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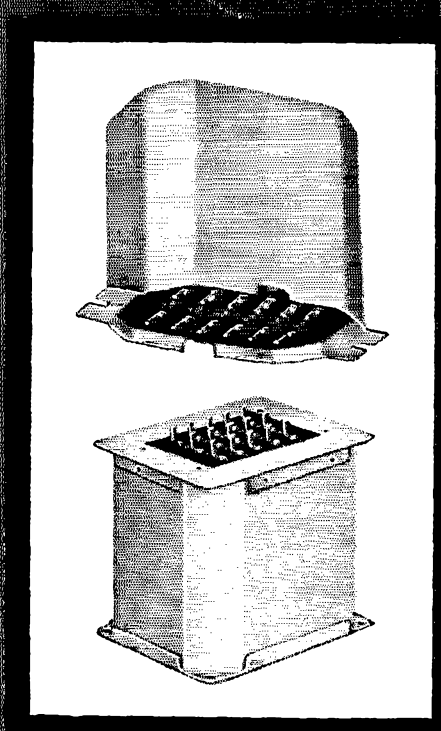

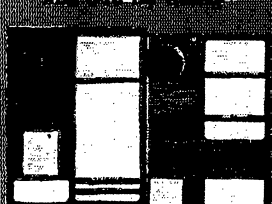

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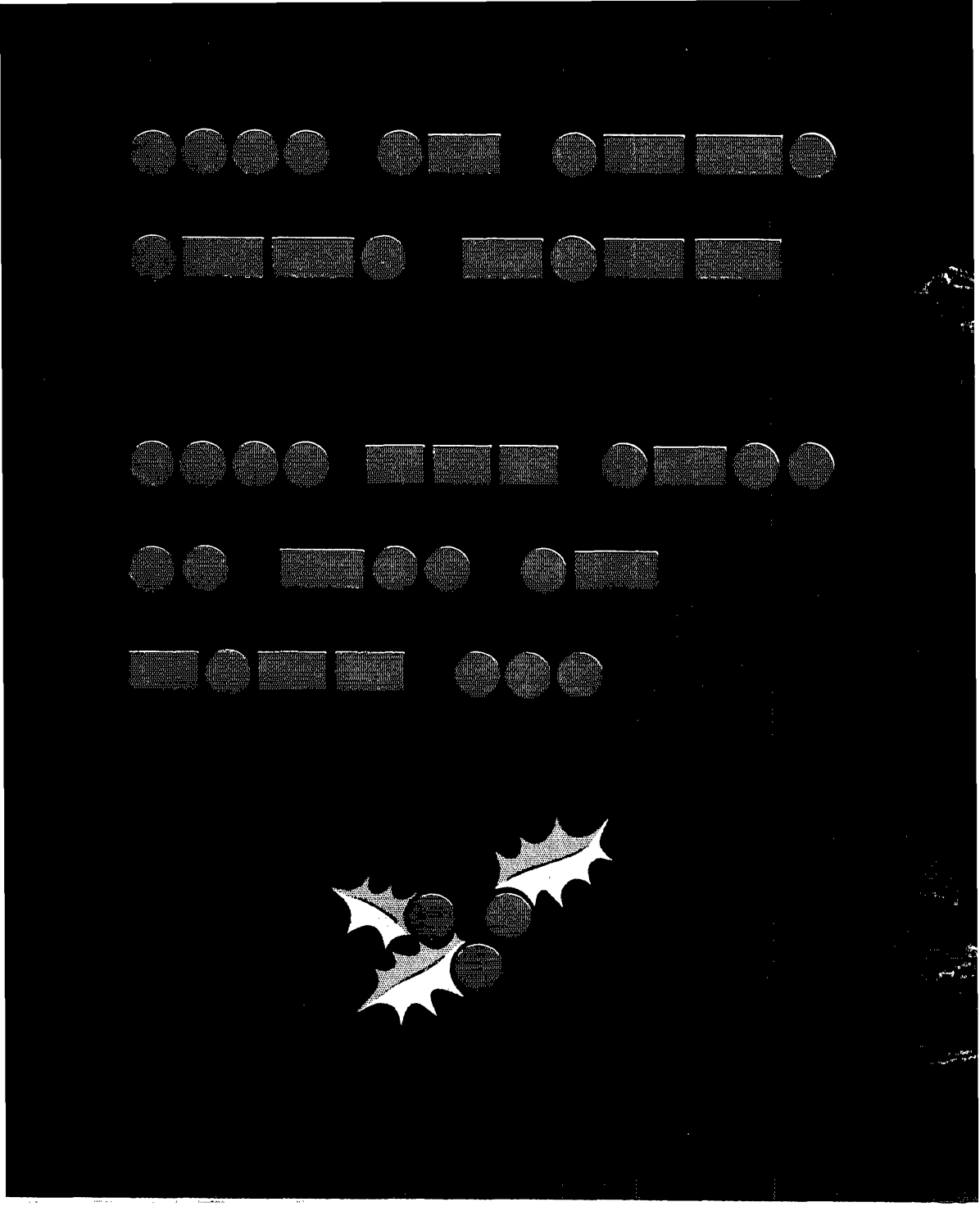

COLLINS

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OUR COVER

Puzzle: Find the transistors. But don't look too hard; the most interesting photo composition in W1YLB's transistorized (almost) transceiver features a vacuum tube! See page 11.

—CONTENTS—

Give SB-34 this Christmas

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OVS, OPS, OO and OBS. Technicians may be appointed OVS, OBS or V.H.F. PAM. Novices may be appointed OVS. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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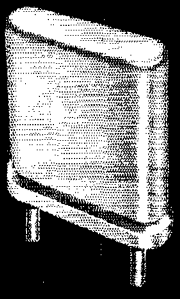

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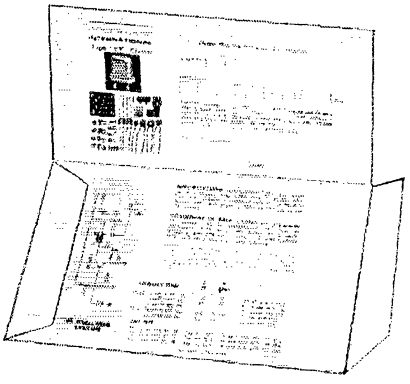

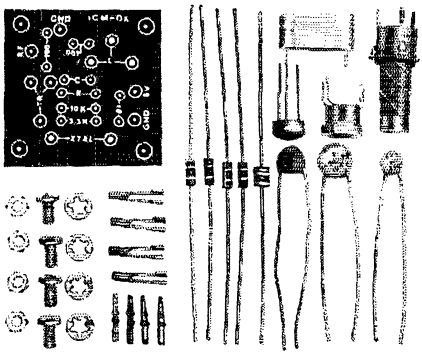

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is 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 prerequisite, although full voting membership is granted only to licensed amateurs.

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"It Seems to Us..."

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 sideband, 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 illustrates 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 regularly encounters hams with good ideas -- or long-smouldering complaints. He only wishes you folks would take the initiative 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 particularly 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 W1IKE 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."

Transceive 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 someplace" 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:

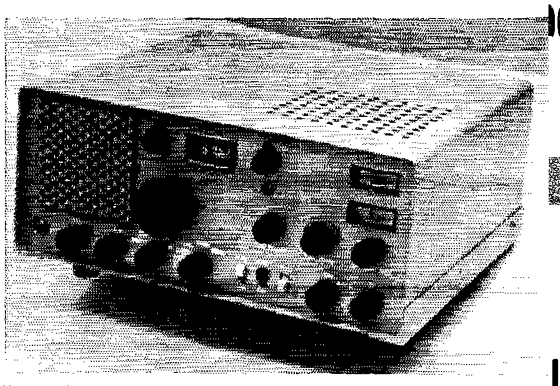
1. Compactness and portability for either fixed or mobile use.
2. Built-in a.c. or d.c. power supply.
3. Minimum battery drain when only receiving.
4. Operation on c.w., a.m., and s.s.b. (selectable sideband) with moderate output.
5. All-band (80 through 10) full frequency coverage.
6. Offset receiver 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-knob 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

* 43 Walnut St., Millis, Mass. 02054



"Almost" transistorized, in this case, means semiconductors everywhere but in the last two transmitter stages, where the r.f. power can be obtained more economically with tubes. The overall size, 11¾ by 5 by 10½ inches, and combination d.c./a.c. power supply make the transceiver useful either in the home station or the car.

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 oscillscope, 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 W6TEU[1] 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 Q_6 is fed into the balanced modulator, where the carrier is nulled out, and the sidebands are then fed through an amplifier

[1] Bigler, "A Sideband Package", *QST*, June, 1958. Also in *Single Sideband for the Radio Amateur*.

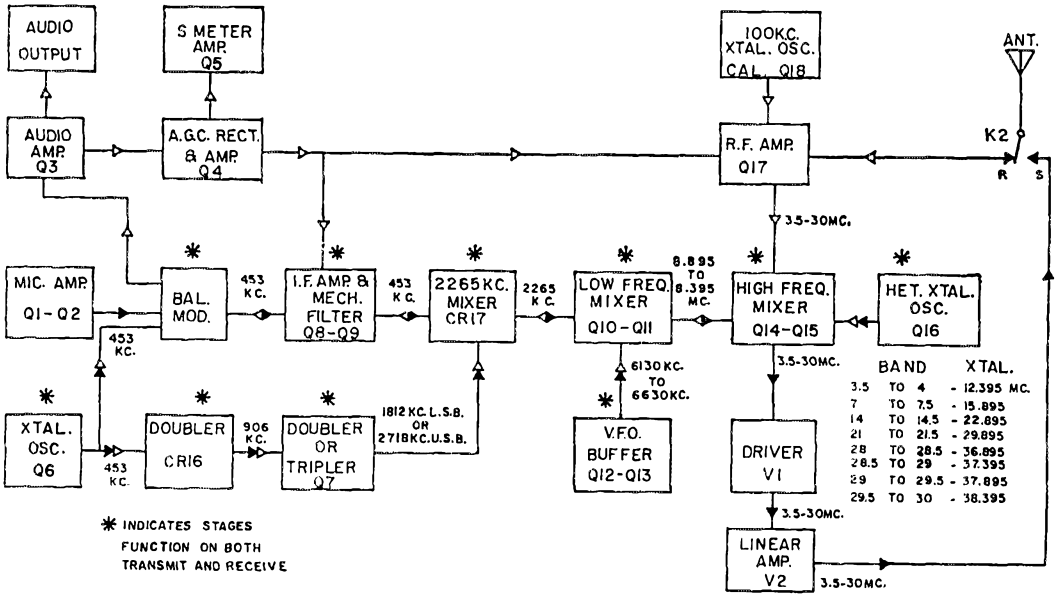


Fig. 1—Block diagram of the transceiver. Open arrowheads indicate direction of signal flow in receiving; solid arrowheads indicate direction in transmitting.

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 Q_7) to arrive at 1812 kc. for lower sideband or 2718 kc. for upper sideband. The selected frequency is mixed in CR_{17}, 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 sideband generator is fed into the low-frequency mixer stage, Q_{10}, which also receives the output of the v.f.o. The v.f.o. tunes a 500-kc. band from 6130 to 6630 kc. The resultant sum output of the low-frequency mixer is tunable from 8.395 to 8.895 Mc. This signal is then converted to the desired operating band in the following high-frequency mixer stage, Q_{14}, by the associated heterodyne crystal oscillator, Q_{16}. 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 29.6 Mc.

In the TRANSMIT mode the output from the high-frequency mixer, Q_{14}, is fed to the 12BY7 Class A driver and from there to the 6JB6 Class AB_1 final linear amplifier. In the RECEIVE mode the signal from the antenna is coupled into the r.f. amplifier stage, Q_{17}, 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, Q_3, and the audio output stages. At the same time, the audio output is gain-controlled by the a.g.c. amplifier, Q_4, which controls the gain of the r.f. amplifier, Q_{17}, and the 453-kc. amplifier, Q_9.

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 Q_6, Q_7, Q_{12}, Q_{13}, and Q_{16} operate continuously. Other stages are biased off as required.

Microphone Amplifier

The mike preamplifier, Q_1, and amplifier, Q_2, are conventional common-emitter amplifiers. Q_1 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-μf. bypass capacitor.

Balanced Modulator

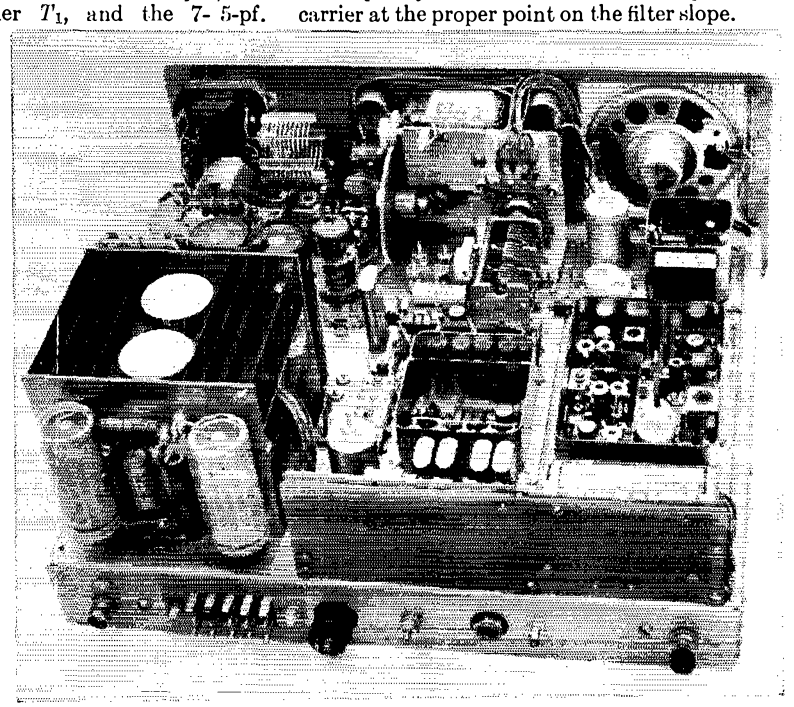
The diode ring-type balanced modulator, Fig. 2, provides approximately 35 db. of carrier suppression as measured with an r.f. probe and v.t.v.m. For TUNE/c.w. operation a small d.c. voltage is allowed to upset the balanced modulator through the CARRIER INSERT control, R_2, when the function switch, S_6, (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.c. 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-μf. capacitors. During c.w. operation the mike gain control should, of course, be fully counter-clockwise. Amplitude modulation is possible by setting the amount of carrier insertion to the safe AB_1 plate-dissipation operating point of the 6JB6 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_3. Adjustments to each alternately are necessary to obtain maximum carrier null.

Amplifier, Filter and Low-Frequency Mixer

The 453-kc. common-emitter amplifiers, Q_8 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 these 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_9.

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_8, 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 newer 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.



In the top-of-chassis layout the transmitting driver and final amplifier occupy the left-hand section between the power supply and panel. Audio, i.f., and v.f.o. circuits are along the right-hand edge; the mechanical filter is visible beyond the upper edge of the circuit board mounted vertically along the rear chassis edge. In the center section, the receiving r.f. amplifier and mixer components are alongside the three-gang tuning capacitor; the heterodyne oscillator and its crystals are in the foreground.

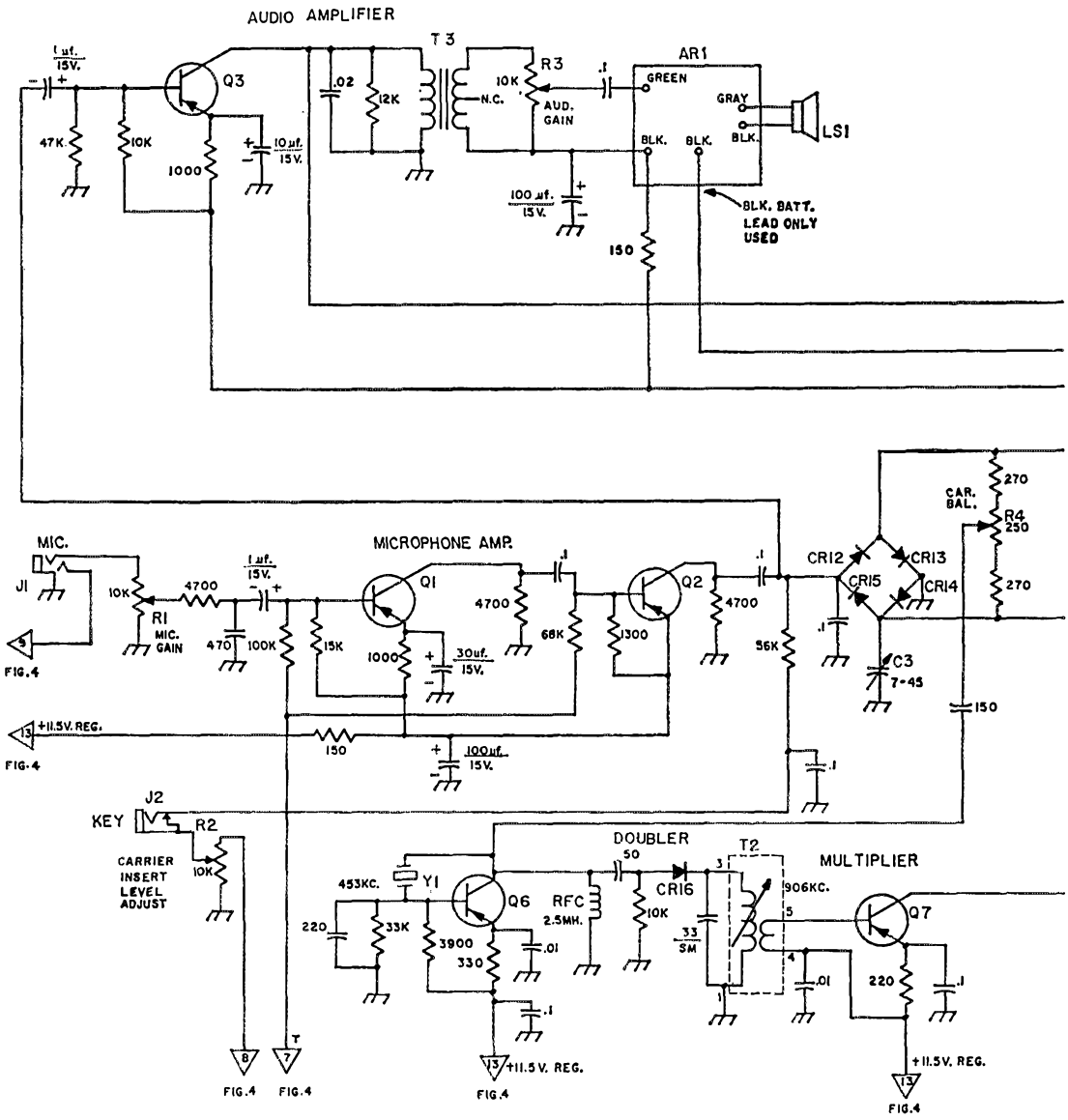
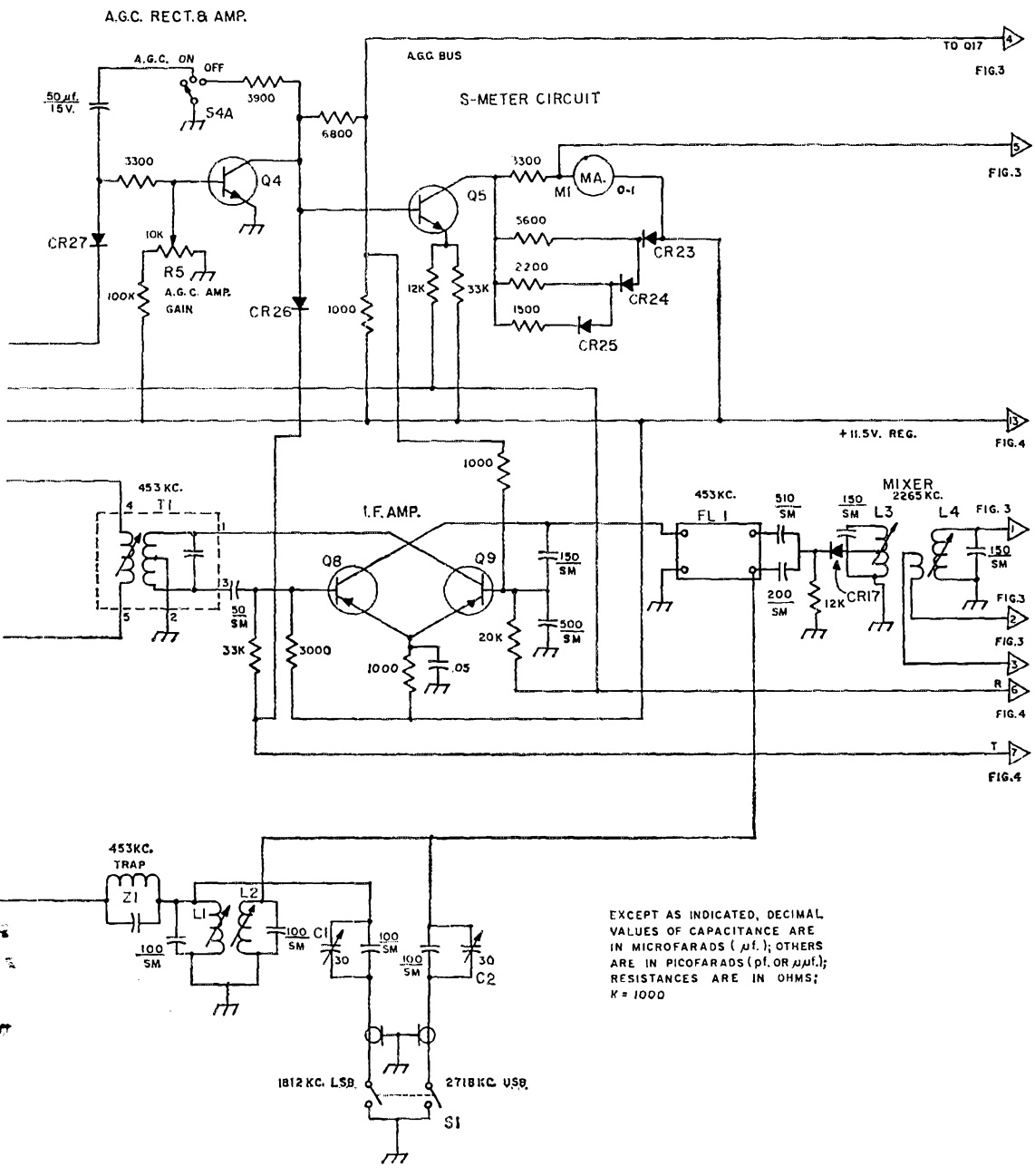


Fig. 2—Circuit of the sideband generator, audio amplifier, a.g.c. amplifier and S-meter amplifier. Unless otherwise specified, fixed resistors are ¼-watt composition; capacitors with polarity indicated are electrolytic, fixed capacitors are ceramic except those marked SM (silver mica).

