds up to 135 miles an hour, many amateurs operated until their antennas went down or their homes were flooded. The list of amateurs participating in this disaster continues to be long. A second hurricane, Huma caused alarm when she suddenly formed and headed north toward the Galveston/Houston area. The already strong focusing areas were punctuated relieved when she took a westward turn and made a landfall in Mexico. Emergency, health and welfare traffic loads were handled solely by amateur radio from many areas. All other communications were out. Other than hurricane operations WSABQ reports that KIERI 5 took the big leap into mantronomy in Nov. and says not to expect him on the air for a while. K5MZL has been transferred from e.d. work to the San Antonio Police Intelligence squad. KC2 WSTFW has a new NW-350 on the air. K5JGB reports for WSAC and requests that you look for them on 160 meters this month. A new OBS is WSABQ in San Antonio. W5CBE is the new U.L.F. PAM for the Harris County ARES. The QSL Bureau asks that you please include your call and some stamps with your QSLs.


CANADIAN DIVISION

ALBERTA—SCM: Harry Horrold, VE7BG—SEC: VE7A, PAM: VE7CN, RM: VE7A, OBS: VE7B, VE7CI, OB5: VE7A, VE7C, VE7D, VE7F. It is with regret that we record the following Silent Keys: VE8AA, Frank R. Duval, Lethbridge; VE6FJK, James A. Nelson, Medicine Hat; and VE7X, Frank Jeunen, Calgary. These boys will be missed by many. Our SEC reports so far indicate that the holidays are over full and winter activities will pick up and plans for some ARES activities are shaping up. Yours truly had a very nice visit from VE20M, Quebec SCM, whom I had not seen for twenty-seven years. Some forgot their traffic reports this month, Traffic: VE6BM 43, VE6FK 17, VE6SS 7, VE6FS 6, VE6AO 4, VE7TY 4, VE7SW 2.

BRITISH COLUMBIA—SCM: H.E. Savage, VE7JB—VE7XW has purchased M. Henlock and will be re-named appropriately. VE7AR is a member of the House in Victoria. VE7BPL visited the U. of B., VE7XK, and met many of the gang he talked to whilst at U.B.C., and operated VE7ACS who, by the way, is now VE7BUC. VE7BVU's SB-100 and long wire accounts for that signal. Our RM, VE7BL, reports that things really are moving on 3550 kc. at 0000Z, VE7AC had to lay off picking apples as W6EY and his XYL also W6VJ and his XYL dropped in for a nice visit. VE7BPL has wired the SB-301 and dusted off the DX-20-1 multiband dipole. VE7TT is now active at 100 Mile House. The Vancouver Club's new officers are VE7TB, pres.; VE7TV, sec.; VE7VB, vice-pres. The East Kootenay ARC is preparing its repeater for 2 meters. VE7BXX is our newest blind operator. To the man who has heard Sput and Shop read on 3755 kc. by VE7BGG we report that he is a blind operator. VE7BLO is confined to a wheelchair and is very hard of speech, VE7AMW moved to a QTH and is building an FM shack. VE7BKK has been doing much travelling. Traffic: VE7BHH 150, VE7BPL 104, VE7BLS 44, VE7BQA 21, VE7HUV 19.

MANITOBA—SCM, John Thomas Stacey, VE4JT—The Mid-Continent Hamfest in Wascana was spoilt by the gang from VE4UM. Nearly two hundred were in attendance including Canadian Division Director VE4CCH, VE4LGG and VE4GJ announced their engagement with wedding bells set for Dec. The building committee at VE4UM consists of VE4HI, VE4CS, VE4EI and Dave Truemann. The VE4CCH has RTTY going again and has started code classes, VE4JY is secy.: VE4XW, operations mgr. and VE4EI, technical mgr. VE4AR reports limited phone net, net and the Northwestern Ontario Net and reports 32 active on NIEN. The closing date for reports in the fifth column and your activity reports would be greatly appreciated. VE4EI took a few days off to visit with
SOUTHCOM SC100—100 WATTS
HIGH PERFORMANCE SSB TRANSCEIVER

- 10 Field Effect Transistors
- 11 Bipolar Transistors
- 30 Junction Diodes
- 3 Vacuum Tubes

The Southcom SC100 is an entirely new single channel solid state SSB transceiver using vacuum tubes only in the high power RF stages of the transmitter. Field Effect Transistors are used extensively to give the low receiver noise figure, exceptional SSB AGC characteristics and freedom from cross-modulation. The toroid coils used throughout the RF stages have typical Qs of 200. The high input impedance of the FETs reduces loading of the tuned circuits giving the high RF selectivity necessary to meet rigid spurious response and emission specifications. The FETs used in the crystal oscillator minimize device and loading variations ensuring maximum frequency stability. Plug in RF and IF printed circuit boards and exchangeable AC and DC power supply modules simplify field servicing. The SC100 is designed to meet the specifications of most Governments. The low price for equipment to this specification makes it attractive to use individual SC100 transceivers on each channel for multi-channel stations.