AR1—100-mw. audio amplifier (Lafayette 99-9042; orange switch leads and red battery lead not used; assembly insulated from chassis.)
C_1, C_2—3-30-pf. mica trimmer (Arco 403 or equivalent).
C_3—7-45-pf. ceramic trimmer.
FL_1—455-kc. mechanical filter (Collins F455-C-31, 3.1 kc. bandwidth, used).
J_1—2-circuit phone jack.
J_2—Closed-circuit phone jack (must be insulated from chassis).
L_1-L_4, inc.—See Table I.
LS_1—3-inch speaker, 8-ohm voice coil.
M_1—0-1 milliammeter, edge mounting (Calrad EW2-S or equivalent).
R_1-R_5, inc.—Linear controls, ¼ or ½ watt composition.
S_1—D.p.s.t. slide switch.
S_4—See Fig. 4.
T_1—455-kc. transistor i.f. transformer (Miller 2042).
T_2—Transistor broadcast oscillator transformer padded to 900 kc. (Vidaire 455 OA or equivalent).



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

T_3—Transistor interstage audio transformer, 10,000 to 2000 ohms (Lafayette TR-96, center tap not used).
Y_1—453 kc. (Surplus FT-241A, Channel 45).
Z_1—Miniature 455-kc. i.f. transformer (see text).

DIODES AND TRANSISTORS

CR_{12}-CR_{15}, inc. CR_{27}—Germanium; 1N34A, 1N67A, 1N68, or similar, matched for forward resistance.
CR_{16}, CR_{17}—Germanium, see text
CR_{23}-CR_{26}, inc.—Silicon; 1N914, 1N484, 1N645, or similar.
Q_1, Q_3—2N508 (p-n-p).
Q_2—2N396 (p-n-p).
Q_4—2N697, 2N440A, 2N1893, 2N1613, HEP-50 (n-p-n).
Q_5—2N1613, 2N697, HEP-50 (n-p-n).
Q_6—2N396A, 2N425, 2N1305 (p-n-p).
Q_7, Q_8, Q_9—2N396A, 2N425, HEP-51, 2N1305 (p-n-p).

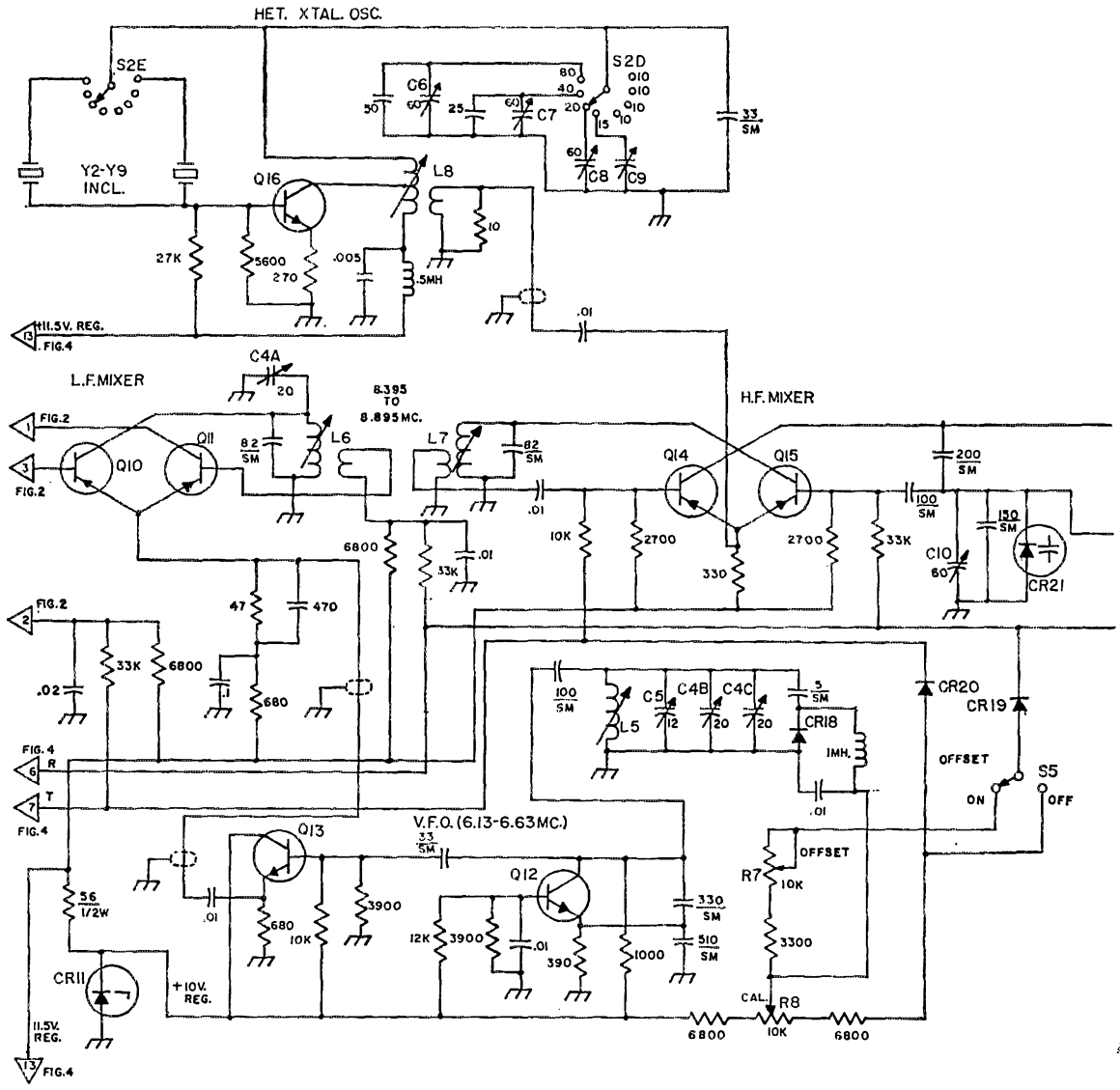


Fig. 3—Circuit of the low- and high-frequency mixers, heterodyne oscillator, v.f.o., driver and final amplifier, receiving r.f. amplifier and 100-kc. calibrator. Fixed capacitors marked SM are silver mica; others are ceramic. Unless otherwise indicated, fixed resistors are ¼-watt composition.

C_4—3-section variable; 6-20 pf. per section (Miller 1460).

C_5—NP0 ceramic trimmer, 3-12 pf. (Centralab 822-FZ or equivalent).

C_6, C_7, C_8, C_{10}—8-60 pf. mica trimmer (Arco 404 or equivalent).

C_9—2-20 pf. mica trimmer (Arco 402 or equivalent).

C_{11}—5-45 pf. air padder with rear shaft extension, ganged with R_8.

C_{12}—2-section superhet-type variable, 365 and 135 pf. (Lafayette 32G1101 or equivalent).

C_{13}—65-340 pf. mica trimmer (Arco 303 or equivalent) modified by adding ⅛-inch shaft for panel control.

C_{14}—1-8 pf. piston trimmer, plastic (Erie 532-000-8R or equivalent).

L_5-L_{23}, inc.—See Table I.

L_{24}—11 turns No. 16, air-wound, 1¼ in. dia., 8 turns per inch (B & W 3018 or equivalent).

L_{25}—14 turns No. 20, air-wound, 1 in. dia., 16 turns per inch, tapped 4th turn from ground end (B & W 3015 or equivalent).

M_2—0-1 milliammeter (Calrad EW-2 or equivalent); indicates 200 ma. full-scale in circuit shown.

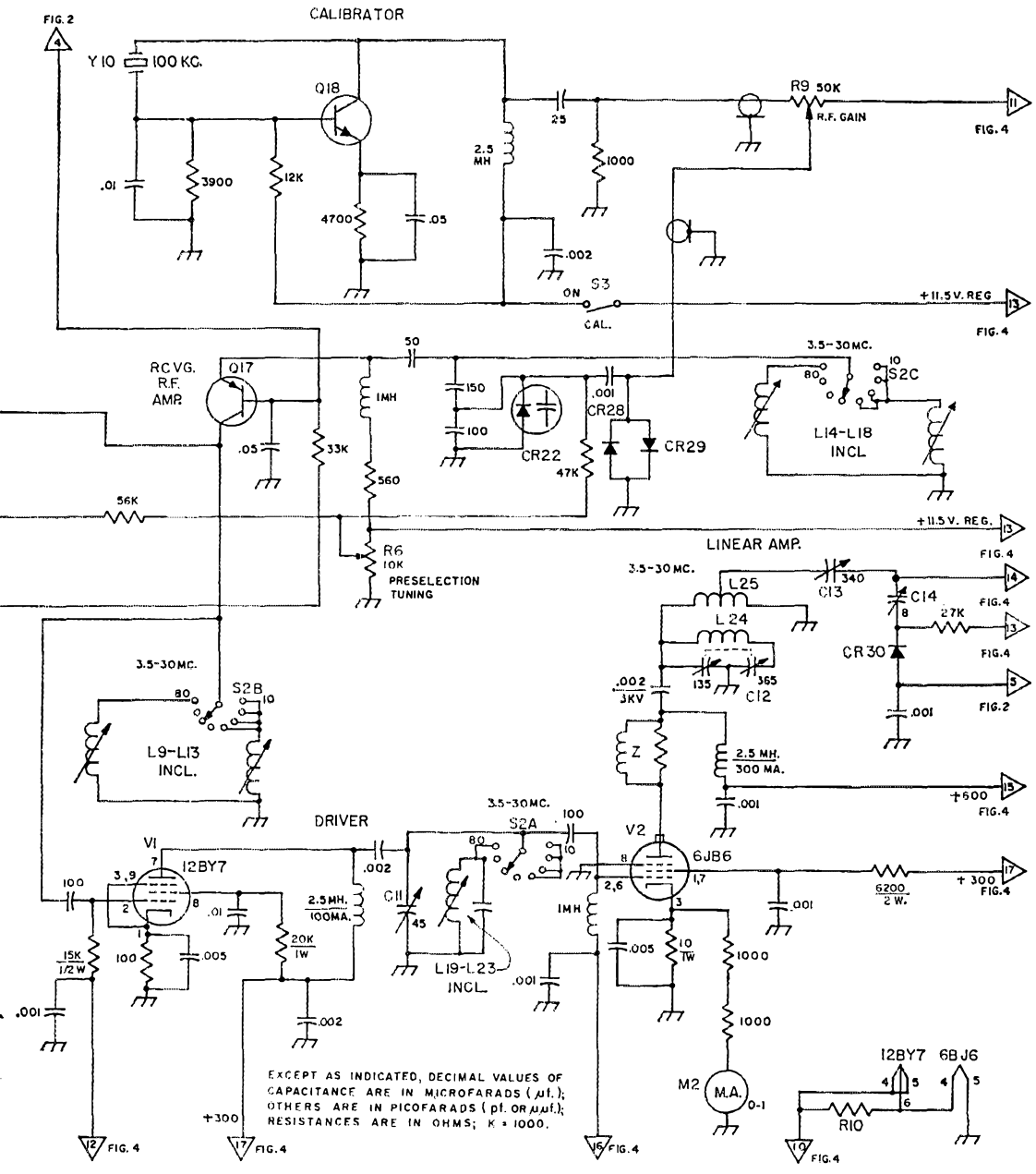
R_6-R_9, inc.—Linear-taper control, ¼ or ½ watt.

R_{10}—7.5 ohms, 10 watts, (TV ballast type, Hamilton-Hall FR-7.5).

S_2—Ceramic rotary, 5 sections, 1 pole per section, 11 positions (8 used) (Centralab PS-21 sections with indexes; see text).

S_3—S.p.s.t. slide switch.

S_5—S.p.d.t. slide switch.



Y_2-Y_9, inc.—See Fig. 1 for frequencies.
Y_{10}—100 kc.
Z—4 turns No. 16 spaced to occupy length of 100-ohm 2-watt composition resistor.

DIODES AND TRANSISTORS

CR_{11}—10-volt zener, ½ watt (1N758 or similar).
CR_{18}, CR_{28}-CR_{30}, inc.—Silicon (1N484, 1N645, or similar).
CR_{19}, CR_{20}—Silicon, matched forward resistances (1N434B, 1N484, 1N645 or similar).
CR_{21}, CR_{22}—Voltage-variable capacitor (1N955, TRW V47 or V947, or similar).
Q_{10}, Q_{11}, Q_{14}, Q_{15}, Q_{17}—PNP r.f. type (2N2905A, 2N2672, 2N1132, 2N711, HEP-51* or similar).
Q_{12}, Q_{13}—NPN, r.f. type (2N706, 2N708, 2N918 or similar).
Q_{16}, Q_{18}—NPN, r.f. type (2N708, 2N918, HEP-50 or similar).
* HEP-51 not optimum for Q_{17}.

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.

Coil	*Form Dia. in.*	*Wire Size*	*No. of Turns*	*Tap Turns*	*Shunt Cap. pf.*
L_1	3/16	33	75		
L_2	3/16	33	65		
L_3	3/16	33	80	45	
L_4	3/16	33	80	10-turn link	
L_5	3/8	26	25		
L_6, L_7	3/16	20	24	4-turn link	
L_8	1/4	24	10	7 2-turn link	
L_9	3/16	33	50		
L_{10}, L_{15}	3/16	26	26		
L_{11}	3/16	24	13		
L_{12}, L_{17}	3/16	24	8		
L_{13}, L_{18}	3/16	24	5		
L_{14}	3/16	33	55		
L_{16}	3/16	24	14		
L_{19}	1/4	26	40		150
L_{20}	1/4	26	22		100
L_{21}	1/4	22	14		75
L_{22}	1/4	22	12		50
L_{23}	1/4	22	17		22

A 453-kc. tuned trap (miniature 455-kc. transistor i.f. transformer), Z_1, is in series with the collector of Q_7 and coil L_1. Apparently a small amount of fundamental signal (453 kc.) from the crystal oscillator was not adequately rejected in the frequency-doubler transformer T_2 or by the higher-frequency tuned circuits L_1 and L_2. Prior to inserting the trap this 453-kc. 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, CR_{16}, and mixer diode, CR_{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 gemanium surplus.

The output (or input as may be the case) coil, L_6 (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_6 through a 500-kc. range.

Audio Circuits

Audio amplifier Q_3, 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-μf. 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-fi-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 CR_{27} 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-μf. capacitor. A.g.c. action reduces the gain of the r.f. amplifier, Q_{17}, and the 453-kc. 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_5. A.g.c. can be defeated completely by switch S_{4A}, which effectively shunts Q_4 and places the a.g.c. bus potential at approximately 9 volts.

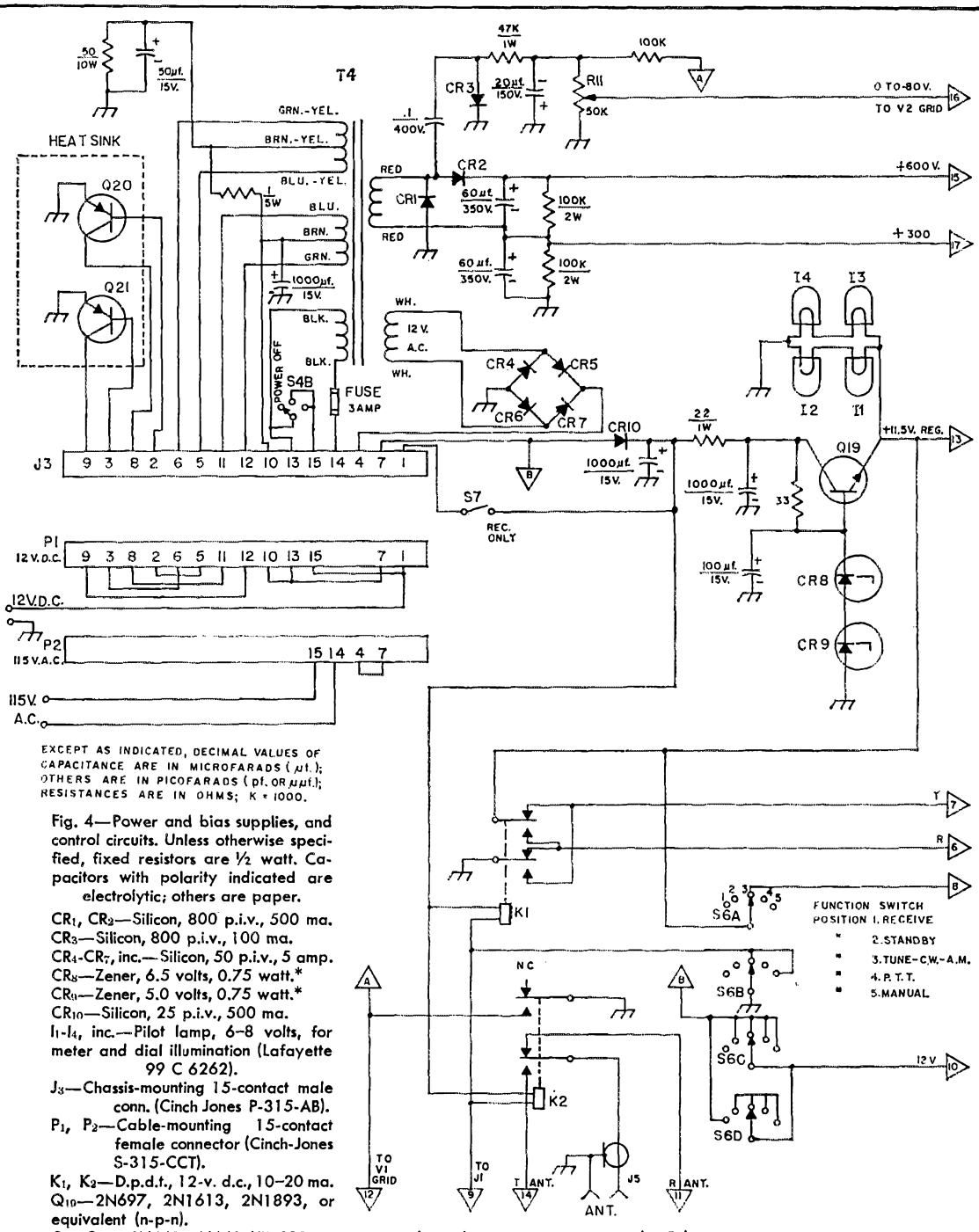
The S-meter circuitry is unusual in that it provides approximately logarithmic compression by nonlinear action. As the a.g.c. voltage applied to the base of Q_5 increases, the collector current decreases and the potential across each silicon diode (CR_{23}, CR_{24}, CR_{25}) rises, exceeding the conduction 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_{25} 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 S9 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_5 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_{26} 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 1¾ by 3-inch epoxy board. Q_{12}, Q_{13} and L_5 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 parallelled in order to make the v.f.o. cover from 6130 to 6630 kc.; the adjustments available by the slug in L_5 and trimmer capacitor C_5 enable the frequency range and tracking to be set.

The v.f.o. circuit incorporates dial-calibration and receiver-offset features. CR_{18} 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_8, initially sets the v.f.o. frequency to correspond with the dial (digital counter) reading. R_8 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_7, 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_7 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_{18} 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 —



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

Fig. 4—Power and bias supplies, and control circuits. Unless otherwise specified, fixed resistors are ½ watt. Capacitors with polarity indicated are electrolytic; others are paper.

CR_1, CR_2—Silicon, 800 p.i.v., 500 ma.
CR_3—Silicon, 800 p.i.v., 100 ma.
CR_4-CR_7, inc.—Silicon, 50 p.i.v., 5 amp.
CR_8—Zener, 6.5 volts, 0.75 watt.*
CR_9—Zener, 5.0 volts, 0.75 watt.*
CR_{10}—Silicon, 25 p.i.v., 500 ma.
I_1-I_4, inc.—Pilot lamp, 6–8 volts, for meter and dial illumination (Lafayette 99 C 6262).
J_3—Chassis-mounting 15-contact male conn. (Cinch Jones P-315-AB).
P_1, P_2—Cable-mounting 15-contact female connector (Cinch-Jones S-315-CCT).
K_1, K_2—D.p.d.t., 12-v. d.c., 10–20 ma.
Q_{19}—2N697, 2N1613, 2N1893, or equivalent (n-p-n).
Q_{20}, Q_{21}—2N441, 2N442, HEP231, or equivalent (p-n-p).
R_{11}—50,000-ohm linear control, ½ watt.
S_4—2-pole, 3-position rotary, 5-amp. contact rating (one section, S_{4a}, Fig. 2, is used for a.g.c. switching; S_{4b} is used for power switching. These functions are combined to conserve panel space.)
S_6—Miniature ceramic rotary, 2 sections, 2 poles per section, 5 positions, non-shorting (Centralab PS-111).
S_7—S.p.s.t. toggle (on R_3).
T_4—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.

* CR_8 and CR_9 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 500 counter reading from minimum mesh to full mesh of C_4. A circular direct-driven dial is much simpler and of course would not require any gearing. For information, with the gearing available the last gear 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, Q_{16}, to the emitters of the high-frequency mixers, Q_{14} and Q_{15}. Although a different crystal is used to cover each of the four segments of the 10-meter band, L_8 with 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, Q_{17}, and high-frequency mixer, Q_{15}, utilize a voltage-variable capacitor diode (CR_{21} and CR_{22}) 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, R_6. R_6 is ganged to the 12BY7 driver tank-circuit capacitor, C_{11}, and thus is used for single-control preselector tuning in RECEIVE and driver output tuning in TRANSMIT. Trimmer capacitor C_{10} in the base of Q_{15} is a padding adjustment for CR_{21} 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 Q_{14} is conducting, to provide some degree of low-level a.l.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

Q_{17} 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, CR_{28} and CR_{29}, 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 CR_{22}. 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 attentuated by this control. As Q_{17} 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.

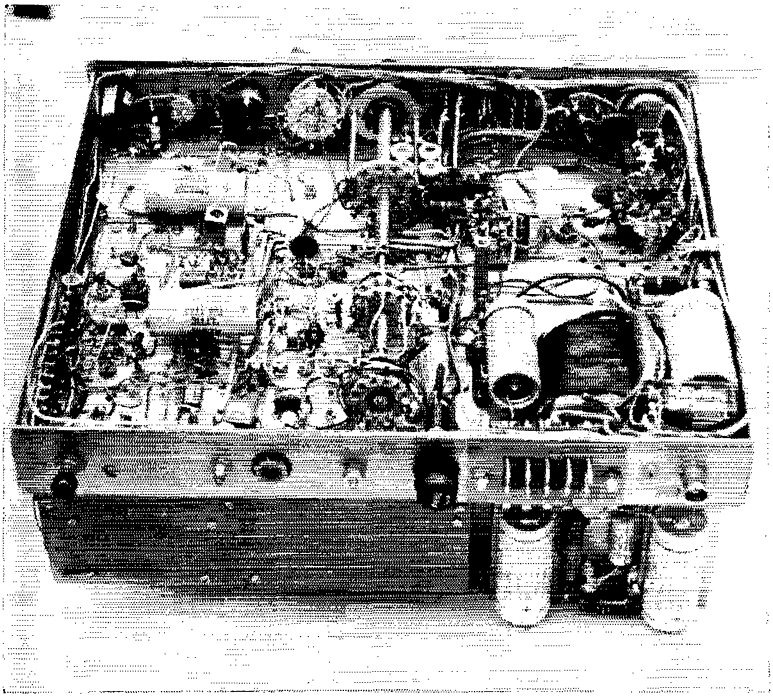
By tying one end of the r.f. gain-control pot, R_9, to the output of the 100-kc. crystal calibrator, variable-amplitude calibration injection is available. When the calibrator is turned on by S_3 and R_9 is rotated toward the calibrator end, signals coming from the antenna are attenuated. Eliminating 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 K_2 (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, L_{19} to L_{23}, 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 more than 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: L_{19} and L_{20}, 4700 ohms; L_{21}, 6800 ohms; L_{22} and L_{23}, 10,000 ohms; all ½ 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.

C_{13}, the output loading capacitor, is adjusted conventionally for loading the amplifier into the antenna.



The band switch extends along the center of the underside of the chassis. Wiring here is principally between the circuit boards that make up individual sections of the transceiver.

Relative power-output indication is obtained by rectifying a portion of the r.f. output by CR_{30} 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_{11} (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_{19}. 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_{10} 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_3, 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_{20} and Q_{21}) 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 6½ by 3-inch copper-clad epoxy board. Another copper-clad board, 8½ by 3½ 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, S-meter amplifier, d.c. regulator, and 100-kc. calibrator 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, S_2, 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 preselector, 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 birdies 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. QST

Grounds

How To Find A Ground For Your Equipment

Setting up your station for the first time? Here's an article that will tell you how to ground your equipment, why a ground is needed, and other pertinent information.

BY LEWIS G. McCOY,* W1ICP

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.

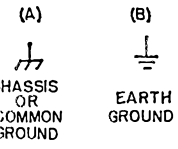


Fig. 1—The symbol at A is the one used to indicate a common or chassis ground. At B is the symbol indicating a connection to an earth ground.

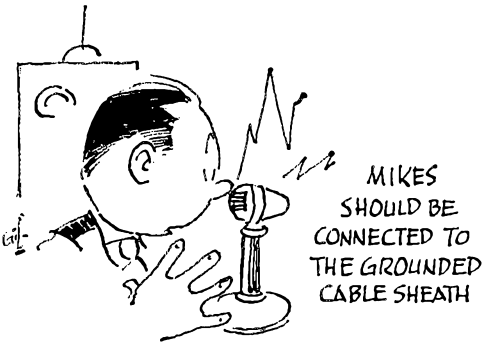
By having all the chassis in the station connected to ground, a component failure will cause the fuse in the faulty equipment to blow—assuming, of course, that the equipment was fused, and it *should* be.

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,

* Novice Editor.



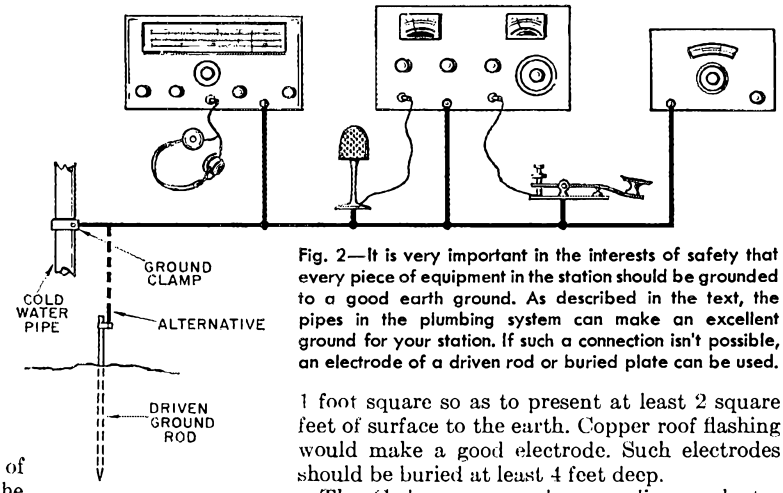


Fig. 2—It is very important in the interests of safety that every piece of equipment in the station should be grounded to a good earth ground. As described in the text, the pipes in the plumbing system can make an excellent ground for your station. If such a connection isn't possible, an electrode of a driven rod or buried plate can be used.

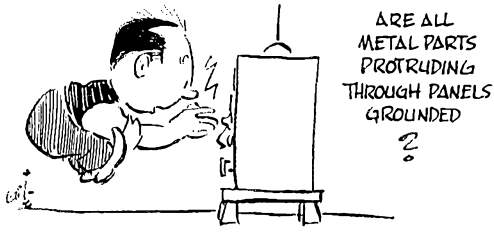
any fairly recent plumbing installation should be carefully checked. In the author's case, a deep well is used to supply water. All of the plumbing in the house is copper tubing, but where the well piping enters the house through the basement wall plastic tubing is used. And plastic "just ain't" a good 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 $\frac{5}{8}$-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 $\frac{3}{4}$ 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 $\frac{1}{4}$-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.

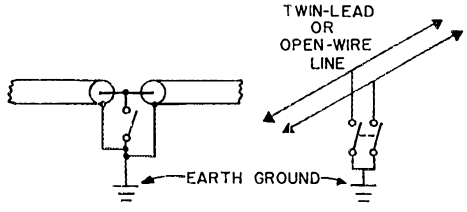


Fig. 3—Method of grounding either coaxial lines or parallel feeders for station lightning protection. T-style coax fittings are available and can be used for coax lines.

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 158)

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 $7.

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 Hallicrafter's SX-100.

Transistors Q_3 and Q_4 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 R_8 to the base of Q_2. With the key up, the emitter of Q_2 is held positive with respect to its base and no current flows in the collector circuit. At the same time, current flows through R_4 into the base of Q_5, 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 Q_5, and since no current is

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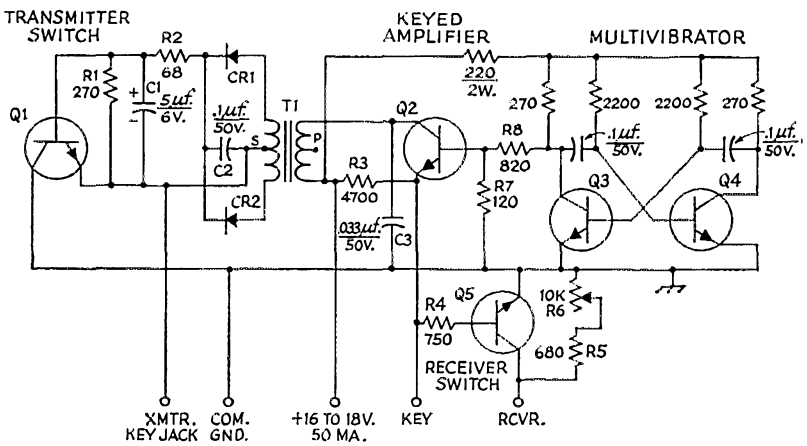

Fig. 1—Circuit of the relayless break-in keyer. Resistances are in ohms (K = 1000); except as indicated, fixed resistors are ½ watt. Except for C_1, which is electrolytic, capacitors are paper or mylar. Component numbers not listed below are for text reference.

CR_1, CR_2—Silicon, 50–100 p.r.v. (1N537, etc.).
Q_1, Q_2, Q_5—RCA 40264 (breakdown voltage 150).
Q_3, Q_4—A.f. transistor, 2N2270 or equivalent.
R_6—10,000-ohm control, linear taper.
T_1—Transistor output, 100 ohms c.t. to 10 ohms c.t., primary center tap not used (Stancor TA-2).

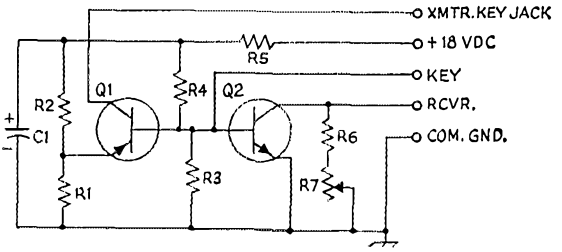

Fig. 2—A version using a p-n-p transistor to key the transmitter. The application of this circuit is limited at present by the availability of transistors having adequate voltage ratings for use at Q_1. Values given below are representative, but should be modified to suit transistors actually used. (Transistors used by the author were Q_1, 2N418 (Bendix) and Q_2, TR-23 (International Rectifier.)

C_1—22 μf., 35 volts.
R_1—50 ohms, ½ watt.
R_2—1000 ohms, 2 watts.
R_3, R_5—240 ohms, ½ watt.
R_4—2000 ohms, ½ watt.
R_6—470 ohms, ½ watt.
R_7—2500-ohm control, linear taper.

flowing through the base circuit the transistor opens. With Q_5 open the receiver cathode string runs to ground through R_5 and R_6. R_6 controls the sensitivity of the receiver when the key is down. Meanwhile, Q_2's emitter becomes grounded when the key is down, and the transistor acts as an amplifier for the output of the multivibrator. Transformer T_1 in the collector circuit of Q_2 steps the audio voltage down and operates into a full-wave rectifier consisting of CR_1 and CR_2. This transformer is used to isolate the base-emitter circuit of Q_1 from ground. Capacitor C_3 helps to change the square wave into something more like a sine wave. C_1, C_2, R_1 and R_2 make up a network which produces a filtered d.c. input for controlling Q_1, but which has a short-enough time constant so that keying is not affected. With Q_1'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 Q_5 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 T_1 is to isolate the base and emitter of Q_1 from ground; this is necessary because Q_1 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, Q_2 has the same function as Q_5 in Fig. 1. With the key open, forward bias is applied to Q_2's base through R_3R_4, causing the transistor to saturate and grounding the receiver cathodes. At the same time, R_1R_2 maintains the emitter of Q_1 at a slightly more negative voltage than that at its base, and Q_1 is nonconducting. When the key is closed, Q_1 conducts and keys the transmitter, while Q_2 is cut off and the receiver gain is controlled by R_6R_7.

In using this circuit the important thing to remember is to adjust the voltage divider R_3R_4 so that Q_2 will keep going without burning up its base, and to keep Q_1 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.

QST

Stepping Up TR Switch Performance

Modification of a Manufactured Unit

BY ROBERT M. MYERS,* W3HGN/W2CUT

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 overcame 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 will (with current equipment) be the same in most applications. — *Editor.*

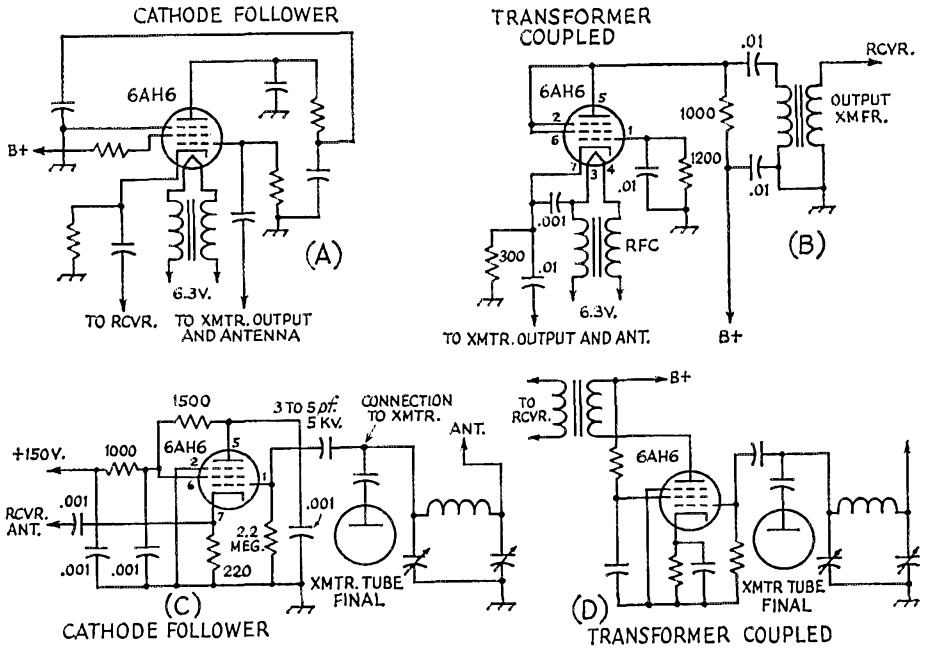


Fig. 1 — Elementary TR switch circuits.

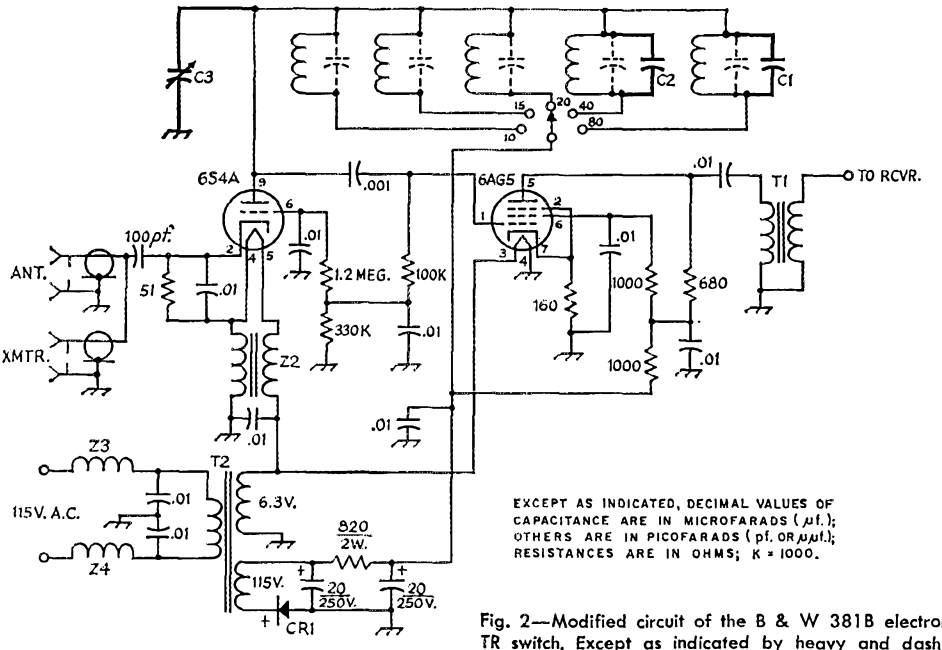


Fig. 2—Modified circuit of the B & W 381B electronic TR switch. Except as indicated by heavy and dashed lines, the circuit and values are the same as in the original equipment.

C_1—56-pf. mica.
C_2—43-pf. mica.
C_3—50-pf. midget variable (Hammarlund MAPC50B or equivalent).

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[2]).

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 (C_3) 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 Z_3 and Z_4 (a.c. line filter coils).

4) Solder a heavy bus bar from the stator connection on C_3 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 C_3 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 C_1 (56-pf. mica) across the 80-meter coil, and connect C_2 (43-pf. mica) across the 40-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

[2] 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 reconnected to Pin 9 of the 6S4A. The lead from the center arm of the band switch to Pin 9 of the 6S4A must be disconnected from Pin 9 and connected to B+.

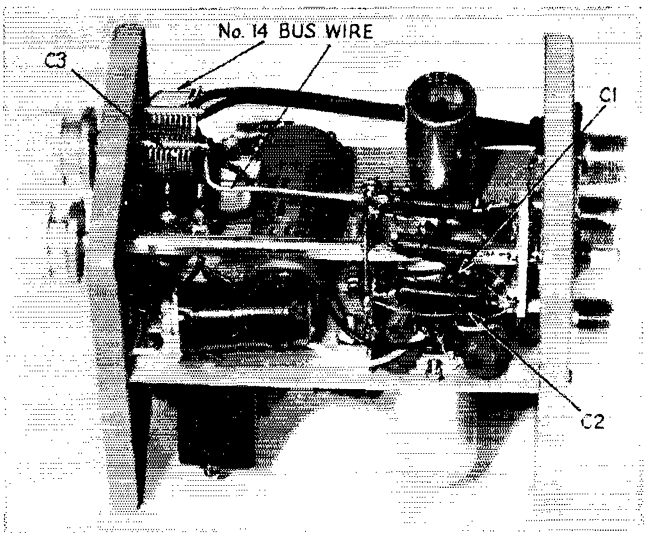


Fig. 3—The added variable capacitor is mounted on the panel alongside the band-switch control. Adjustment of the capacitor peaks the switch tube's plate tuning for maximum signal strength at any amateur-band frequency in the 3.5-30-Mc. range.

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 important when using an expensive tube in the final amplifier).

Another advantage is the increase in overall receiver gain; however, a really good communications 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, W5IGJ, for his original idea and correspondence, without which this article would not have been possible. QST

Strays

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 is your chance to make amateur radio your career.

Duties include composing answers to regulatory, legal and general radio questions received in letters from members; conducting tours of headquarters for visitors, doing promotion and publicity work; handling international correspondence 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.

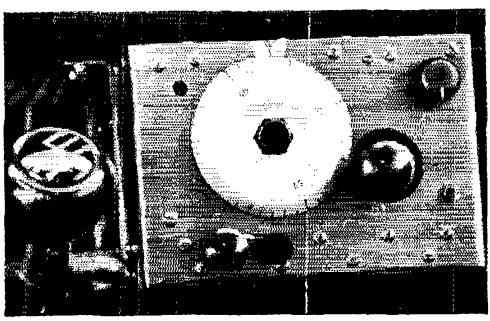
Because there is little parallel outside the League to this position, we'll have to train our man on the job. Thus we are especially interested in a young man, perhaps in the mid-twenties. Candidates for the post should write to Box A, ARRL, Newington, Conn. 06111, outlining their education, prior employment, 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_{15}, 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_{12}, 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 b.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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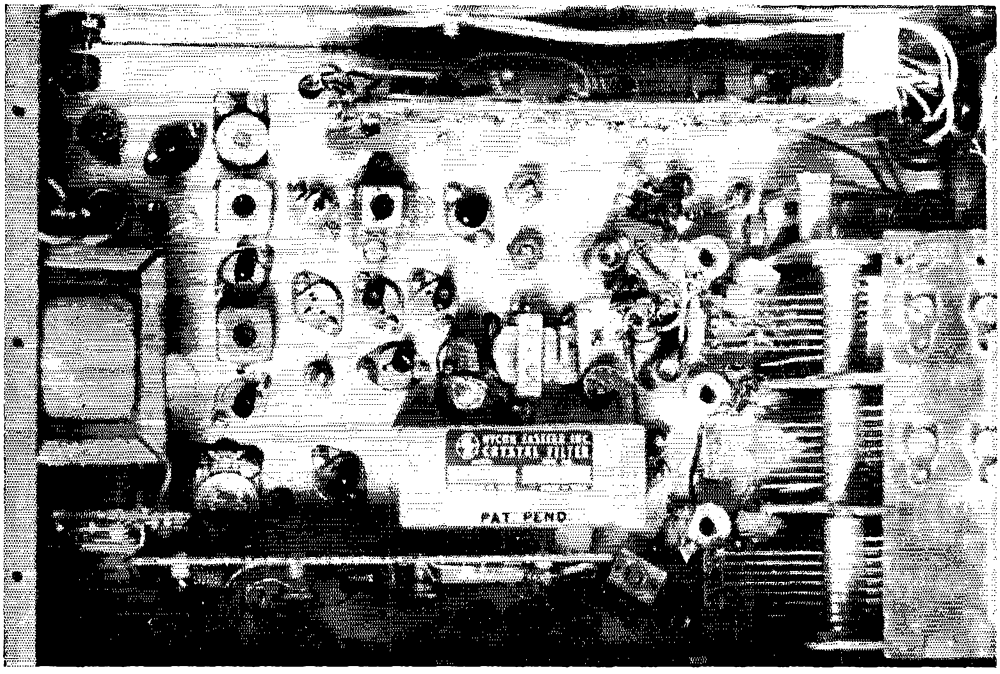


Interior of the 50-Mc. receiver. The 3-gang tuning capacitor, actually at the front of the receiver, is in the right edge of the picture. The circuit board at the lower left carries the bandpass filter circuits. The 10.7-Mc. i.f. and filter circuits are near the center, with the 455-kc. i.f. components in the left center. The circuit board at the upper right has the first audio and squelch components.

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_{EBO}, 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_{12}, 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-kc. 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 11.155-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_{10} out of its socket). Feed a tone of around 1000 cycles to the input of the audio a.g.c. amplifier, Q_{13}, 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

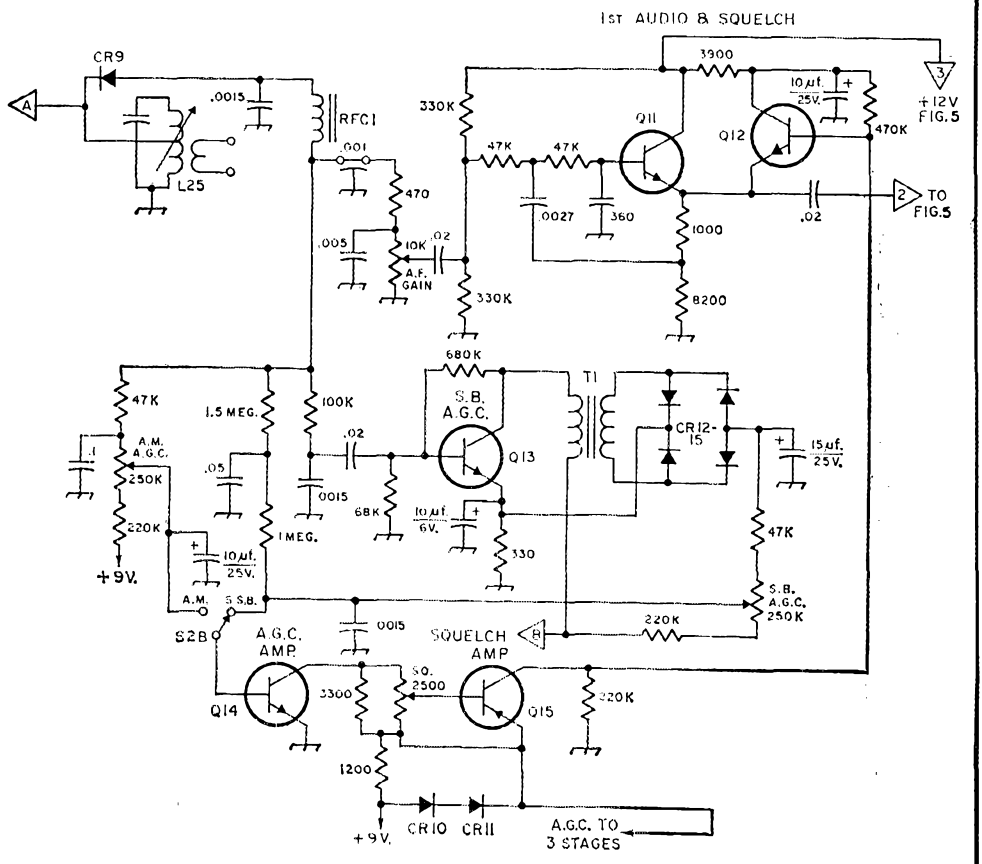


Fig. 4—Schematic diagram and parts information for the detector, audio, and a.g.c. circuits of the 50-Mc. transistor receiver. Points A and B run to Fig. 3, Part I.