TECHNICAL SPECIFICATIONS

- POWER OUTPUT: 100 watts minimum, 125 watts typical
- HARMONIC SUPPRESSION: 40dB
- SPURIOUS ATTENUATION: Greater than 50dB
- INTERMODULATION DISTORTION: 3rd order — 35dB
- ALC: Output within 1dB for 10dB AF increase
- STABILITY: .0002% standard, .0002% with oven
- SIGNAL TO NOISE: 0.5 µv for 15dB s+n/n
- IMAGE: 2.0 MHz — 90dB, 12 MHz — 70dB
- AGC: 10dB maximum AF change 4 µv — 0.1v
- AUDIO OUTPUT: 2 watts minimum, 5% distortion
- FREQUENCY RANGE: 2-15 MHz standard
- TEMPERATURE RANGE: —10° to 60°C
- SIZE: W 9.2 in, 23.5 cm; H 5.3 in, 13.5 cm; D 10.5 in, 27 cm
- CONTROLS: AF, RF Gain, Clarifier, On-Off-Standby
- POWER REQUIREMENTS: 110V, 50/60Hz; DC: 13.6V nominal; Rx 600ma Tx 12A average
- MODELS: Base, Mobile, Rack-mounting.

Write for further information. Dealer or trade enquiries welcome.

MARITIME—SCM, J. Garley Grimmer, VE6MUK, Ant, SCM; R. P. Thoms, VO6IN, SKC; VE6XJ, Sec. The 1967-68 executives of the NSBRA are VE6YU, pres.; VE6ID, vice-pres.; VE6GFL, secretary; VE6N, past-pres. The 1967-68 executives of the NSBRA are VE6IAC, pres.; VE6IUL, 1st vice-pres.; VE6EL, 2nd vice-pres.; VE6IR, secy.-treas.; VE6IS, registrar for call letter plates, VE6UB. One of the youngest amateurs in this area is VE6IAR, who is 16 years old, has been on 20 and 40 with a 1-150, VE6F and all-band vertical. Ex-VE6LMK is now signing VE6JRN on the amateur band for the 2-element 20-meter beam and a five-element 20-meter beam in operation for the DX contest this winter, VE6LMK is now an active member in the N.Y. State QST Party, Memorial University of Newfoundland, ARAC, VO6IN. He is following the summer lay-off, VO6IN is back on the air, having filled his gear off after it was soaked when his basement flooded. The 1967-68 ARAC executives are; VO6IAC, pres.; VO6IN, 1st vice-pres.; VO6JUL, 2nd vice-pres.; VO6IR, secy.-treas.; VO6L, very active. VO6CWA worked KT7WIA and double E July 17 for 43 states on 8, VE6IJL has produced a solid state power detector to plug into the 290 socket of a second detector. The S.O.S. Dinner in Toronto was a huge success and VE6JSH my sister, needs a little help from the QST staff by sending her a little encouragement. VE6IAR is now active. VE6ION is active on the QST staff by sending her a little encouragement. VE6IAR is now active. VE6ION is active on the QST staff by sending her a little encouragement. VE6IAR is now active. VE6ION is active on the QST staff by sending her a little encouragement. VE6IAR is now active. VE6ION is active on the QST staff by sending her a little encouragement. VE6IAR is now active. VE6ION is active on the QST staff by sending her a little encouragement. VE6IAR is now active. 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SUPEREX HAM HEADPHONES
Full comfort even after many enjoyable hours of continuous use. superb comfort even for eyeglass wearers. Crisp, distortionless reproduction and high sensitivity allows you to single out that weak signal and hard to reach station. 600 ohms impedance, completely adjustable head harness.