CR_9—1N60, 1N295 or 1N805.
CR_{10}–CR_{15} incl.—1N914 or 1N4002.
L_{25}—Miniature i.f. transformer, 455 kc. Secondary not used. (Miller 2031)
Q_{11}, Q_{12}, Q_{13}, Q_{14}—2N2925.
Q_{15}—2N3638 or 2N4122.
RFC_1—3.3-mh r.f. choke.
S_2—D.p.d.t. switch, also used in Fig. 3 (Alco MST205N).
T_1—Miniature driver transformer, 10,000 to 2000 ohms (Lafayette 99R6124).

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 S.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

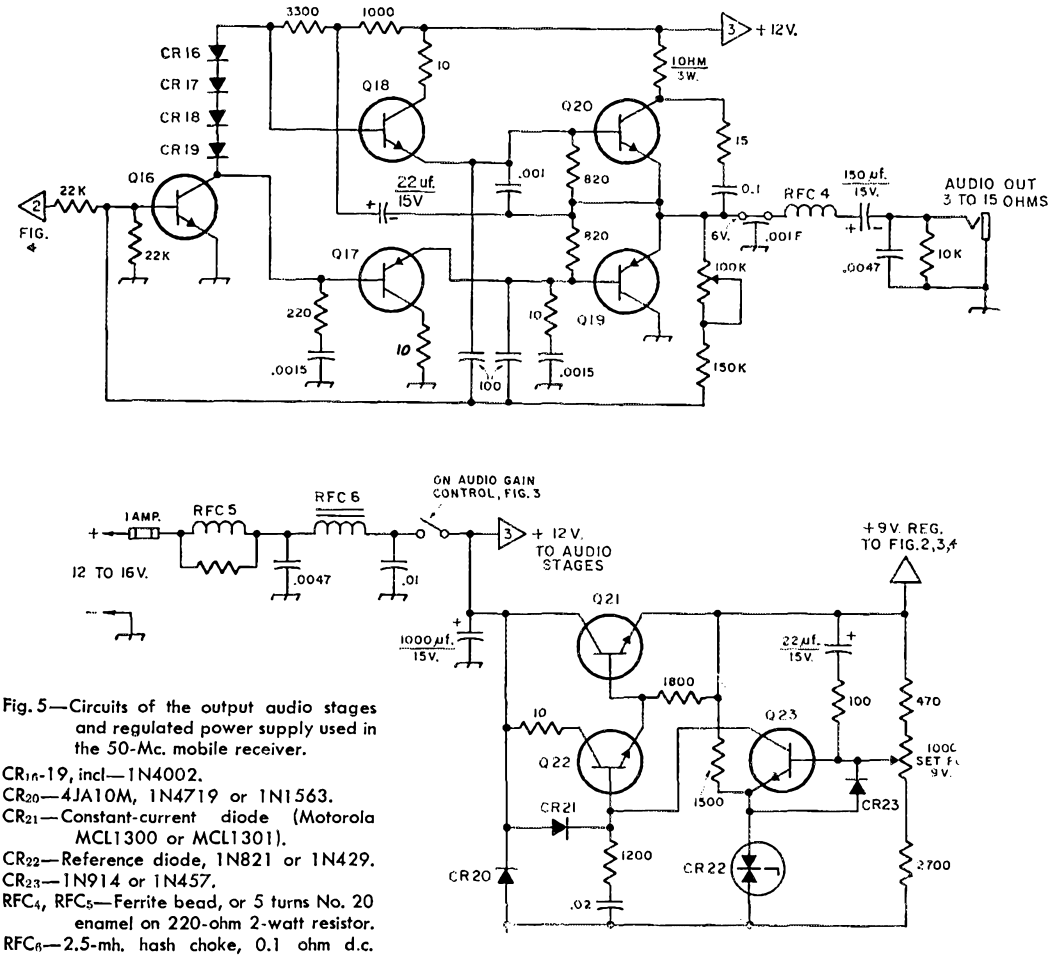


Fig. 5—Circuits of the output audio stages and regulated power supply used in the 50-Mc. mobile receiver.

CR_{16}-19, incl—1N4002.
CR_{20}—4JA10M, 1N4719 or 1N1563.
CR_{21}—Constant-current diode (Motorola MCL1300 or MCL1301).
CR_{22}—Reference diode, 1N821 or 1N429.
CR_{23}—1N914 or 1N457.
RFC_4, RFC_5—Ferrite bead, or 5 turns No. 20 enamel on 220-ohm 2-watt resistor.
RFC_6—2.5-mh. hash choke, 0.1 ohm d.c. resistance, or Stancor TC-1 or Thordarson TR-153.
Q_{16}—2N2925 or 2N910.
Q_{17}—273638 or 271132.
Q_{18}—2N3642 or 2N697.
Q_{19}—2N3741.
Q_{20}—2N3766.
Q_{21}—40310 or 2N3766, mounted to chassis with mica washer.
Q_{22}—2N2714 or 2N706.
Q_{23}—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 29.3 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 Q_1.

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 .88, 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 i.f. with u.h.f. converters. It is helpful to be able to tune an i.f. 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. QST

Rejecting Interference from Broadcast Stations

Interference from strong signals in the broadcast band 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.

Filters and Traps for the Ham Receiver

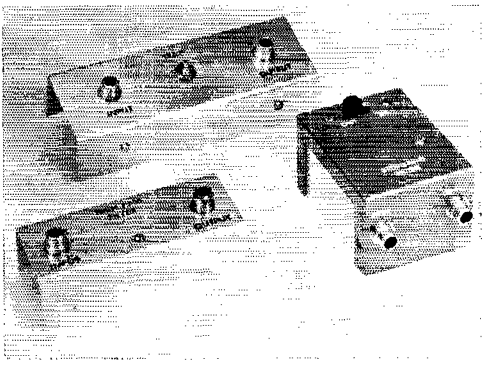
BY DOUG DEMAW,* W1CER

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 accomodate 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.

* Assistant Technical Editor.



A top view of the filters. The high-pass and series-trap filters are at the left and are constructed in open channels. Better isolation would result if the channels were completely enclosed. A Minibox is used for an enclosure to house the stopband filter at the right.

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 fre-

[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.

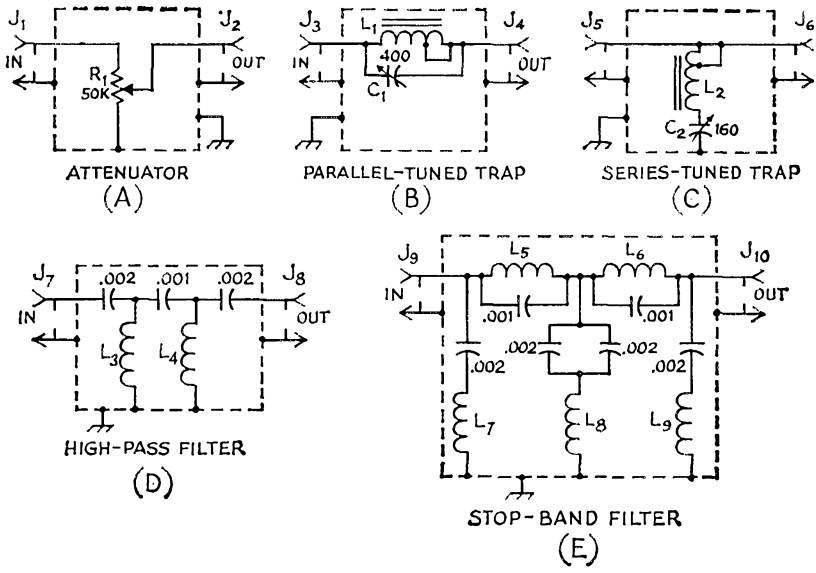


Fig. 1—Schematic diagrams of the traps and filters. Variable capacitors are rated in pf. All others are disk or tubular ceramic and are rated in μf. Resistance is in ohms; K = 1000. Inductors L_1 and L_2 are ferrite-bar broadcast radio antennas, providing excellent Q for optimum rejection with the traps. The taps on L_1 and L_2 are shorted to the end of the winding nearest to them as shown at B and C.

C_1—50 to 400-pf. adjustable padder (Miller 160-B suitable).
C_2—10 to 160-pf. adjustable padder (Miller 160-D suitable).
J_1-J_{10}, inc.—Phono jack.
L_1—240-μh. ferrite-strip antenna (Miller 2004 suitable).
L_2—700-μh. ferrite-strip antenna (Miller 2005 suitable.)
L_3, L_4—3.3 μh. (Miller 70F336A1 suitable).
L_5, L_6—33 μh. (Miller 70F335A1 suitable).
L_7, L_9—10 μh. (Miller 70F105A1 suitable).
L_8—4.7 μh. (Miller 70F476A1 suitable).
R_1—50,000-ohm audio-taper control.

quency 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 W1INF, the ARRL Hq. 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 doublet 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 front-end 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. 1 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 (*fco*) of the filter, the greater the rejection. For this reason, a high-pass filter designed to reject the 550-to 1650-kc. 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 radiobeacon 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 i.f. channel (some l.f. stations operate on or near the common i.f.s of receivers — 455 kc., 465 kc., 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-E. 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 1600-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 W1INF, 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 many 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

[2] *The Radio Amateur's Handbook*, Filters, Chapter 2.

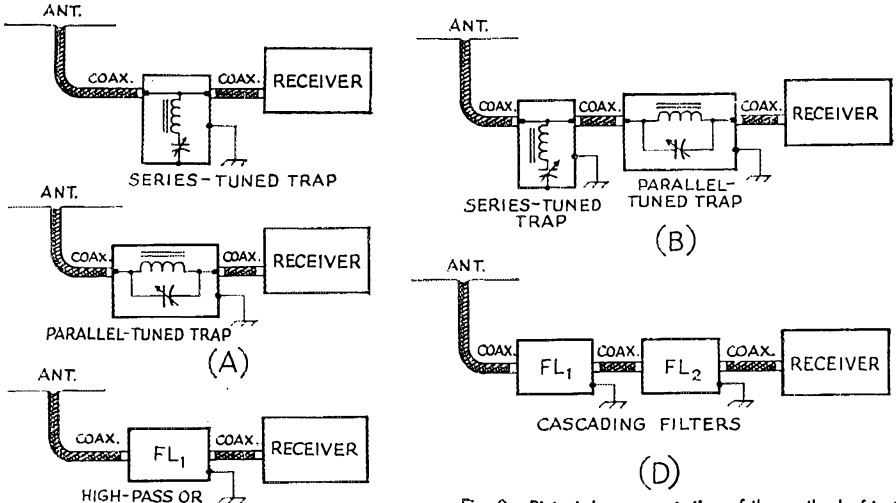
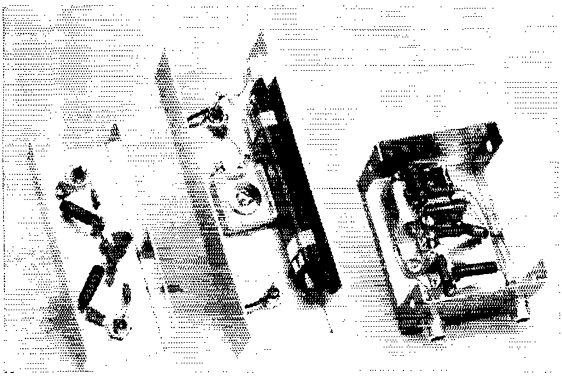


Fig. 2 — Pictorial representation of the method of installing the traps and filters. For best results, an earth ground should be used on the trap or filter and on the cabinet and chassis of the receiver.



Bottom view of the filters. Shown left to right: High-pass filter; series-trap filter; stopband filter.

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 $3\frac{1}{4} \times 2\frac{1}{8} \times 1\frac{5}{8}$ inch Minibox. To lessen cost and to make the units as small as possible, phono 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 the builder's area.

Better attenuation characteristics could be realized when using the filters of Fig. 1D and 1E if the inductors were of a very high-Q variety. Pot-core 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. QST

The Antenna Noise Bridge

Wide-band Noise as a Signal Source

BY R. T. HART,* W5QJR

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.

The circuit described in this article is used in the Model TE-7-01 Antenna Noise Bridge made by Omega-T Systems, Inc. When we first saw a sample of the bridge we were so taken by the concept that we asked its designer to prepare a technical article for QST, *believing that the underlying idea was one amateurs should know about. Although the production device uses some components that won't be found at the corner store, the ingenious ham builder probably won't be stymied.*

The basic principle — use of a wide-band signal source and a selective detector — obviously can be applied to other r.f. bridge measurements.

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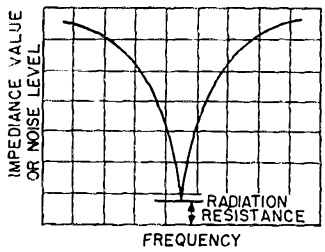


Fig. 1—Typical variation of antenna impedance vs. frequency. The curve also represents relative noise response when the antenna noise bridge is used for determining resonant frequency and radiation resistance.

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.

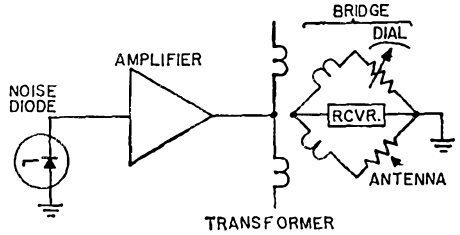


Fig. 2—Functional diagram of the antenna noise bridge.

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 CR_1 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 S9, 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

[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. — *Editor.*

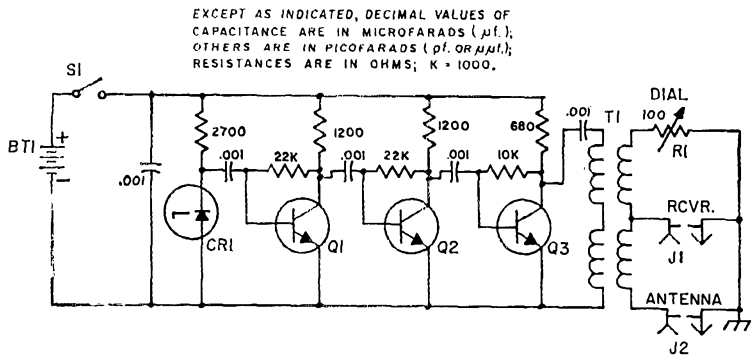
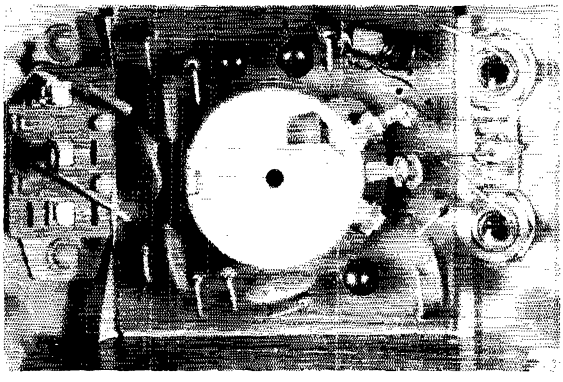


Fig. 3—Schematic diagram of the antenna noise bridge. Capacitors are disk ceramic; fixed resistors are ½-watt composition.

BT_1—9-volt battery.
CR_1—Zener diode (Hoffman HW6.8A).
J_1, J_2—Shielded connectors (phono jack or coaxial).
Q_1, Q_2, Q_3—2N3563 (Fairchild).
R_1—100-ohm composition control.
S_1—S.p.s.t. slide switch.
T_1—4 quadrifilar turns No. 28 enam. (see text) on ⅜-inch o.d. ferrite core (Indiana General type CF102Q2 core).

ferrite toroid core chosen for T_1 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, R_1, 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 etched board on which the noise generator, amplifier, and bridge are mounted is little larger than the standard-size volume-control-type variable resistor. This whole assembly fastens to the front of the plastic container in the manufactured unit.

The unit was designed for 50-ohm coax systems. Increasing the resistance of the potentiometer to accommodate 300-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. QST

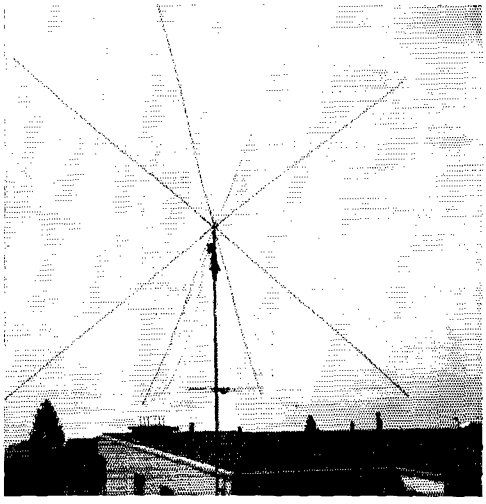
[2] For resistors in the 50-ohm region this inductance is principally in the leads. If the lead length can be made negligible (mounting the resistor in a coaxial plug is one method) the resistance is essentially "pure" up to 100 Mc. or so. The errors become greater with large or small values of resistance. — *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



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.

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 eyes 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.

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.

* Rhynerstrasse 8712, Staefa, Switzerland.

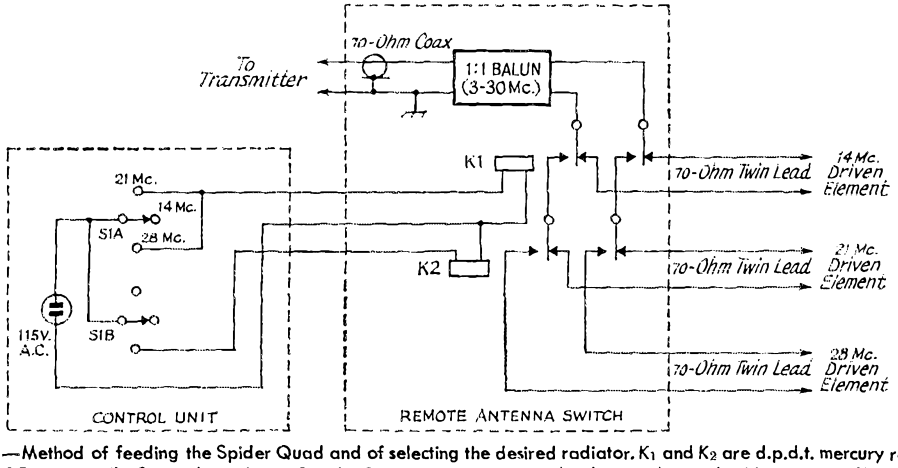


Fig. 1—Method of feeding the Spider Quad and of selecting the desired radiator. K_1 and K_2 are d.p.d.t. mercury relays with 115-v. a.c. coils. S_1 can be either a 2-pole, 3-position rotary or a d.p.d.t. toggle switch with a center-off position.

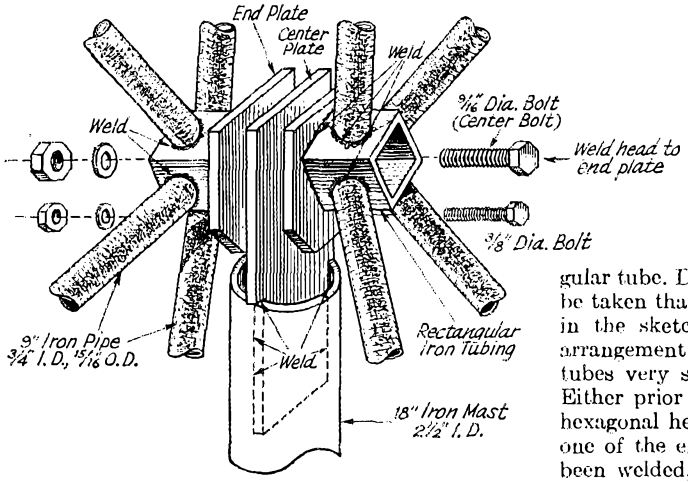


Fig. 2—Sketch showing the heart of the Spider Quad. Once the various pipes, plates and tubes have been welded, they are cleaned and hot-dipped galvanized.

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

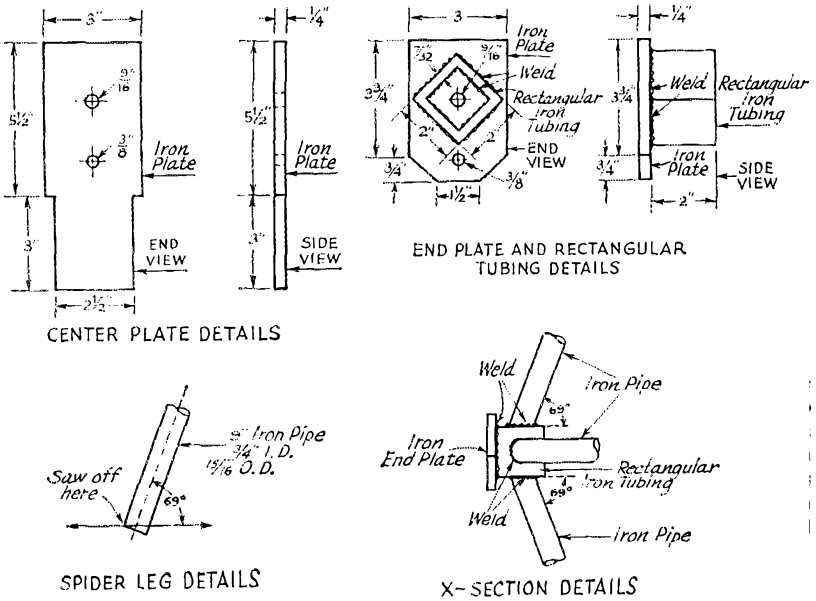
Details of the central portion of the quad are given in Figs. 2 and 3. The plates, tubes and pipes that form this part of the antenna are made entirely of iron. Construction is started by welding the center plate to an 18-inch length of pipe. Then a 2-inch length of rectangular tubing is welded to each end plate. Next, after eight 9-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.[1]

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

[1] The addresses of outfits that do hot-dip galvanizing can be found in the yellow pages of the telephone directory. — *Editor.*

Fig. 3—Details of the various iron pieces that make up the center portion of the quad. As long as the resulting antenna is sturdy, plates and tubing of different sizes than shown can be used.



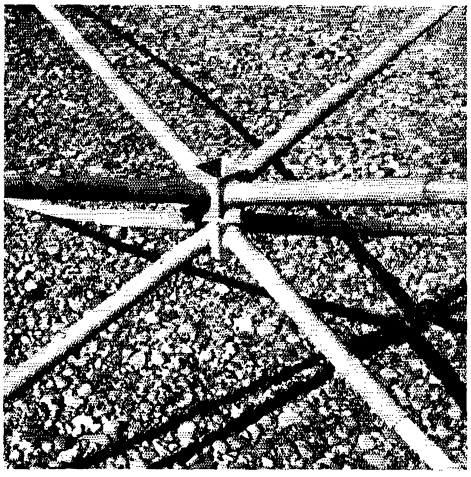


Fig. 4—A closeup of the heart of the antenna with the center plate and mast removed. A single nut and bolt secures each fiber glass rod to one of the eight pipes shown.

14-Mc. stub can be 48 inches, the 21-Mc. stub 36 inches, and the 28-Mc. stub 24 inches. Once the stubs have been adjusted, the excess length can be trimmed off.

Before the wiring is begun, each X section is placed on top of a support that lets the fiber glass rods extend freely and in a straight line toward the ground. Then three short rings of plastic tubing are pushed over each fiber glass rod. The approximate position of each ring (in respect to the center of the X section) and the element lengths are given in Fig. 5. No. 14 or 16 copper wire is used to string the antenna. As shown in Fig. 6, the antenna wire is looped 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.

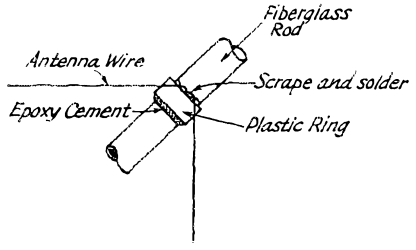
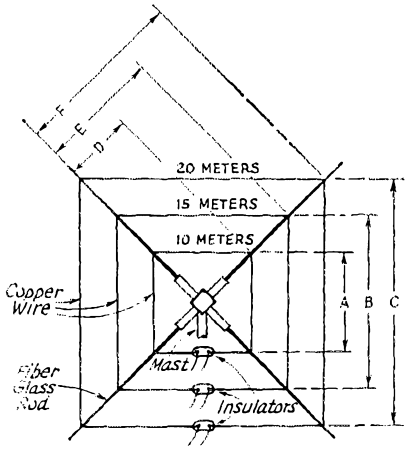


Fig. 6—Method of fastening the antenna wire to the fiber glass rods.



	A	B	C	D	E	F
RAD.	8' 7"	11' 8"	17' 7"	6' 3"	9' 6"	13' 5"
REF.	9' 0"	12' 3"	18' 5"	6' 3"	9' 6"	13' 5"

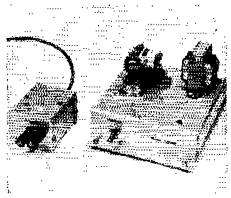
Fig. 5—Element dimensions and insulator placement for the Spider Quad. The figures in columns D, E and F are only approximate.

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 an 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 S-meter reading on the station receiver. QST

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 × 6 × 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.

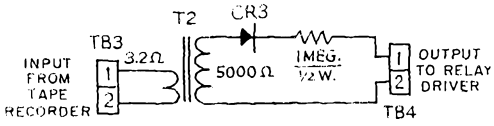


Fig. 1—Adapter for use with tape-recorded code.
CR_3—200 p.r.v., 100 ma. or more.
T_2—5000 to 3.2 ohm universal output trans.
TB_3, TB_4—Same as TB_1, Fig. 1.

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 2¾ × 2⅛ × 1⅝-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.

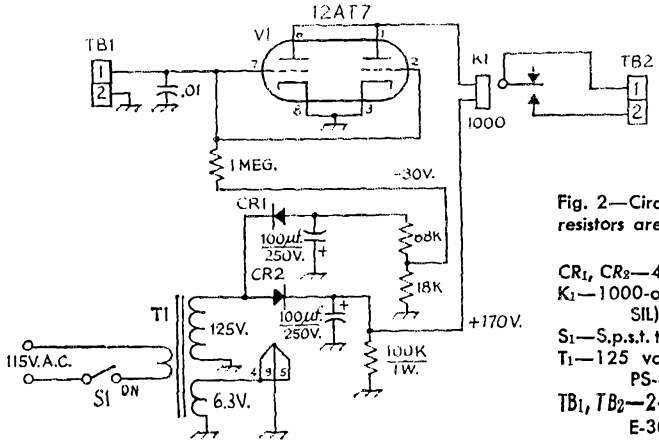


Fig. 2—Circuit of the relay driver. Except as indicated, resistors are ½ watt; capacitors with polarity indicated are electrolytic.
CR_1, CR_2—400 p.r.v., 100 ma. or more.
K_1—1000-ohm relay, s.p.s.t. contacts (Sigma 41F 1000S-SIL)
S_1—S.p.s.t. toggle
T_1—125 volts, 15 ma.; 6.3 volts, 0.6 amp. (Stancor PS-8415)
TB_1, TB_2—2-lug terminal strip (two Millen E-302 or one E-304)

*39C Salmon Brook Drive, Glastonbury, Conn. 06033.

Hints and Kinks For the Experimenter

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. Mayne, WA8KRH*

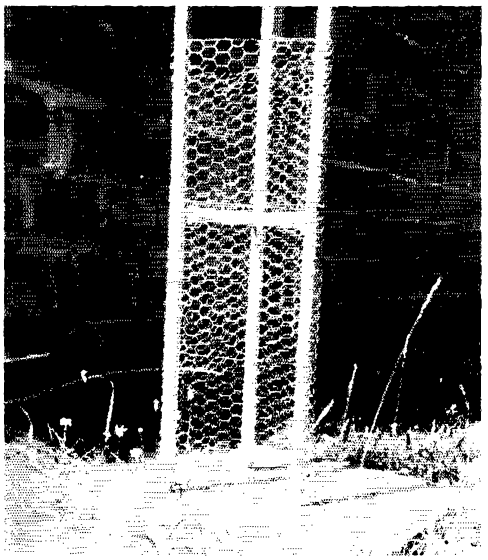


Fig. 1—Screening used to keep small children from climbing an antenna tower.

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-PTT-XMT and rewiring S_{14} 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, R_8, to the MIC GAIN on-off switch, S_{14}.

2) Disconnect the white wire with orange and green tracers from the CAL contact of the FUNCTION switch, S_{11}, and connect it to the free lug of S_{14}.

3) Disconnect the white wire with black tracer from the NB contact of S_{11} and tuck it back out of the way. If the noise blanker is installed, ground the wire.

4) Connect two shielded wires to S_{11} 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

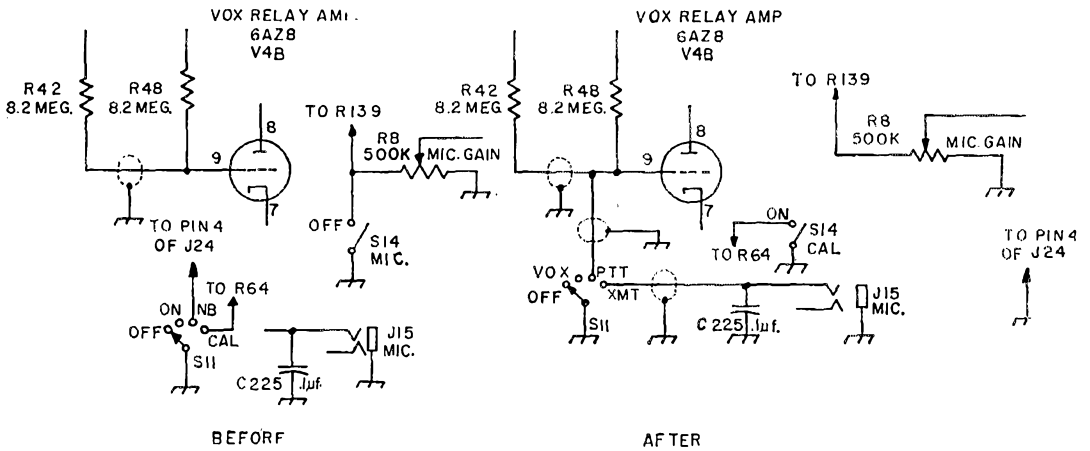


Fig. 2—Modification of the KWM-2 for ease in going from VOX to push-to-talk or manual operation. Reference numbers are Collins' part numbers. Resistances are in ohms (K = 1000) and resistors are ½ watt.

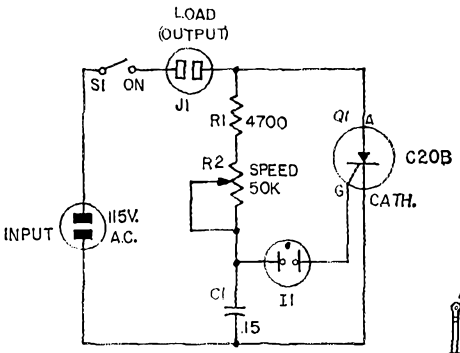


Fig. 3—Circuit diagram of the SCR motor-speed control.
C_1—0.15-μf. 200-v. paper tubular.
I_1—NE-2 neon lamp.
J_1—Chassis-mounting line socket (Amphenol 61-F1).
Q_1—C20B SCR (General Electric).
R_1—4700-ohm ½-watt composition.
R_2—50,000-ohm linear taper potentiometer.
S_1—S.p.s.t. toggle.

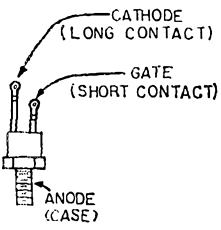
might be returned someday to its unmodified state, the original lettering can be left on the panel. In this case, paint a small plate gray to match the coloring of the panel, letter the plate, and place it under the hex nut that bolts the FUNCTION switch to the panel. Matching spray paint, part No. 097-6162-00, 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, Q_1, 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 C_1, R_1, R_2 and neon lamp I_1. When the voltage across C_1 reaches the ignition voltage of I_1, the neon lamp fires and sends a pulse to the gate of the SCR. The setting of R_2 determines the charging rate of C_1 and thus the conduction angle of the SCR. Decreasing R_2 increases the speed of an electric drill plugged in the output connector, J_1.



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 2¾ × 2⅛ × 1⅝-inch Minibox (Fig. 4). Since the mounting stud and main body of the SCR are common with the anode, care should be used 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, K1MET*

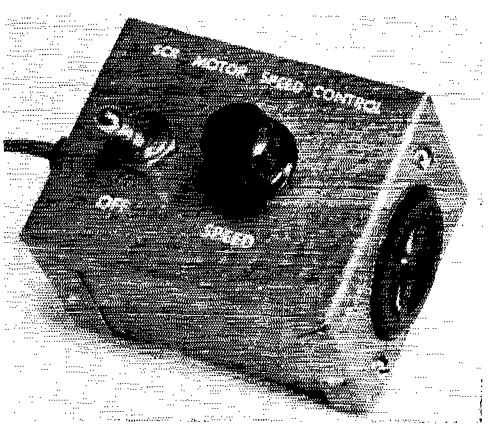


Fig. 4—Small enough to fit in the palm of your hand, the SCR motor-speed control is housed in a tiny Minibox.

Technical Correspondence

ABOUT THE "CONNECTICUT LONGHORN"

Technical Editor, *QST:*

The article "The Connecticut Longhorn" by K1KLO 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.[2-6] The Northrop Corporation has done a great deal of work on the antenna as the DDRR antenna and in this form it has been discussed in several popular magazines.[7,8]

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 nondirectional 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 surface on which the car is driven.

K1KLO 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, curled 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 is *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, K6CAF, 17221 Osborne, Northridge, California 91324.*

[1] Ronold King, C. W. Harrison, and D. H. Denton, "Transmission Line Missile Antennas," *IRE Transactions on Antennas and Propagation:* January 1960, p. 88.

[2] R. W. Burton and R. W. P. King, "Theoretical Considerations and Experimental Results for the Hula-Hoop Antenna," *Microwave Journal*, November 1963, p. 89.

[3] R. C. Fenwick, "A New Class of Electrically Small Antennas," *IEEE Transactions on Antennas and Propagation*, May 1965, p. 379.

[4] M. Boella, C. Cergiani, A. Villa, and R. Zich, "Thin Wire Loop Antennas," *Electronics Letters*, September 1965, p. 183.

[5] M. Boella, C. Cergiani, A. Villa, and R. Zich, "Low Gain Ring Antenna, Input Impedance Properties;" *Alta Frequenza:* 1966, *35*, p. 620.

[6] M. Boella, C. Cergiani, A. Villa, and R. Zich, "Low Gain Ring Antenna, Radiation Properties on a Ground Plane;" *Alta Frequenza:* 1967, *36*, p. 408.

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

[8] Roy E. Pafenberg," The Hula-Hoop;" *Popular Electronics*, July 1963, p. 25.

144-MC. IC CONVERTER

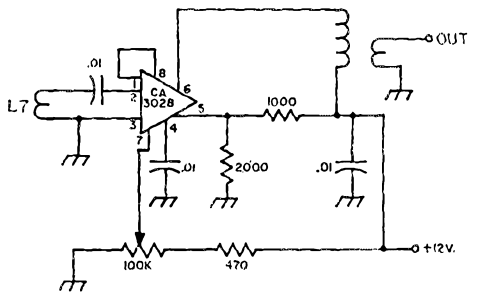
Technical Editor, *QST:*

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 MPF102 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 CA3028 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 4½ by 6½ 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, WØLCN/AFØLCN, 5036 17th Ave. South, Minneapolis, Minn. 55417.*

HURRICANE PICTURES

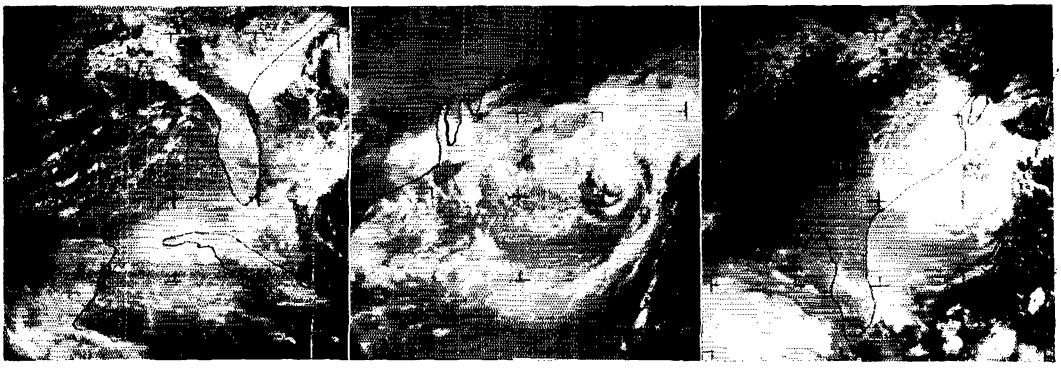
Technical Editor, *QST:*

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, 6500 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[1]. 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 teletypewriter lines and internationally by radioteletype. 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.

APT satellite ESSA 2 equator crossing times and longitudes for December 1 are 0024Z at 110.1 E, 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.

Tracking and gridding procedures are described in the APT User's Guide obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402, at a cost of $1.00. Request document C52.8:AU8. QST

* National Environmental Satellite Center, Washington, D. C. 20233

[1] Anderson, "Amateur Reception of Weather Satellite Picture Transmission," *QST*, November 1965, p. 11.

ESSA APT Signal Parameters

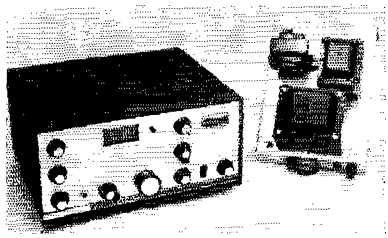
Carrier
Frequency: 137.50 Mc.
(subject to change)
Modulation: f.m.
Deviation: ± 10 kc.
Sub-Carrier
Frequency: 2400 cycles
Modulation: a.m.
Polarity: Max. amplitude — white
Min. amplitude — black
Video
Frequency: 0-1600 cycles
No. of lines: 800
Line rate: 4 per second
Scan time: 200 seconds
Start tone time: 3 seconds
Phase time: 5 seconds
Total frame time: 208 seconds
Picture interval: 352 seconds *

*** Carrier and subcarrier remain on during the interframe gap.**

Recent Equipment

To acquaint you with the technical features of current amateur gear.

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 8-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_{15}). 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.

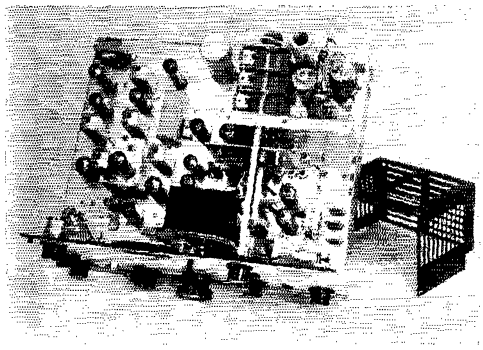
On 80 and 20, mixer local injection is the signal from V_{11}, the 8.7–9.3-Mc. v.f.o. (the only tunable element), amplified in V_{10B}. On the other bands (40, 15 and 10), the v.f.o. signal is combined in V_{10B} with a crystal-controlled signal from "band oscillator" V_{10A}, V_{10B} now operating as a "premixer," to yield the proper injection frequencies for these bands. The resulting ranges are 3.5 to 4.1 Mc., 7.6 to 7.0 Mc., 13.9 to 14.5 Mc., 21.6 to 21 Mc., and 28.5 to 29.1 Mc. Band-oscillator crystals for the ranges of 28.6 to 28 Mc. and 29.1 to 29.7 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-to-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 a.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_8, V_{12} and V_{13}. The manual r.f. gain control is also applied to these three stages. The a.g.c. system has fast-attack and slow-release characteristics.

The rectified a.g.c. signal is also applied to the grid of V_{6A}, 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 0A2.



Top chassis view. The v.f.o. is in the black box at bottom center. The assembly above and to the left contains the balanced modulator and transmitter i.f. amplifier (V_5). The carrier oscillator (V_7) is just below. The receiver audio output transformer is at the extreme upper left, and the rectangular gray box contains the crystal filter. To the right of the v.f.o. is the premixer with its band crystals. The final amplifier is in the upper righthand corner, normally covered by the black shield to the right of the chassis. The driver tube, V_3, is immediately in front of the amplifier compartment.

Transmitting Section

In this section, the carrier-oscillator signal from V_7 is combined with the microphone (high-impedance) audio signal from V_6 in a four-diode ring balanced modulator (1N542s), where the carrier is suppressed. The 5.2-Mc. d.s.b. output signal from the modulator is amplified in V_5, 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_{12}, and then fed to the transmitting mixer V_4. 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_3, and thence to the final amplifier V_1V_2 (parallel neutralized AB_1 6JB6s)

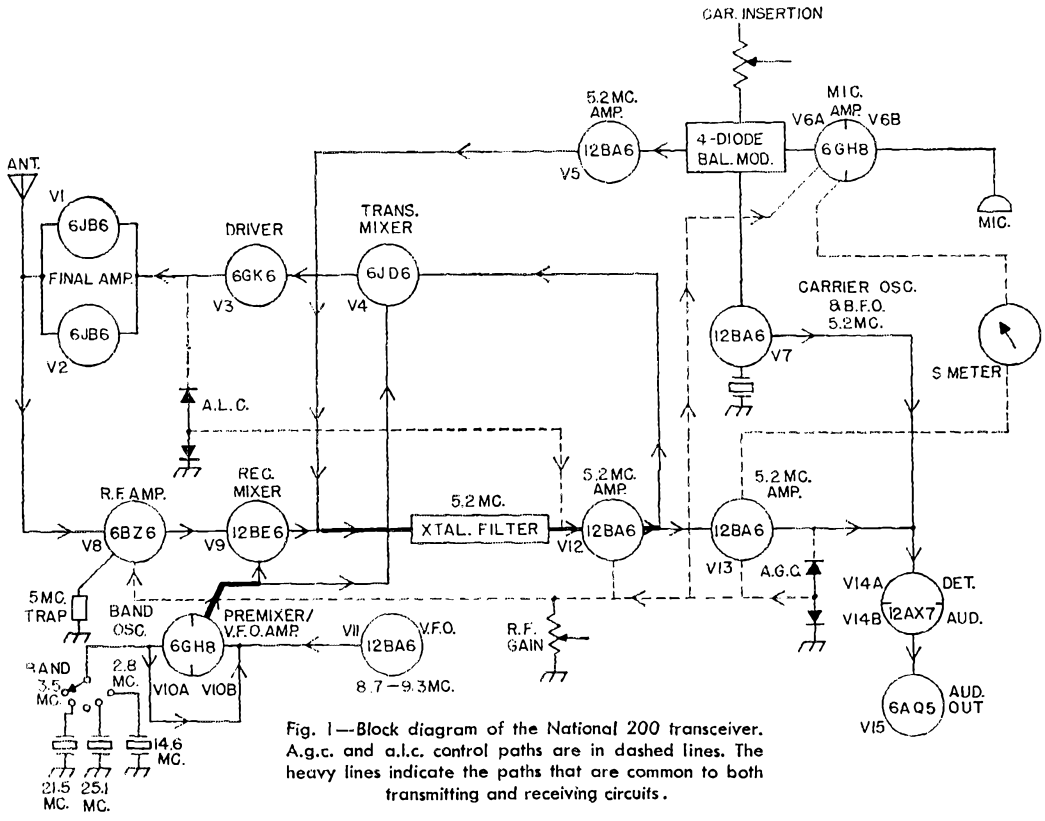


Fig. 1—Block diagram of the National 200 transceiver. A.g.c. and a.l.c. control paths are in dashed lines. The heavy lines indicate the paths that are common to both transmitting and receiving circuits.

with pi-network output. With the exception of the input and output circuits of V_5, 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 c.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 l.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.l.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 overdrive into grid current, back to an exciter 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.l.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 MOX 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_3, 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_5, 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.g.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_8 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_8 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_5 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_5 is lowered for full gain. On c.w., the product detector and b.f.o. are in use, the key jack is connected, V_5 is

at full gain, the carrier-insertion control is operative, and the plate of V_{6B} 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 2.8 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 sideband − 40 db., third-order distortion products −30 db.