$24.95

$12.95 W2AU FOUR PURPOSE BALUN $12.95
BALANCE YOUR ANTENNA • STOP YOUR COAX FROM RADIATING • HELP ELIMINATE TVI • IMPROVE YOUR RADIATION PATTERN PLUS F/B RATIO
• Broad-banded 3-32 mc. • Center hang-up hook for inverted Vees • Handles full legal power. 2KW PEP • Built-in lightning arrester • SI0239 RF connector for coax transmission feed line eliminates center insulator • Withstands up to 600 lb antenna pull • For use with all type antennas fed with balanced coax line • Weighs only 61/4 oz. 11/2 diam. 6" long • 2 Models: 1:1 matches 50 or 75 ohm unbalanced coax to 50 or 75 ohm antenna lead. 4:1 matches 50 or 75 ohm unbalanced coax to 200 or 300 ohm. • W2AU Super Vinyl jacketed 2 element 10-15-20 meter quad. Complete quad $64.95 • W2AU Super-Fiberglass 2 element 10-15-20 meter quad. Complete quad $99.95

NEW, ALL WAVE RECEIVER MODEL R-5
For Amateurs, Police, Fire, Short Wave Covers 54 MHz through 54 MHz in 5 continuous bands. Includes standard broadcast, all foreign broadcast, all amateur bands through 6 meters, all 27 MHz CB channels, all 2-way radio frequencies from 30 to 50 MHz including police and fire departments. Fully transistorized • AC and portable (optional) • Noise limiter • Bandspread • Includes BFO.
$64.95 kit, $79.95 wired

Waters
Mod. 376
PROTAX ANTENNA SWITCH
Functions as a regular selector switch with 5 side mounted (radial) connectors. Has the additional feature of automatically grounding the entire antenna system when the rig is not in use. Complete with knob, mounting hardware and escutcheon plate. Power handling 1000 W. VSWR less than 1.2:1 up to 150 MHz.

$12.50

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WEFAX Satellite
(Continued from page 94)

into the antenna line for the desired frequency.

Amateurs cooperating in the experiment are asked to:

- Send samples of charts and pictures received to Goddard (address below).
- Complete the WEFAX Daily Evaluation Report for occasional short periods during the scheduled evaluation program.
- Complete the WEFAX Monthly Evaluation Report.

Transmission schedules vary somewhat because WEFAX must be time-shared with other experiments on the ATS I satellite. Sufficient WEFAX transmissions are made, however, to evaluate the experiment and to provide the APT stations with useful meteorological information. An alert message (TBUS-3) specifying WEFAX transmission times is transmitted daily on meteorological teletype circuits. In addition, a weekly schedule is prepared for use by participants.

All amateur stations having APT reception capabilities may participate in the experiments. Further information may be obtained by writing: WEFAX Coordinator Code 783 NASA, Goddard Space Flight Center Greenbelt, Maryland 20771

An Unusual Story
(Continued from page 85)

“Well, Iko tells me that this is his last day on the island and that he is going to be taken off by a sub in a few hours. They are closing down the radio station on that island. He even asks me to help him get his radio gear into his rubber raft. At the time it seemed like a pretty good idea so I asked him if he'd let me dynamite the hut after he left, just to make things look all right.

“We shook hands, exchanged 73s, and I watched him paddle off to the sub.

“The rest of the story is uneventful except that I got a medal for my bravery on the island.”

Then Bob got up from his chair to get some more ice for the drinks as I sat there and relaxed my pipe.

“Well, Doc, the cap to this story is that I worked a JA1 on 20 s.s.b. last week and it was Iko. It makes me feel good that things worked out ok after all.”

We both raised our glasses and drank to JA1 —.

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"HERE’S A REAL HOT SPECIAL—

—the New SWAN 500—plus two
great package buys selected
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A.R.P.S.C.

(Continued from page 71)

1RN. He knows that W1EEN will show up to take any traffic for ARRl. His New Haven outlet is W1IKUO, his Bridgeport outlet W1RFJ, his New London outlet W10BR; these are regulars, and they usually report in without traffic. Let's assume they have no traffic on this particular night. Before the net convenes, they are all ready, fired up on the net frequency waiting for the NCS to commence firing.

Comes 8 second of 31 minute and time for the net to begin. WA1HBN gives with the net call-up, and stations start reporting in; but only those with traffic, and the "irregulars." Not W1EFW, W1EEN, W1IKUO, W1RFJ or W10BR. If they had traffic, of course they would report in, but since they are QRU this night, they just sit and wait while the NCS checks in traffic-holding stations.