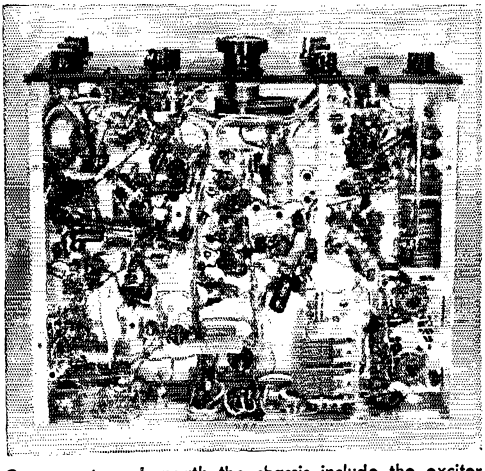
Receiver sensitivity: 0.5 μv. for 10 db. s/n (s.s.b.). Output impedance: 50–60 ohms.

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 crossmodulation 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.



Components underneath the chassis include the exciter tuning capacitor at the right, and pi-network loading capacitor below.

National 200 Transceiver

Height: 6 3/16 inches.
Width: 13 3/8 inches.
Depth: 11 inches.
Weight: 15 lbs.
Power Requirements: 700 v.d.c. at 300 ma.; 280 v.d.c. at 200 ma.; — 80 v.d.c. at 10 ma.; 12.6 volts at 5 amperes.
Price Class: $360 less power supply and speaker; AC-200 power supply: $75.
Manufacturer: National Radio Company, 37 Washington St., Melrose, Mass. 02176.

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-kc. 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-kc. 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. — *W1TS*

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 S9 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 AC4YN. 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 nowdays.

"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 before 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 get 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 suprise 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.

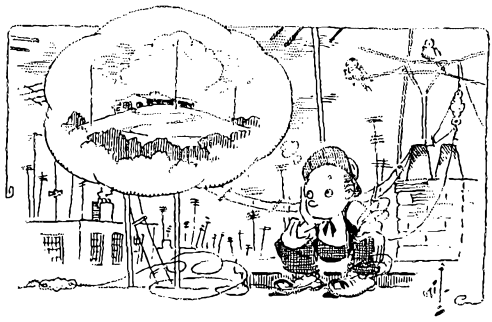
"Before long we're having a gay old time as he's broken out a special bottle of rice wine and started gabbing about old DX on 20 c.w. I finally explain that, ham buddy or not, there's going to be hot times for him real soon.

(*Continued on page 146*)

*711 Broad St., S.W., Gainesville, Ga. 30501

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 eye 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 riffle 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 WIMK 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, proceed 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 first-hand 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 WA4PCP, 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 call area provide several examples:

W4AKO and W4AAP live simply on High Road and High Street, respectively. WB4AKM 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. WB4AGO isn't deceiving anyone with his spelling of Hycliffe Avenue; we hear you, OM, loud and clear. We are further convinced that W4AFQ's Mountain Way is not just the road on which you get to the mountain!

WA4AJY gets out fabulously in all directions but one from his QTH on Hillside Drive, and K4AKF does well on Ribault 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 Bayview Drive, where W4ACX lives, or maybe WA4ABC's place on Riverview 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 common-place-sounding QTHs: I tried page 217 and found K4OXA on Bluff Street, K4OXS on Hickory Hill Lane, K4OYH on Terrace Drive, while his counterpart WA4OYH is paying off the mortgage on Plateau Road. K4OYI lives on Pinecrest Drive, while W4PFF holds forth on Hillcrest Drive and W4OXX has sunk his roots on the Avenue of the same name. With WA4PFD, it is Highland Avenue and WA4PFA lives on Lookout Street. W4PEP'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 WA4PBN settled down (but not very far) on Ridge Top Drive.

If circumstances prevent your selecting a QTH

* R.F.D. 1, Popes Head Rd., Clifton, Va. 22024.

on high ground, go for something remote. One would hardly imagine a procession of noisy trucks passing WA4PCQ's home on Lost Trail. Moreover, it suggests a paucity of close neighbors, a circumstance relished by every ham.

Not at all untypical of the quest for prestigious station locations is the case of W4CXA. His XYL was recently commissioned by her DX-minded hubby to seek out a new family abode having the requisite attributes with which we are all familiar. She soon became known to real estate agents far and wide as the lady looking for the top of a hill. A further specification handed along by her practical OM required avoidance of the homes of several established hams — by a factor of several miles — leaving the land merchants to ponder the nature of the shortcomings of those undesirables.

Yessir, there's a lot to be said for the old QTH and what it conveys to our brother hams; I'm sure it is worth all the trouble it takes to find it.

If you can't locate a spot that provides or implies a built-in advantage in any other way, do as WA4PAJ did; he lives at 4275 Watts. Man, what a signal! QST

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 eight 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." QST

*13102 Larchdale Rd., Laurel, Maryland 20810.

Examination Room Revisited

BY PERRY F. WILLIAMS*, W1UED

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.

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 $4.00 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.)

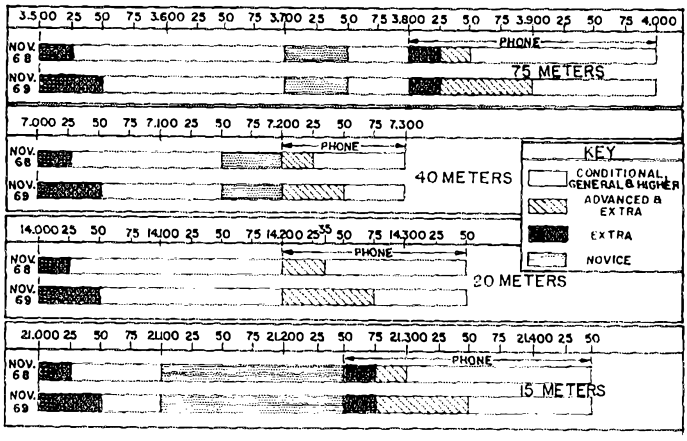
* Senior Assistant Secretary, ARRL.

The 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., $\overline{BT}$, $\overline{AR}$, $\overline{SK}$) can be expected but you don't need to worry about parentheses, semicolons and the more exotic signs. (Note to Old Old Timers — $\overline{MIM}$ 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 4B, 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 Licence 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; Mon.-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., 9-10 A.M.
* Also conducts examinations at Salem, Va. in Apr. & Oct.; Wilmington, N.C. in June & Dec.; Winston-Salem, N.C. in Feb., May, Aug. and Nov.

6 Atlanta, Ga. 30303; 240 Peachtree Street, N.E.; Tues., and Fri., 8:30 A.M.
* Also conducts examinations at Nashville, Tenn. in Feb., May, Aug., and Nov.; Memphis, Tenn. in Jan., Apr., July and Oct.; Knoxville, Tenn. in Mar., June, Sept. and Dec.; Birmingham, Ala. in Mar., June, Sept. and Dec.

6S Savannah, Ga. 31402; York & Bull Streets; 2nd & 4th Tues. each month, by appointment only.

7 Miami, Fla. 33130; 51 S. W. First Ave.; Thurs., 9 A.M.
* Also conducts examinations at Jacksonville, Fla. in Apr. and Oct.

7T Tampa, Fla. 33602; 500 Zack Street; Mon.-Fri., by appointment only.

8 New Orleans, La. 70130; 600 South Street; Mon., 8:30 A.M.
* Also conducts examinations at Jackson, Miss. in June and Dec.; Little Rock, Ark. in Feb., May, Aug. and Nov.

8M Mobile, Ala. 36602; 113 St. Joseph Street; Wed. by appointment only.

9 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.

9B Beaumont, Texas 77701; 300 Willow Street; Tues. by appointment only.

10 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 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 revised 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 Welsh, W6DDB, 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", "W1AW Master Schedule:" (including code practice transmissions).

ARRL publications, notably the *Radio Amateur's Handbook* ($4) 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 57*)

11 Los Angeles, Calif. 90012; 312 N. Spring St.; Wed. 9 A.M. and 1 P.M.
* Also conducts examinations at Bakersfield, Calif. in May; Las Vegas, Nev. in Jan. and July; Phoenix, Ariz. in Jan., Apr., July and Oct.; Tucson, Ariz. in Apr. and Oct.

11SD San Diego, Calif. 92101; 1245 Seventh Avenue; Wed., by appointment only.

12 San Francisco, Calif. 94111; 555 Battery St.; Fri., 8:30 A.M.
* Also conducts examinations at Fresno, Calif. in Mar., June, Sept. and Dec.

13 Portland, Ore. 97205; 620 S. W. Main Street; Fri., 8:45 A.M.
* Also conducts examinations at Boise, Idaho, in Apr. and Oct.; Klamath Falls, Ore. in May.

14 Seattle, Wash. 98104; 909 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 Albuquerque, N. Mex. 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., 8:45 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. 64106; 601 E. 12th St.; Thurs., and Fri., 8:30-11 A.M.
* Also conducts examinations at Des Moines, Iowa in Mar., June, Sept. and Dec.; Omaha, Nebr. in Jan., Apr., July and Oct.; St. Louis, Mo. in Feb., and Sept.

18 Chicago, Ill. 60604; 219 South Dearborn St.; Fri., 9 A.M.
* Also conducts examinations at Davenport, Iowa in Jan., Apr., July and Oct.; Fort Wayne, Ind. in Feb., May, Aug. and Nov.; Indianapolis, Ind. in Feb., May, Aug., and Nov.; Louisville, Ky. Feb., May, Aug. and Nov.; Milwaukee, Wisc. in Jan., Apr., July and Oct.

19 Detroit, Mich. 18226; Washington Blvd. & La Fayette Street, Wed. and Fri., 9 A.M.
* Also conducts examinations at Charleston, W. Va. in Mar., June, Sept. and Dec.; Cincinnati, Ohio in Feb., May, Aug. and Nov.; Cleveland, Ohio in Mar., June, Sept. and Dec.; Columbus, Ohio in Jan., Apr., July and Oct.; Grand Rapids, Mich., in Jan., Apr., July and Oct.

20 Buffalo, N.Y. 14203; Ellicott & Swan Streets; 1st & 3rd Fri., 9 A.M.
* Also conducts examinations at Pittsburgh, Penna. in Feb., May, Aug. and Nov.; Syracuse, N.Y. in Jan., Apr., July and Oct.; Williamsport, Penna. in Mar., June, Sept. and Dec.

21 Honolulu, Hawaii 96808; 502 Federal Building; Tues. and Wed., 8 A.M. and by appointment.
* Also conducts examinations at Hilo in Oct.; Lihue, Kauai in Nov.; Wailuku, Maui in Oct.

22 San Juan, P. R. 00903; 322 U. S. Post Office & Courthouse; Fri., 9 A.M.

23 Anchorage, Alaska 99501; 4th Avenue at F & G Streets; Mon.-Fri., by appointment only.
* Also conducts examinations at Fairbanks in May and Nov.

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 610 and check or money order for $4, payable to the FCC.

QST

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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 × 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.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 Mc. are invited to take part. Yukon-N.W.T. (VE8) 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 Periods:* 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 receipted 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.

(b) 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 stations in ARRL sections for contest credit. Foreign stations will give their country name in the exchange.

(c) 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.

6) *Conditions for Valid Contact Credit:* (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:* W6NLO works W6SD/6 on 50 and 144 Mc. for complete exchanges of 2 points on each band: 2 × 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 1 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.

While no minimum distance is specified for contacts, equipment 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 licenses 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.

A gavel with an engraved 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 local club territory, may be included in club 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 Award Committee.

9) *Reporting:* Reports must be postmarked no later than Feb. 3, 1968, to be considered for awards. QST

EXPLANATION OF V.H.F. SS CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the.....NR		*Call*	*CK*	*Place*	*Time*	*Date*
Exchanges	Contest numbers 1, 2, 3, etc., a new NR for each station worked	Send your own call	CK (Readability and strength or RST of station worked)	Your ARRL section	Send GMT time of transmitting this NR	Send date of QSO
Sample	NR 1	W1AW	59	CONN	1905	JAN 6

1968 DX

Competition

If early advance rules for overseas DX contest participants should appear in this early issue of *QST*, 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 KH6/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* (3W8), *Indonesia* (JZ0, 8F) and *Thailand* (HS).

Canadian amateurs may not work *Cambodia* (XU), *Vietnam* (3W8), *Indonesia* (JZ0, 8F), *Laos* (XW8), *Jordan* (JY) and Thailand (HS).

CONTEST PERIODS

Phone

Starts	Ends
Feb. 3, 0001 GMT	Feb. 4, 2359 GMT
Mar. 2, 0001 GMT	Mar. 3, 2359 GMT

C.W.

Feb. 17, 0001 GMT	Feb. 18, 2359 GMT
Mar. 16, 0001 GMT	Mar. 17, 2359 GMT

Rules

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

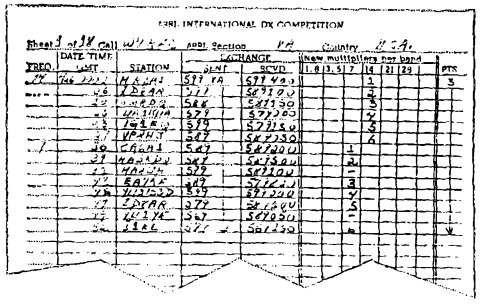
2) *Object:* Amateurs in the 48 continental United States and Canada will try to work as many amateur stations in other parts of the world as possible under the rules and during the contest periods.

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.

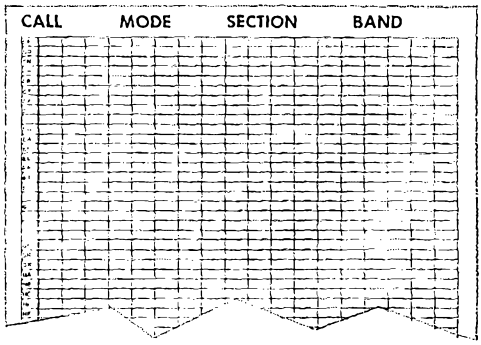
4) *Entry Classifications:* Entry may be made in either or both the phone or c.w. sections: c.w. scores are independent of phone scores. Entries will be further classified as single- or multiple-operator stations. Single-operator stations are those at which one person performs all the operating, logging, 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 after to eliminate them from your log.



7) *Exchanges:*

a) *Amateurs in the 48 continental U.S. and Canada* will transmit a three-figure number, representing the RST 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:* W6LDD, might transmit "579CAL" on c.w., "57 California" on phone.

b) *Amateurs outside* the 48 Continental United States and Canada will transmit six-figure numbers, each consisting of the RST report plus 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:* KH6IJ, with 150 watts input, might transmit "569150" on c.w., "56150" on phone. If the input power varies considerably on different bands, the "power" number should be changed accordingly. (Note, KH6 and KL7 are considered as *DX*.)

8) *Scoring:*

a) *Points:* One point is earned by a W(K) or VE/VO station upon receiving acknowledgement of a contest exchange sent, and two points upon acknowledging an exchange received. Two points are earned by any other station upon receiving acknowledgement of a contest exchange sent, and one point upon acknowledging an exchange received.

b) *Final Score:* W(K) and VE/VO stations multiply total points earned under Rule 8(a) by the number of countries worked on one band plus the number of countries worked on each other band. All other stations multiply total points earned under Rule 8(a) by the sum of the number of continental states and VE/VO licensing areas worked on one band plus the number of states and VE/VO licensing areas worked on each other band.

There are 48 continental states plus VO and VE1-VE8, a possible total of 57 multipliers per band.

9) *Repeat Contacts:* The same station may be worked again for additional points 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, 1968 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 34th 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 c.w. entrants in each country, in Alaska and Hawaii, 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 operator making the highest single-operator phone score in each ARRL-affiliated club, provided the club secretary submits a listing of a minimum of three phone entries by members of the club and that these scores are confirmed by receipt at ARRL of the individual contest logs from such members. The highest-single operator c.w. scorer in each club will be awarded a certificate under the same conditions. Only a bona fide resident member, operating a station (his or another club member's) in local club territory, may compete for club certificates.

c) A personalized plaque will be awarded to the highest-single-operator DX phone and c.w. station (non-W/VE) in Africa, Asia, Europe, North America, Oceania and Asia.

d) ARRL will award a gavel to the affiliated club submitting the greatest aggregate phone and c.w. score by its members, whether single- or multiple-operator entries, provided such scores are confirmed by receipt at ARRL of the individual contest logs from such members. Only scores of bona fide resident members, operating a station (his or another club member's) in local club territory, may be included in club totals.

12) *Judges:* All entries will be passed upon the ARRL Awards Committee, whose decisions will be final. The Committee will void or adjust entries as its interpretation of these rules may require.

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 disqualifications. Some examples of practices which can result in disqualification: off-frequency (out-of-band) operation, harmonics, spurious emissions, low tone reports in logs, key clicks, splatter, excessive sidebands W(K) stations working banned countries, interfering with channels handling amateur emergency communication.

QST

ARRL INTERNATIONAL DX COMPETITION

DX stations use check list below to check off multipliers.

			160	80	40	20	15	10
1	Connecticut	CONN						
	Maine	ME						
	Massachusetts	MASS						
	New Hampshire	NH						
	Rhode Island	RI						
	Vermont	VT						
2	New Jersey	NJ						
	New York	NY						
3	Delaware	DEL						
	Maryland-D.C.	MD						
	Pennsylvania	PA						
4	Alabama	ALA						
	Florida	FLA						
	Georgia	GA						
	Kentucky	KY						
	No. Carolina	NC						
	So. Carolina	SC						
	Tennessee	TENN						
	Virginia	VA						
5	Arkansas	ARK						
	Louisiana	LA						
	Mississippi	MISS						
	New Mexico	NMEX						
	Oklahoma	OKLA						
	Texas	TEX						
6	California	CAL						
7	Arizona	ARIZ						
	Idaho	IDA						
	Montana	MONT						
	Nevada	NEV						
	Oregon	ORE						
	Utah	UTAH						
	Washington	WASH						
	Wyoming	WYO						
8	Michigan	MICH						
	Ohio	OHIO						
	W. Virginia	WVA						
9	Illinois	ILL						
	Indiana	IND						
	Wisconsin	WIS						
Ø	Colorado	COLO						
	Iowa	IOWA						
	Kansas	KANS						
	Minnesota	MINN						
	Missouri	MO						
	Nebraska	NEBR						
	N. Dakota	NDAK						
	S. Dakota	SDAK						
VO	Newfoundland-Labrador	NFLD LAB						
VE1	New Brunswick Nova Scotia Pr. Ed. Is.	NB NS PEI						
VE2	Quebec	QUE						
VE3	Ontario	ONT						
VE4	Manitoba	MAN						
VE5	Saskatchewan	SASK						
VE6	Alberta	ALTA						
VE7	Br. Columbia	BC						
VE8	Yukon-N.W.T.	YUK NWT						

Dx'ers Check List

SUMMARY, ARRL INTERNATIONAL DX COMPETITION

Call..... ARRL Section..... Country.....

☐ C.W. ☐ PHONE ☐ Single Operator ☐ Multioperator Single Xmtr. ☐ Multi. Xmtr. ☐

Name..... Address.....

Transmitting Equipment.....

Input Power..... Receiver(s).....

Antennas.....

MULTIPLIERS: W/VE stations show number of countries per band, use CD-175. Non-W/VEs show number of continental U.S. states and Canadian call areas per band. Non-W/VEs use the check sheet on the reverse side of this summary.

	1.8 Mc.	3.5 Mc.	7 Mc.	14 Mc.	21 Mc.	28 Mc.		TOTALS
Multiplier								
Contacts								

Multioperator stations show all calls: .....

Number of different countries worked overall..... Total time on.....

Participating for ARRL-Affiliated club award in the.....

on .....

..... X ..... = ...

(Points) (Multiplier) CLAIMED SCORE

* Total number of multipliers on all bands.

** Count 3 points per completed QSO; See contest rule 6a in January QST.

I certify, on my honor, that I have observed all competition rules as well as all regulations established for amateur radio in my country, and that my report is correct and true to the best of my belief. I agree to be bound by the decisions of the ARRL Awards Committee.

.....
Operator's Signature and Call

Use the space below for comments on new countries or new states, score improvement, conditions, interesting experiences, etc. Be sure to enclose your operating and antenna photos for QST consideration. Mail summary, log sheets and check lists (CD-175) to ARRL Communications Department, 225 Main Street, Newington, Connecticut, U.S.A. 06111.

Sample summary sheet that must accompany all reports.

SEPTEMBER VHF QSO PARTY RESULTS

COMPILED BY ELLEN WHITE,* W1YYM

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 344 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 hand 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, W1HDQ, should simplify things for everyone!

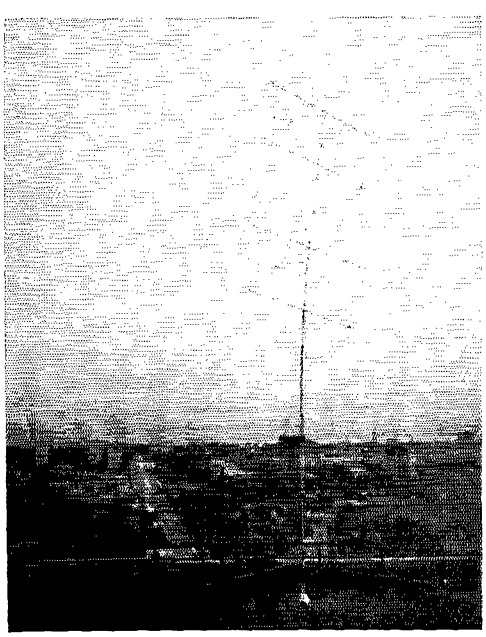
Operation may be in any continuous 28-hour period beginning no earlier than 1900 GMT Saturday and ending no later than 0600 GMT Monday (starting time on the hour).

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 break for the go-for-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!

* Deputy Communications Mgr., ARRL.



The elevation of the antenna here is only 30 feet. Oh yes, that's on top of a 21-story building! OM G3PAC/W9 single-operated the I.I.T. **WA9JYR** club station in Chicago catching a couple of nice 2-meter openings and topping the Illinois section in a two-band effort. Eric got a chuckle listening to the stations who couldn't convert local standard to local daylight time. Whew, we hope we fixed that one for 1968!