Maybe the second station reporting in will have a "thru" message, or maybe two (or three), NCS thereupon calls W1EFW. Milt hits a dit on his key to indicate he's there, NCS then dispatches him DN5 to clear the traffic. Milt and his victim go down five, Milt calls first the station with traffic zeroes and responds, and the traffic starts to flow. After it is cleared, Milt might just stay there, rather than report back into the net, but he listens on the net frequency to make sure his pal returns to the net frequency and reports back in. NCS can then send the next station DN5 to meet Milt to clear "thru" traffic. Milt just stays there as NCS sends stations down to him. When all "thru" traffic is cleared, NCS tells Milt QNX, and that's all. W1EFW took part in the net, but never actually formally reported in. NCS was saved the trouble of checking him in and out each time he changed from the net to a QNY frequency, and Milt was saved the trouble of moving back and forth — at a total saving in net time and increase of efficiency.

The same procedure would apply to the other "regulars." NCS spots them on QNY frequencies and they stay there, listening on the net frequency for all dispatches and instructions. If NCS wants them to come to the net frequency, he simply sends their call, gives them a second or two to zero on him and report in.

Such a procedure can be used to even better advantage on region and area nets, where each NCS knows pretty much in advance who is going to be receiving for wintertime, section, region, or area.

A clinker! What happens if the expected receive station doesn't show, or someone else shows in his place? In the first case there would be no acknowledging dit, and therefore the dispatch would not be completed. NCS could wait a minute or two, try again — or the receive station, arriving late and looking for it, could now effectively QNI in the normal fashion. In the second case, the substitute station should QNI in the normal fashion, indicating, or course, what traffic he was receiving.

The above procedure can also be used in phone nets using voice procedure. In this case, NCS would say "W1EFW?" and Milt could merely grunt, say "here," "present," "yes!" or anyhow indicate his presence on the net frequency, whereupon NCS would complete the dispatching procedure.

Our nets are supposed to be the epitome of brevity and efficiency. It is agonizing, sometimes, to sit and listen to NTS net stations go through complicated and long-drawn-out procedures, most of which are unnecessary or superfluous. Although the example is fictitious, the procedure described above is actually used, but not widely. We think it has possibilities for adoption as standard NTS procedure. Give it a try on your NTS net, let us know how you make out. — W1HY.

September Reports:

<table>
<thead>
<tr>
<th>Net Station</th>
<th>Traffic Rate</th>
<th>Average</th>
<th>Representation (%)</th>
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</thead>
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<tr>
<td>EAN</td>
<td>1571</td>
<td>1256</td>
<td>92.4</td>
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<tr>
<td>CAN</td>
<td>1222</td>
<td>964</td>
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<td>PAN</td>
<td>1177</td>
<td>871</td>
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<tr>
<td>1RN</td>
<td>406</td>
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<tr>
<td>RN6</td>
<td>1258</td>
<td>759</td>
<td>27.8</td>
</tr>
</tbody>
</table>

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DXCC Listing
(Continued from page 104)
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Requested by newcomers and oldtimers alike: See page 177
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Don’t delay. Place your order now to allow plenty of time for arrival before Christmas

Also, if you can get contact with the metal frame of the building, the frame is usually at ground potential. You can check this also with your voltmeter.

Lightning and Grounding

Still another good reason for grounding equipment is for lightning protection. First, let’s make one point clear that many hams have a misunderstanding about; an amateur antenna is no more of an attraction for direct lightning strokes than any other object at the same height in the vicinity. However, an ungrounded antenna system can pick up a sizeable electrical charge from any nearby electrical storm. This can damage equipment, particularly the front end of a receiver, so the feeders should be grounded whenever a storm is in the area. Fig. 3 shows a simple method for grounding either coax or balanced feeders. An inexpensive knife switch can be used for this purpose, and as long as the leads from the switch contacts to the feeders are no more than an inch or so long, the switch won’t upset the normal operation of the feeders. Don’t forget to open the switch when using the station; otherwise you won’t be likely to work out!

Safety

When installing a new piece of gear, the first thing to install is the ground connection; when removing equipment, the ground connection should be the last connection removed. Always keep in mind that electricity can be dangerous. You don’t need to be afraid of it, but by all means maintain a healthy respect for any voltage, no matter how small.

As stated at the beginning of the article, you can operate your equipment without grounds, and many amateurs may have to do so because of their station location. However, if it is possible, install a ground system for safety’s sake.

I.A.R.U. News

(Continued from page 177)

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Philippine Islands: F.A.R.A. QSL Bureau, P.O. Box 4083, Manila

(Continued on page 182)
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<td>The CRUISER II</td>
<td>The CRUISER IIA</td>
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World Above 50 Mc.

(Continued from page 91)

W100P varactor tripler and a 32-element collinear. At Hiawatha, in eastern Iowa, KG6MO has a similar rig and a 48-element collinear. In northwestern Illinois, WA9NKX is active with an 8122 final and a 48-element collinear up 55 feet. He is also working toward 1296.

W6DRK, at Topeka, Kansas, is building antennas again. He is working on an array of sixteen 11-element W1HDQ Yagis to go with his 4CX250B! He has been running daily schedules over a 450-mile path to W9WCD in De Kalb, Illinois with a high degree of success. W6DRK would also like to arrange other schedules.

1315 Mc. and up is receiving considerably more attention in recent months. Allen Katz, K2UYH, is continuing work on improving the pre-amp which appeared in last month's QST. Allen and Dolph Vidard, WA2YTR, are working with modified ATP7s, using a 3C22, and expect this to be an inexpensive method of obtaining 30 watts output at 1296.

(Continued on page 164)

ALL-BAND ANTENNA CONNECTOR

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WA2VTR sends information on a dish antenna, the picture of which appears elsewhere in this column. The antenna construction method was devised by the late K2QWE who built several in various sizes between three and nine feet in diameter. The material is soft aluminum wire (TV ground wire) tied at each point with nylon fish line and sprayed with Krylon. The center is an aluminum plate drilled and tapped for attaching the radial arms. The cross supports are aluminum angle stock. Concentric rings are made from the soft wire and tied at each intersection. The launcher is one-inch copper tubing and the reflector is drilled copper laminate. The dish shown is 4 3/4 feet in diameter. Dolph says its gain seems to be about 18 db.

VK3ATN plans to use his new dish on 1296 in the next few months and would like to hear from others interested in 1296 e.m.f. schedules. His address is Ray Naughton, Box 80, Birdhip, Victoria 3485, Australia.

Emergency Preparation
(Continued from page 74)

traditions of the Amateur Radio Service and would certainly help in justifying its continued existence.

Fellow amateurs, it is not too late to do something about this if you have not done it already, but it is late enough. None of us knows when or where the next disaster, man-made or natural, will hit this country. After all, when there are now two large and powerful countries or groups of countries that adhere to an ideology which has already proclaimed its intention of dominating the world, it might be tomorrow when one or both of them decides to take direct action against the United States. Mother Nature seldom gives us much warning, either, before visiting us with a flood, a hurricane, an earthquake, a tornado, or even a forest fire. Let me repeat; it is important that we be fully prepared; we must be ready, willing and able to provide emergency communications to prove our worth.

In closing, I would like to add a postscript to the account of the Chicago area amateur club which I mentioned before. I am happy to add that many contacts with county, city and other key officials in the area have now been made and that many more are in the process, so that such officials as well as those of the Red Cross and similar organizations will have readily available the necessary information to avail themselves of the Chicago area 2-meter mobile amateur network. May I suggest that other “nets” which have not already done so follow their example.

Thank you for inviting me to speak to you at this meeting. It is always a pleasure to meet and talk with fellow amateurs, and I am often agreeably surprised at the number of longtime friends and acquaintances whom I meet unexpectedly at these gatherings, 73 and 30.
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W1JBE, Robert F. Gagnon, Lawrence, Mass.
W1VMU, Roy G. Johnson, Barnstree, Mass.
W2BIN, Isadore Kurland, Peninsulas, N. J.
W2DZP, Richard G. Dorr, Sr., East Paterson, N. J.
W2DXN, Mario E. J. Baglia, Brooklyn, N. Y.
W2JTH, Earl E. Lucas, Wayne, N. J.
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W5IWA, Henry E. Parker, Jackson, Miss.
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W9PML, Floyd Mitchell, Granite City, Ill.
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W9WST, Charl R. Ryan, Indianapolis, Ind.
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V3ZCGA, John Parkinson, Hamilton, Ont.
V5STM, Art Driver, Regina, Saskatchewan
V6SGX, Joe Robson, Lae Lae Ronge, Saskatchewan
V6AA, Frank Duval, Lethbridge, Alberta
V6GEO, James Nelson, Medicine Hat, Alberta
V6EYZ, Frank Isenow, Calgary, Alberta
ex-V6BO, Ed Brooks, Vancouver, B. C.
ZS1AB/2S3AB, Barney Joel, Sea Point, South Africa

Myrl F. Jones, W7IS

QST sorrowfully records the death of "Pop" Jones. He will be remembered by many old timers as W4IR, the editor of the "Dixie Squinch Owl" and his activities in the old Army Amateur Radio System. His QST column of the thirties, "Dixie Jones Owl Juice," was a combination of biting satire and learned philosophy in hum affairs.
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