Soapbox

"A good inversion kept all sections from Delaware to Maine booming solidly into W1-band. Really made this a great contest and only 5 watts input on 2 at this QTH." — *W1DZ/1.* "Arrived home from the hospital Saturday morning to recover from an eye operation. I just got on briefly to give a few points. Oh well, CU in January!" — *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." — *K1PXE/1.* "Operation was from Mt. Everett in the southwest corner of Mass., 2500 ft. elevation; battery power." — *W1HDQ/1.* "Our generator went west at 2115 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." — *WA2VGA/1.* "Your minimum multiplier box sure made me work a little harder!" — *WA1GFG.* "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.I." — *W1EUJ.* "A certain N.Y. multiop, 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 more sense would come from a thousand watts." — *anon.* "Next time I'll have more rig than a Gonset II!" — *WA1FSK.* "This time 46% of my contacts were on c.w." — *W1EXZ.* "Low Sunday activity. Heavy rains fell on our contest site on Mt. Wachusett, Princeton, Mass." — *K1YLU/1.* "I am submitting this log to prove that there was a 6-meter station on in Vermont. Sorry the rig blew as I had lineups waiting for a section multiplier. Mobile operation in a Porsche 912 is tough, but fun." — *W1ADZ/1.* "The hardest part of the contest was trying to read other people's writing when recopying the log. 432 Mc. wouldn't work, but wait till June! This was just the second effort by our Talcott Mountain VHF Society." — *K1TZD/1.*

"Tried the entire contest on 6 meter c.w. and disappointed about the number of c.w. stations active. However, this sure is a good way to get rare multipliers!" — *WB2VVQ.* "Is Vermont still in the Union?" — *W2WGL.* "Without a v.l.o. you don't stand a chance. Some means should be found to encourage a bit of spreading out." —

Alabama certificate winner WB4DQW (remember KL7EBB/9?) 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.

W2KXG. "Our location was 2470 ft. up on top of Sumitt Mt. (W.N.Y.) in the fire tower." — *WB2EFH/2.* "This was a new experience for the 6220 Club. We operated from n.w. 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." — *W2PEZ/2.* "This was my first contest and I had a ball! I used a Two'er with one crystal and a 6-element beam 10 feet high which I rotated from my window using a yardstick." — *WN2AWX.* "I'll be back in January with more power and 220/432 Mc. capability." — *WB2KKO.* "When reaching our planned site, we find it occupied by WB2s QZZ WJV. They had gear for 6 and 2 and we had equipment for 220/432/1296. We decided to join forces and had a fine time until hit by a severe rain storm." — *K2UYH/2.* "This contest was the best I have ever entered. More activity plus good conditions with Vermont and R. I. represented." — *WB2MRK.* "Remedying our June mis-

Minimum Number of Sections
(If any one minimum figure is met, all bands are shown.)

Band (Mc.)	15	10	2	2	1
		144	220	420	1215
K1ABR	15	18			
W1ALE	7	6	5	3	
W1AZK		16	6		
W1AJR	11	12	5	7	
K1BZM/1*	16	12	8		
WA1DCI*	7	8	5	5	
W1EUJ	11	11		4	
WA1GFG	9	11			
K1IED		20			
W1IPJ/1*	11	13	5	4	
K1JIX		10	9	8	
W1JSM		11			
W1POP	6	10			
K1PUG/1*	15	11			
K1PXE/1*	13	19	1		
W1QVF		5		3	
W1QXX*	16	10	5		
K1TPK	12	11			
K1TZD/1*	13	14	8		1
W1WHL	12	10	5		
K1WHT	21	15			
K1YLU/1*	13	12	5	3	
K1YON	7	10	9	2	1
K2ACQ				3	
W2AQT		17			
K2BWR*	15	12			
K2CBA	15	9	1	8	
K2DNR		18	5		
W2DLT/2*	12	15	8	7	1
W2DZA	5	7	3	2	
W2EIF	13	8	6	7	
K2ERQ*	12	12			
W2FAN				2	
WA2FYE	15	10			
W2JKI*	18	19	7	4	
WB2KHD		13			
WB2MRK	14	11	5	1	1
WB2MZE*	12	10			
W2OW*	12	11	2	1	
W2PEZ/2*	17	16	7	3	
WA2PBN	20				
WB2PVB*	9	14			
WB2SEJ/2*		13			
W2SEU	12	11	7	6	
K2TXB/2*	10	15		7	
WB2UCS	8	12			
WB2UVP/2		15			
K2UYH/2*	12	14		11	
W2WGL		12			
WB2W1K/2*	12	13			
WA2WZP	17	10			
WB2YQU	9	12			
W3AD/3*	15	17			
W3ARW*	10	20	6	3	
WA3BIV	12	10	2		
K3CDW/3*	15	14			
W3CGV	11	7	3	6	1
WA3GBK		10			
W3GKP		12			
W3HIX	8	5	2	3	
K3HKK/3*	19	16	2	6	
K3IPM	18	14	7	3	
K3IUV	13	9	8	7	
K3JRO/3*	15	12			
W3KWH	31				
W3LCC	4	7	2	2	
W3LP*	10	10			
K3LUK/3*	14	4	2		
W3MMV		6		6	1
K3OBU	2	14			
W3PGA/3*	8	10		4	
W3SAO	3	7	2		
K3WJB	14	17			
K3YFD*	10	12			
K4EJQ	3	14		3	
K4QPJ/4	10	16			
K4SUM	7	10		7	
W4ZJA/4*	8	6		2	
K7AUO/7*	2	3	2	2	2
K7RKH/7*	2	5		3	
W7TYR	2	2	2	2	1
K7ZIR	5	3	2	2	1
WA8BCA*	21	19			
WA8LRE	21				
WA8PAR*	20	6			
W8PT			1	7	
W8WEN	18				
W9CSF/9*	5	6	1	4	2
K9OXY/9*	6	6			1
K9ZGT		10			
WØNXF		12			
WA0SKH/0	1	3		1	1
VE2HW		9		2	
VE2SH	5	9		2	
VE3AIB		2		2	
VE3BDX	2	5		3	
VE3EZC		10		2	

* Multioperator Station.

DIVISION LEADERS

Single Operator		*Multioperator*
K3IPM	Atlantic	K3HKK/3
K9DZK	Central	W9CSF/9
KØGJX	Dakota	.....
WA4YKN	Delta	W4SGI/4
K4QPJ/4	Great Lakes	WA8BCA
WB2MRK	Hudson	W2PEZ/2
WØPFP	Midwest	KØTLM
K1WHT	New England	K1PXE/1
K7ZIR	Northwestern	K7AUO/7
WB6YKU	Pacific	W6YEP/6
K4SUM	Roanoke	K4LVV/4
WØAJY	Rocky Mt.	WAØSKH/Ø
WB4FJM	Southeastern	WA4QPL
K6IBY	Southwestern	K7RKH/7
W5WAX	West Gulf	.....
VE2SH	Canada	VE2RM

take, we had 220 Mc. gear with us and it paid off (7 multipliers). 432 Mc. was a surprise with low power (15 watts). Maybe by January that will be changed to something in the order of 300 watts or so." — *W2JKI*. "Where were all the W1s on 6 meters. Good scatter Sunday morning helped for sections." — *WA2PBN*. "This was my first sideband experience and it was interesting to hear the consistent signals of W3KWH on s.s.b." — *K3MBQ/2*. "Activity in the N. Y. area was excellent, perhaps the best yet. Operating seemed unusually polite, a pleasant change!" — *W2DLT/2* (Murray Hill ARC). "The first time I've worked more than 200 contacts and conditions were only fair to poor." — *W2SEU*.

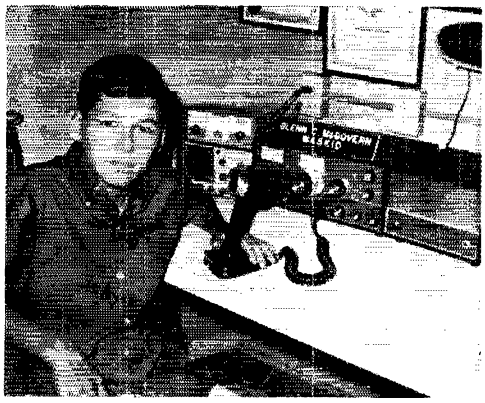
"432 c.w. and a half kilowatts really paid off this time. Next test we hope to have new antennas for 6 meters *plus* 220/432 Mc. Two meter s.s.b. activity is increasing, W9JZI was 8-9!" — *K3HKK/3*. "I'd have scored twice as many points if I had been set up on c.w." — *WA3ADN*. "Rain and colder weather put a damper on conditions late Saturday and through Sunday. We're already planning for next June and hope to work 220/432/1296 and possibly 3400 in addition to 6 and 2." — *W3AD/3*. "The FAA once again gave me permission to use the 100 foot tower on Mt. Minsimat at the Delaware Water Gap. Most signals at the mountain were very good this time and I heard, though missed, Maine and R. I." — *K2VPV/3*. "In general very good 'closed band' 50 Mc. conditions with 20 sections worked by ground wave and 11 by iono-scatter. W9ECV/Ø, WØPFP and W5WAX were heard most consistently here on scatter. Activity was apparently better than last September too. All transmissions were s.s.b., all multipliers (except R. I.) were worked 2-way s.s.b. We hope to be multiop. in January with sideband KWs on 6 and 2." — *W3KWH*. "We would have increased our section total if we had closed down our Novices. However, when the groundwave conditions started to get really good, the Novices were having such a swell time of it no one had the heart to turn off the SR-42 and fire up the Zeus. It was a good time in spite of poor band conditions." — *K3YFD*. "I had only been on 6 for a week when the contest started and I think that I had more fun than all of the OTs put together." — *WA3GLZ*.

"Too many of the stations had to QRT early and missed the tropo on 144 and 432 Mc. During tropo I worked states #32 (S. Dak.) and #33 (Minn.) on 144 Mc. Also worked Va., Ind., Ill. and Mich. for four new ones on 432 Mc. I was heard by K9ZUF/Ø in Iowa who did not have a working 432 Mc. transmitter. Sob!" — *K4EJQ*. "You are most likely wondering why I'm turning in a score of 3. Well, until the fellows recognize that there is somebody on down here in Tennessee and turn their beams south, the score I'm listing will remain the same." — *WB4DCW*. "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 s.s.b., seems like *they* were doing OK." — *K4WHW*. "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." — *K8SNR/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." — *K4QPJ/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." — *K4HQI*. "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 scatter. We'll be back for our fourth year on Mt. Jefferson next June under the call of WA4BNX." — *K4LVV/4*.

"The few contacts I did make were hard work without band openings but I did enjoy the contest." — *WA5LTA*. "Two was in better shape than in June, but no skip." — *K5BDQ*. "W3KWH was in very good all day Sunday morning on 50 Mc. scatter. Tropo was very good both Saturday and Sunday evening on 144 Mc and I worked as far as 850 miles. Worked S. Dak. and Ohio for two new states on 2 meters. W. Pa. and S. Tex. were worked iono-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." — *W5WAX*.

"Just moved into a new home and the XYL had me planting shrubs. Thanks to WA6GER/7 I did work Nevada for a new state although conditions on 6 were very bad." — *W6DOR*. "Not as much activity on 2 as there should have been. Somebody boobooed by scheduling our combined Southwestern/Pacific convention on the same weekend." — *WB6TFC*. "Lets exchange handle and QTH." — *WB6KBZ/6*. "Sorry to see such a poor showing. I think

K6DYD/6 went to the highest location (14,496 feet) and made the lowest score (zero). Jerry had only one crystal on 50.012, input 2 watts. He pleads for the s.s.b. stations to keep an ear pealed for these mountain-top c.w. mini-watters.



On the left, 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." — *K6IBY*. "We need more publicity about the September contest." — *WB6WLF*.

"What with rain, lightning and wind, no wonder there s nobody in Idaho! I had to QRT with a dead battery at 0400 GMT." — *K7ZFG/7*. "The contest was loads of fun although the lack of local Washington participants was observed. Only a few locals on 6 although I worked 35 Oregon stations on 2." — *WA7ECY*. "I'd sure like the Washington hams to get the prod for their inactivity. It's getting so we have to send out satellite groups to ensure contacts! 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." — *K7AUO/7*. "Murphy's Law really struck everywhere including here and me (Doug Murphy!). Antenna problems before and during the contest, poor 6 and 2 meter activity. Thanks to K7ZFG/7 for our only additional section multiplier." — *WA7IAW*. "Almost all of the two meter rigs were still up in Fairbanks so there weren't very many on from Anchorage. I think that is the only way I stand a chance of winning, hi!" — *KL7GCK*. "We were located east of Mt. Vernon, Wash., at an elevation of 2000 feet, at Devil's Mountain lookout." — *WA7EHE/7*.

"Club station and hilltop efforts would be more worthwhile if the contest ended at around 1900 GMT Sunday and some confusion might be avoided if all time zones started together." — *WA8TYF*. (See the lead Tim — *Ed.*) "K4EJQ is my 13th state on 432 Mc." — *W8PT*. "The best 2-meter opening of the summer was noted here as the contest closed." — *K8MWA*. "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." — *WA8EOW*. "S.s.b. accounted for 90% of the QSOs on 6." — *WA8LKE*.

"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 c.w." — *W9KHH*.

"I suggest future v.h.f./u.h.f. contests be judged solely band-for-band. 6 is a snap, 2 is hard, 432 is mighty rough and 1296 is a bear cat." — *WØNXF*. (Bob, handling perhaps 5 or 6 times the volume of certificates now handled is a formidable problem but we will indicate single band. — *Ed.*) "Heard several 3s, 8s and 9s calling CQ Contest towards the end on scatter but was unable to copy the complete calls." — *WAØMRH/Ø*. "Lots of enthusiasm sparked by this first attempt of our newly formed hp-Loveland ARC. Several new stations have been added to 2 locally as a direct result. Hope to see some 220/432 Mc. stations result too. Two meters into Wyoming and Nebraska proved so easy that future contests may see us put up a portable site in each state to provide contacts for other contest stations at least on 6 and 2." — *WAØSKH/Ø*.

"One of the worst contests I've ever operated with poor conditions, high noise level and worst of all, no rotator!" — *K2PCG/Ø*.

"Please accept my fantastic score of 2 points. What else can I say?" — *VE6MC*. "Ours was a group activity of the Hamilton & District AREC." — *VE3RCB*. "The band seemed to be fine 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 in Ottawa on 432 Mc. I flew home from VO1-land for the test." — *VE2HW*. "Look for me on 1296 Mc. in the next contest, the extra points are worth it." — *VE3BDX*. "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!" — *VE3EZC*

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 the bands used. A represents 50 Mc.; B, 144 Mc.; C, 220 Mc.; D, 420 Mc.; and E, 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 single-band high scorers.

ATLANTIC DIVISION

Delaware

W3CGV 3584-108-28-ABCDE
K3OBU 848- 53-16-AB
K3NYG 322- 46- 7-AB

Eastern Pennsylvania

K3IPM 18,564-411-42-ABCD
K3WJB 10,385-335-31-AB
K3IUV 6660-148-37-ABCD
WA3BIV 4944-196-24-ABC
K2VPV/3 3876-204-19-AB
WA3ADN 2880-180-16-AB
WA3EIO 1836-101-18-ABD
K3QGQ 1650-165-10-A
W3HIX 918- 37-18-ABCD
W3ETB 704- 88- 8-A
WA3FYL 693- 77- 9-B
W3SAO 624- 48-12-ABC
WA3GLZ 576- 64- 9-A
W3MMV 559- 31-13-BDE
WA3HIT 504- 84- 6-B
K3AZH 440- 40-11-A
WA3BSC 400- 80- 5-A
WA3BRW 238- 34- 7-AB
WN3HMK/3 100- 20- 5-B
W3AD/3 (7 oprs.) 10,240-320-32-AB
K3YFD (9 oprs.) 6754-307-22-AB
W3ARW (W3s ARW PMG, K3SQO) 6123-142-39-ABCD
W3BN (10 oprs.) 5460-266-20-ABCD
WA3AAN (WA3s AAN HGX) 3856-241-16-AB
W3LP (W3s GFN JUZ, WA3FBP) 2560-128-20-AB
K3YQS/3 (K3YQS, WA3s BCD DXY) 1386-126-11-A
WA3DBF (WA3s BOC DBF) 1232-112-11-AB
K3VZI/3 (6 oprs.) 996- 83-12-AB

Maryland-D. C.

K3HCE 2492-178-14-A
WA3AZK/3 1131- 87-13-AB
W3LCC 1125- 68-15-ABCD
WA3GBK 730- 73-10-B
WA3HEN 588- 84- 7-AB
W3TFA 441- 49- 9-AB
WA3GWK 432- 54- 8-AB
W3HB 414- 46- 9-B
W3GKP 396- 33-12-B
W3MHB 329- 47- 7-B
W3MNE 144- 36- 4-AB
W3MSR 28- 7- 4-B
WA3ILO 26- 13- 2-B
WA3GUI 22- 11- 2-B
K3CUW/3 (7 oprs.) 7482-258-29-AB

W3PGA/3 (6 oprs.)
3652-161-22-ABD
K3LUK/3 (5 oprs.)
3640-178-20-ABC
WA3FCN/3 (WA3s EOP FCN) 2338-167-14-AB
WA3GLP/3 (WA3s GDB GLP) 1092- 91-12-AB
WA3AQS (multiopr.)
395- 79- 5-AB

Southern New Jersey

W2EIF 8942-225-34-ABCD
WB2UVB
1573-143-11-AB
WB2YEH
1562-142-11-AB
WB2TLT 1008-112- 9-A
WA2URU/2 (WB2WRP, opr.) 688- 86- 8-A
WB2WVC 549- 61- 9-B
WB2LZW 246- 41- 6-AB
K3MBQ/2 208- 26- 8-A
K2BWR (K2s BWR ZRJ)
3267-121-27-AB

Western New York

K2LZF 3160-151-20-ABD
K2YCO 3090- 85-30-ABCD
WB2OEU 945-105- 9-AB
WA2TEY 693- 77- 9-AB
WA2KND 492- 75- 6-ABD
K2MZB/2 350- 70- 5-B
W2WGL 324- 27-12-B
WB2WLL 296- 74- 4-AB
WB2KYQ 126- 21- 6-B
WB2CHO 122- 61- 2-A
K2PKK 105- 21- 5-AB
WA2HWC 87- 26- 3-ABD
K2ACQ 78- 13- 3-D
WA2KVN 52- 26- 2-AB
WN2AWX 46- 23- 2-B
WN2BSG 30- 15- 2-B
W2FAN 8- 2- 2-D
W2OW (WA2QGF, WB2s NJN YJT)
5044-188-26-ABCD
K2TXB/2 (K2TXB, WA2CJK, K3BBO)
4544-126-32-ABD
K2ERQ (10 oprs.)
4176-174-24-AB
K2LFB (K2LFB, WA2GJA)
1330- 93-14-ABD
WB2SEJ/2 (WB2s RNS SEJ)
858- 66-13-B
WB2VPY (9 oprs.)
623- 89- 7-A
WA2VMB (5 oprs.)
504- 63- 8-AB
WB2EFH/2 (5 oprs.)
232- 58- 4-B

Western Pennsylvania

W3KWH (W3ZGI, opr.) 6851-221-31-A
W3BWU 1100- 99-11-ABC
WA3ISY 378- 63- 6-AB
W3DJM 124- 31- 4-A
WA3HTD 112- 28- 4-AB
WA3BGE 48- 16- 3-A
K3HKK/3 (9 oprs.)
10,492-235-43-ABCD
K3JRO/3 (4 oprs.)
5670-210-27-AB
WA3CFK/3 (WA3s CFK EOQ 686- 49-14-AB
W3NAV (WA3s FTS GKJ GPD 2- 2- 1-A

CENTRAL DIVISION

Illinois

WA9JYR (G3PAC, opr.)
2379-183-13-AB
K9ZGT 1130-113-10-B
WA9NVB 819- 91- 9-AB
WA9OBQ 400-100- 4-B
WA9FXH 384- 96- 4-B
WA9ONN 308- 77- 4-B
W9DJZ 216- 54- 4-A
WA9MSZ 188- 47- 4-B

Here's a view of the **K7AUO/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.

WA9UCX 150- 50- 3-B
WA9NRI 92- 46- 2-B
W9EET 11- 11- 1-B
WA9LIV (5 oprs.)
2338-167-14-AB
K9JAM (K9VKF, WA9NPS)
2184-182-12-AB

Indiana

K9DZK 3927-187-21-AB
K9QCB 2070-135-15-ABCD
WA9SSX 150- 30- 5-A
W9CSF/9 (7 oprs.)
3024-157-18-ABCDE

Wisconsin

WA9JCX 688- 86- 8-A
WA9JFM 612- 51-12-AB
W9KHR 39- 13- 3-A
WA9POV 6- 6- 1-A
WA9ULK 3- 3- 1-A
K9OXY/9 (K9OXY, W9GJJ, WA9LZM)
1066- 76-13-ABC
W9IHX (WB2TTK, K8OOV, WA9IOC)
720- 90- 8-AB
K9DKW (K9DKW, WA9s MCC SRW)
550- 50-11-AB

DAKOTA DIVISION

Minnesota

WAØQCZ 68- 34- 2-A

South Dakota

KØGJX 351- 27-13-AB
KØFKJ 60- 12- 5-AB

DELTA DIVISION

Arkansas

WA5LTA 72- 12- 6-AB

Louisiana

WA5KID 116- 29- 4-A

Tennessee

WA4YKN
1802-106-17-AB
K4EJQ 1500- 72-20-ABD
WB4DGW 3- 3- 1-A
W4SGI/ (5 oprs.)
2190-146-15-AB
WA4JKP/4 (WA4s HGQ JKP PWO)
1815-121-15-AB
WA4NUJ/4 (5 oprs.)
996- 83-12-AB

GREAT LAKES DIVISION

Kentucky

K4QPJ/4 4238-163-26-AB
K8SNR/4 (4 oprs.)
1512-105-14-ABD

Michigan

WA8REM 567- 81- 7-AB
W8CVQ 544- 67- 8-ABD
W8NOH 540- 60- 9-AB
WA8EOW 350- 70- 5-A
WA8HAA 224- 32- 7-AB
WA8VHG 205- 41- 5-B
W8PT 160- 20- 8-CD
K8BVY 153- 51- 3-B
K8AIWA 150- 30- 5-B
WA8STV 132- 33- 4-AB
W8DBL 95- 19- 5-A
WN8WCF 62- 31- 2-B
W8IBB 55- 11- 5-B
WA8JXE/8
40- 10- 4-B
WN8WXZ 11- 11- 1-B
W8WVU/8 8- 8- 1-B
WA8JQA/8 1- 1- 1-A

Ohio

WA8LRE 3465-165-21-A
W8WEN 1800-100-18-B
K8ZES 936-117- 8-B
WA8RMZ 505-101- 5-AB
WA8BCN 78- 39- 2-A
WA8WSP 53- 53- 1-A
WA8TYF 40- 8- 5-AB
K8LUC (WA8STX, opr.)
12- 6- 2-A
WA9SPA/8 12- 12- 1-B
WA8BCA (8 oprs.)
18,560-464-40-AB
WA8PAR (5 oprs.)
5668-218-26-AB
W8VND (WA8s DFD STX TYF) 1404-117-12-AB

HUDSON DIVISION

Eastern New York

K2CBA 7848-193-36-ABCD
WA2FYE 5300-212-25-AB
K2DNR 2714-107-23-BC
WB2YQU
1848- 88-21-AB
WB2VQK 1242-138- 9-B
WB2OIM 1212-101-12-A
WA2VAZ 840- 60-14-AB
WN2BLM 776- 97- 8-B
WB2SIH 676- 52-13-AB
WN2BND 312- 52- 6-B
W2IP 196- 28- 7-B
WA2ZPD 160- 20- 8-AB
WB2AEB 136- 34- 4-B
WB2VVQ 60- 12- 5-A
W2JKI (6 oprs.)
22,368-432-48-ABCD
WB2VVS/2 (5 oprs.)
2625-175-15-AB

N.Y.C.-L.I.

WB2MRK
10,592-307-32-ABCDE
W2SEU 8784-218-36-ABCD
W2KXG 440- 55- 8-B
WB2TJE 225- 45- 5-B
WB2AIEO 204- 34- 6-B
WB2UZU 145- 29- 5-B
W2QPP 84- 14- 6-B
WB2WOI 42- 14- 3-B
W2ZSD 36- 12- 3-B
WB2MZE (WB2s MZE QLP RIR) 6600-300-22-AB

Northern New Jersey

WA2WZP
6669-247-27-AB
WA2PBN 3500-175-20-A
WB2UCS 2720-136-20-AB
W2AQT 2210-130-17-B
WB2KHD
1768-136-13-B
WB2UVP/2
1380- 92-15-B
W2CVW 1140- 76-15-AB
WN2ANI 904-113- 8-B
WB2WWB
900-100- 9-B
W2MNK/2
744- 62-12-A
W2DZA 680- 31-17-ABCD
WN2ZHL 400- 80- 5-B
WA2ACP 15- 5- 3-B
W2PEZ/2 (11 oprs.)
30,143-664-43-ABCD
W2DLT/2 (5 oprs.)
27,047-584-43-ABCDE
K2UYH/2 (5 oprs.)
10,175-243-37-ABD
WB2WIK/2 (6 oprs.)
5875-235-25-AB
WB2KKO (6 oprs.)
4368-208-21-AB
WB2PVB (WB2s GMR PVB)
3565-155-23-AB

MIDWEST DIVISION

Iowa

WØPFP 715- 55-13-A

Kansas

W9ECV/Ø 552- 46-12-A
WØSPF 65- 13- 5-AB

Missouri

WØLFE 287- 41- 7-B
KØTLM (WA2BXE, WAØIKI, KØTLM)
610- 61-10-AB

Nebraska

WØNXF 384- 32-12-B
WAØMRH/Ø
216- 36- 6-A
KØMBC 130- 26- 5-A
K2PCG/Ø 114- 19- 6-A

NEW ENGLAND DIVISION

Connecticut

K1WHT
12,708-353-36-AB

This is a mighty fine way to go hilltopping! **WB6ODM** (left) joined forces with **WB6PXN/6** to operate two bands at Leek Springs, El Dorado County, Sacramento Valley.

K11ED 4100-205-20-B
W1WHL 3456-120-27-ABC
K1YON 3132-84-29-ABCDE
W1DZA 876-73-12-B
K1KKK 567-63-9-AB
WA1GTP 496-31-16-AB
WN1HUE 276-46-6-B
WA1GIS 245-35-7-AB
W1QVF 232-25-8-BD
K1PCC/1 216-27-8-A
WA1GOI 152-38-4-B
W1WHR 140-28-5-B
WA1FSK 65-13-5-A
K1WHS 30-6-5-A
WN1HOL/1 5-5-1-B
K1PXE/1 (14 oprs.) 13,932-378-36-ABC
K1TZD/1 (12 oprs.) 11,088-290-36-ABCDE
K1PUG/1 (K1s PUG TKJ) 4316-166-26-AB

Eastern Massachusetts

W1EUJ 4446-164-26-ABD
WA1ETC 1469-113-13-AB
W1DOM 1008-84-12-AB
W1JSM 627-57-11-B
WA1DYU 276-46-6-A
W1MX (K4GGI, opr.) 238-34-7-B
W1CTR/1 160-31-5-BD
W1MCR 150-25-6-AB
W1CTR 75-25-3-A
W1QXX (W1QXX, K1SLZ, WA1BGB) 6355-193-31-ABC
WA1DCI (4 oprs.) 5075-186-25-ABCD
WA1ACD (WA1s ACD BIQ) 3009-177-17-AB

Maine

W1IPJ/1 (14 oprs.) 13,530-387-33-ABCD

New Hampshire

K1MFQ 2125-125-17-AB
W1ALE 1701-67-21-ABCD
W1AZK 1474-56-22-BC
K1BJT 975-75-13-AB
W1JJO 880-80-11-AB
W1CYB 250-25-10-AB
K1THG 65-13-5-A
WA1DWS/1 (WA1s DWS ECY HVZ) 2912-224-13-A

Rhode Island

WA1GFG 4640-232-20-AB
W1AJR 4305-105-35-ABCD
K1ABR 3102-94-33-AB
K1TPK 3082-134-23-AB
W1POP 1680-105-16-AB

Vermont

W1ZGZ/1 1053-81-13-A
K1GYT 832-64-13-AB
W1ADZ/1 192-24-8-A
W1EXZ 91-13-7-AB
WA2VGA/1 (WA2VGA, WB2YEM) 160-20-8-A

Western Massachusetts

K1JIX (WA2BVU, opr.) 2808-72-27-BCD
K1ULZ 900-75-12-AB
W1HDQ/1 784-49-16-AB
WB4BY/1 700-70-10-A
W1UCB 15-5-3-AB
K1BZM/1 (8 oprs.) 9468-252-36-ABC
K1YLU/1 (10 oprs.) 7656-217-33-ABCD

NORTHWESTERN DIVISION

Alaska

KL7GCK 15-15-1-B

Idaho

K7ZFG/7 (K7GWE, opr.) 24-8-3-AB
K7UGD/7 14-7-2-B

Oregon

K7ZIR 1183-81-13-ABCDE
W7TYR 486-45-9-ABCDE
W7HBH 90-17-5-ABC
WA7ECY 35-35-1-B
K7AUO/7 (11 oprs.) 1404-93-13-ABCDE
W7ICS/7 (W7ICS, K7ELM) 81-25-3-ABD

Washington

W7FIM 20-5-4-AB
WA7EHE/7 (5 oprs.) 260-65-4-AB
K7OUV/7 (5 oprs.) 4-4-1-B

PACIFIC DIVISION

Nevada

K7ZOK 35-7-5-AB

Sacramento Valley

W6DOR 57-19-3-A
W6HBU/6 (6 oprs.) 558-62-9-AB
WB6PXN/6 (WB6s ODM PXN) 520-52-10-AB

San Francisco

WB6YKU 246-41-6-B
WB6WLF 148-37-4-A

San Joaquin Valley

K6UJG 168-21-8-AB
W6YEP/6 (4 oprs.) 1905-127-15-AB

Santa Clara Valley

WB6WLH (4 oprs.) 792-87-9-ABD
WB6KBZ/6 (WB6s KBZ PGN) 696-58-12-AB

ROANOKE DIVISION

North Carolina

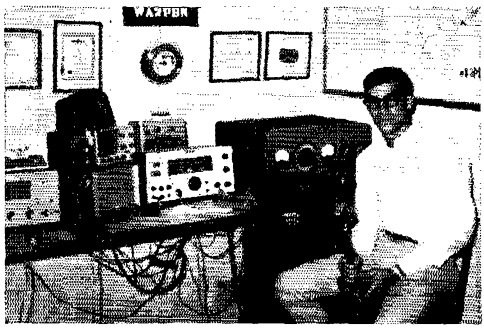
WA4BVW 728-56-13-AB
W4EPV 174-29-6-AB
W4HJZ 147-21-7-AB
K4LVV/4 (K4LVV, WA4s BNX VCC) 2304-144-16-AB

South Carolina

W4GCB 33-11-3-B

Virginia

K4SUM 4752-181-24-ABD
WB4FQR 310-62-5-A
WN4GFC 117-39-3-B
W4ZJA/4 (2 oprs.) 2112-128-16-ABD



WA2PBN concentrated on 6 meters and came up with 20 sections. John just got on to give out a few points and wound up by operating from midnight on! Input 700 watts, and antenna a 6-element Telrex up about 50 feet.

WA3HQD 4 (WA3s ELA HQD HQE) 1034-94-11-AB

West Virginia

K8HYE (K8s HYE PCF) 760-76-10-A

ROCKY MT. DIVISION

Colorado

WØAJY 154-77-2-AB
WAØSKHØ (14 oprs.) 546-87-6-ABDE
WAØPHZ/Ø (5 oprs.) 114-57-2-AB
WAØHFS (WAØs HFS QNR) 18-24-2-AB

New Mexico

W5IXS/5 40-20-2-AB
W5OJM 28-28-1-B

Utah

WA7IAW 48-12-4-AB

SOUTHEASTERN DIVISION

Alabama

WB4DQW 495-55-9-AB
K4WHW 184-46-4-AB
K4EOA 76-19-4-AB

Eastern Florida

WA4STJ 9-9-1-A

Georgia

WB4FMJ 570-57-10-AB
K4HQI 360-30-12-AB
W4CAH 76-19-4-A
WA4QPL (6 oprs.) 225-45-5-AB

SOUTHWESTERN DIVISION

Arizona

K7RKH/7 (4 oprs.) 260-21-10-ABD

Los Angeles

K6BPC (K6QPH, opr.) 72-24-3-AB

Orange

K6IBY 352-32-11-AB

San Diego

WB6TFC 176-44-4-B

WEST GULF DIVISION

Oklahoma

W5WAX 602-43-14-AB

Southern Texas

K5BDQ 20-20-1-B

CANADIAN DIVISION

Quebec

VE2SH 1408-82-16-ABD
VE2HW 407-33-11-BD
VE2RM (8 oprs.) 1462-84-17-ABD

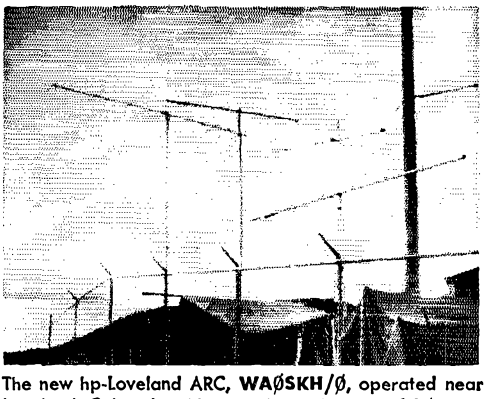
Ontario

VE3EZC 864-64-12-BD
VE3DSQ 814-74-11-AB
VE3BDX 570-51-10-ABD
VE3CRA/3 330-33-10-AB
VE3FIB 165-55-3-B
VE3AIB 136-32-4-BD
VE3ESE 132-33-4-B
VE3CTT 90-17-5-ABD
VE3DNR 40-20-2-B
VE3SAU (7 oprs.) 1230-82-15-AB
VE3RCB (10 oprs.) 110-55-2-B

Alberta

VE6MC 2-2-1-A
CHECK LOG: WB4HIP, WA9CUK, VE3FCH/W9

QST



The new hp-Loveland ARC, **WAØSKH/Ø**, operated near Loveland, Colorado with an enthusiastic crew of 14 manning 4 bands, 50/144/42/1217. Gear on 220 and above was homebuilt or modified surplus. They doubt trying that hilltop in January but wait till June '68!

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

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

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.

This is K5HXR, EC/RO Harris County Texas, beside the van that was used during the Hurricane Beulah communications emergency.

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 insure 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. — *W1NJM.*

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 is 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 area under §97.107. This request came from the Dallas FCC office, and Special Bulletin Nr. 785 on Sep. 29 cancelled it.

Principally through the efforts of the Section Emergency Coordinator for Southern Texas, we receive quite a number of different reports on amateur radio activities during this disaster, from the period Sep. 14–29. The following Emergency Coordinators or Radio Officers submitted reports: *W5s* AQK BFI BRZ DAA KR OBC PIL TFW ZPJ *K5s* ETH GDH HMF HXR QQG ZSC WA5NHL. We received reports from W5KLV (Phone Activities Manager for South Texas), from K5BNH (Secretary of the 7290 Traffic Net), and from WA5CLA on activities of a Hospital Network of amateurs.

K5QQG (SEC STex) says: "The unselfish devotion to their fellows was again displayed by amateurs, as it always is in times of danger. I had more volunteers for service than I could use in the Houston area. RACES was eminently successful, and the Houston Chapter of the Red Cross was well organized by W5JFU."

W5AQK (EC Nueces County Corpus Christi) reports that at 1:00 A.M. on Sep. 20 "Condition One" was set by the Mayor, and the American Red Cross opened ten shelters in Corpus Christi school buildings to receive refugees from the low-lying areas of the beach and Laguna Madre. At this time the hurricane was near Brownsville, and forecasts indicated 10-to-15-foot tides for the Corpus Christi area. The local AREC/RACES members set up a 2-meter network to provide communications between c.d. headquarters, City Hall, Red Cross headquarters and the refugee shelters. By noon of Sep. 20, there were nearly 20,000 refugees in the shelters, and the wind velocities had increased to nearly 75 m.p.h. There were some technical problems and some commercial power failures at points but these were quickly corrected and communications were reinstated within a short time. Outside communications were maintained with the outlying areas on the HFs. At 10:30 P.M., Beulah's eye was reported to be approaching Corpus Christi but weakening, and by 1:30 A.M., the wind and rain had subsided and the 2-meter net secured. At daybreak on Sep. 21, extreme flooding was reported at Robstown (16 miles west) with no radio station on the air. W5QEM/mobile was dispatched and found that several hundred persons had taken refuge in the County Showbarn. He then contacted the Red Cross representative to find out the requirements and radioed them to Red Cross headquarters at Corpus Christi. Later, W5QEM/mobile was relieved by WA5MPA and eventually by WA5GWT during the next 24 hours. On Sep. 24, c.d. officials at Raymondville requested communications equipment for use in evacuation operations. W5HQR and W5CYV 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 OOG QCT QGY and WA5GZI. 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 teletypes. Contacts were made with XE2NE, EC 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: "When Beulah crossed 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 W5MIF went to Three Rivers and operated from a hospital which was being used as a shelter. The area was also represented by W5PIL at Beeville and WA5OFN at George West. K5FPJ 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, WA5EWE 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 W5VCE 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 landline 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.

W5DAA (EC Kleberg County) reports that equipment was set up at the Kingsville City Hall by the Kingsville Radio Clubs and the call sign utilized was W5ERC. They used 75 meters for county communications and 6 meter for locals. The 6-meter units were at Red Cross headquarters and at each shelter and worked well with simple antennas. At one time the hospital 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.

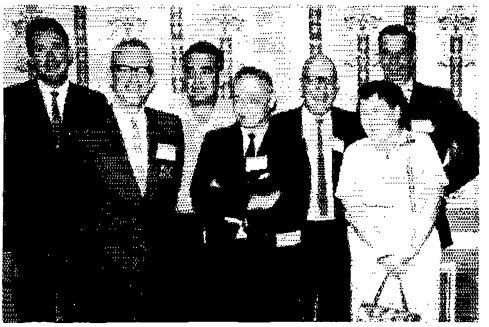
W5ONG (EC Victoria), had WA5MWY and WN5RFA operate his station for messages received and relayed to and from the Red Cross. WA5NWO and WA5NGP operated at City Hall and W5OXQ at the local broadcast station. W9SWB/5 used 2-meters at the Red Cross building. Victories was well represented during the emergency.

K5BNH (Secy. of the 7290 Traffic Net) reports 32 sessions representing 77 hours with 12 different net control stations with nearly 1260 check-ins and 1118 formal message handlings. Especially helpful were: *W5s* KFI KPX QYJ, K5QGY, *W.45s* DKN NRD.

WA5CLA sez *W5s* KR BVZ KPX WYJ, *K5s* EHY MKB participated in the Hospital Network, which utilized the RACES frequencies of 3987.5 and 7248.5 kc. to handle messages concerning medical availability of blood, beds, doctors, etc.

W5ZPJ (Gulf Coast Hurricane Net), reports operation from Sep. 14 to Sep. 20 with twice-daily schedules held with *XE2s* CY FFC QQU 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 funnels were sighted in the Houston-Harris County area during a 3½-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 WA6BRG (at large), K7JHA (RN7), W6VNQ (PAN), K7NHL (TWN), W6HC (Chairman), WB6BBO (RN6), W7DZX (TCC Pacific). Missing was member-at-large W6EOT.

Diary of the AREC and RACES

On Sep. 16 to 19, amateur radio operators performed meritoriously during the Typhoon Sara communications emergency. KW6EJ of Wake Island was one of the spark plugs for the activity. WA4QXB/KW6 passed most of the messages with the help of one unidentified operator. KW6EM and KW6CB were helpful representing their areas, while KG6AQT in Guam helped to relay from Wake to Honolulu when conditions were difficult. KH6SP, operated by WA6ZTY and WB6BNQ, was the net control station during the entire emergency. Some of the stateside stations who helped by passing messages and maintaining communications were W6BB, K6BPI, K7HYI and K7TWD. All these stations had a common quality, *preparedness*, which is something that no emergency should be without — KH6BZF *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 partially blocking the highway. VE2ALE/mobile Hawksbury, stopped at the nearest service station and reported the hazard to the authorities — VE2ALE *SEC Quebec.*

— • • • —

On Sep. 27, K6EJT heard a news report concerning a druggist'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. K6EJT 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, W6FKQ 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 — *WB6IZF.*

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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 WCARS to find a station in Santa Ana who could contact OA8AE in order to obtain information concerning a very ill relative in Santa Ana for the missionary in Peru. WA6VIB responded and completed the communications on 15 meters.

On Sep. 15, XE1DDP used 7255 kc. to report that WA6AVN had become critically ill while visiting Mexico. With the aid of WB6OTP and W6ZOM, arrangements were made to have WA6AVN transported to San Diego and notification made to his wife and brothers. Eight other amateurs aided in the various relays. WA6AVN was recovering nicely at latest report. Twenty-six amateurs furnished communications for 7 different accidents, 4 cases of stalled vehicles, two vehicle fires and 1 traffic hazard during the period from Sep. 2 to Oct. 8 using the coverage of the WCARS on 7255 kc. — *WB6IZF.*

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On Aug. 11 to 20, eight amateurs 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 jammed the telephone lines so that all communications were curtailed. This year the amateurs had communications available but an emergency situation did not develop. — *W9PRN SCM Ill.*

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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.*

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On Aug. 16, K8GMO called in on 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. W5HUT assisted by WB2YUC and HC1RR, 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 — *K8GMO.*

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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 at key points within the airport grounds. Seventeen amateurs participated in this activity — *WA8PQL EC Cuyahoga County, Ohio.*

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On Sep. 16, Disaster Exercise *Phantom II* was held in the Washington, D.C., area. The amateurs utilized 50.4 Mc. The authenticated originations were sent via four different services (C.A.P., MARS, CB, AREC) and elaborate systems were used to be sure that the radio messages were authentic. One radio unit was designated to place fictitious messages in the system and attempt to sabotage the operations. This resulted in a few messages being diverted from the addressees and some false messages getting into the networks. The widespread exercise, covering D.C. and parts of Md. and Va., provided the first opportunity for many of the participants to handle formal messages and work in a net. During the exercise, weather summaries of Hurricane Doria were sent at regular intervals, and if an emergency situation had developed, the units in the exercise would have been available for the real thing. The joint effort worked to the advantage of everyone participating — *W4TE.*

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From Sep. 15 to 17, during the hurricane Doria 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 Sideband Net maintained a watch for nearly 15 hours, logging 75 stations and maintaining contact with the capital at Richmond and the Red Cross headquarters at Alexandria. WB2ADE (EC for Cape May and Atlantic Counties, N. J.) organized the AREC/RACES systems using 2 meters. Seven amateurs represented the Atlantic County effort and eight in the county of Cape May. W3PM was very helpful in the Delaware section. The hurricane turned away, and an emergency situation did not develop. — *W2BZJ, W3LDD, K3NYG, W4OKN.*

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On Oct. 1, The Catamount Ham Radio Club of Bennington, Vt., and the Mount Greylock Mobil Ears CB Radio Club of North Adams, Mass., joined forces in providing communications for a foliage parade which embraced 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.*

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

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Forty-five SEC reports were received for the month of August representing 15,952 AREC members. This is three fewer reports and 2,847 fewer members than a year ago. Sections reporting are: Ala., Alta., Ark., BC, Colo., Conn., Del., E.Fla., E.Mass., E.Pa., Ga., Hawaii, Ind., Ill., Kans., Ky., L.A., Mar., M.D.C., Me., Mich., Miss., Mo., Mont., N.C., Nebr., Nev., N.L.I., N.N.J., Ohio, Okla., 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 Orange Section should have been listed for June in Oct. *QST* and also for 100% reporting for the first half of 1967.

This is K4KRG BEBA headquarters in Orlando, Fla. pictured are K4FXF, W4BKC, K4UIZ, AAA man and K4KRG in action at the Orlando office of the AAA during the "Bring 'em Back Alive" activity from Sept. 1 through 4. The ARPSC communications supplemented the normal facilities during the heavy holiday traffic periods, and provided on the spot information regarding traffic loads, accidents and weather advice to motorists throughout the state. Nearly 600 information bulletins were transmitted by amateurs on 7240 or 3940 kc. either from AAA field offices or ARPSC units (fixed, portable or mobile). There were 73 stations represented in this report from Eastern Florida — W4FP.

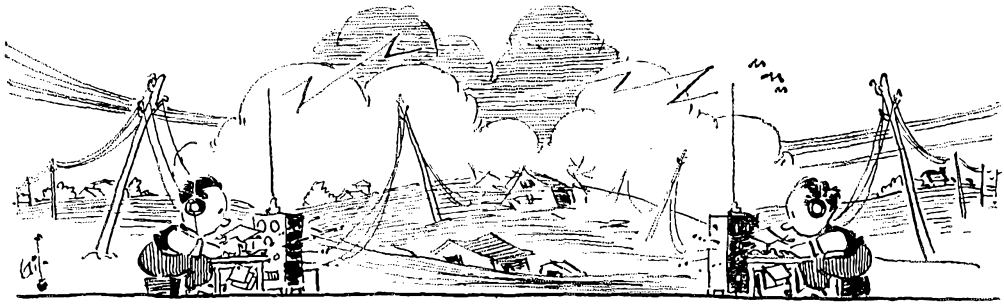
National Traffic System

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 NTS 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" net stations to report into the net *at all?*

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

Well, let's take a fictitious example. Suppose WA1HSN is NCS for the Connecticut Section Net on a given night. On this particular night he knows that W1EFW will QNI to take "thru" traffic, and will later take that traffic to

(*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.

possible exception of the Citizens Radio Service which I mentioned earlier. All of them, with the same possible exception, are continuing to do so — their operation has been demonstrated to meet the criteria of "*Public* interest, convenience and necessity." They are contributing to the public safety or the productivity of the particular activities or industries with which they are associated. Their use constitutes "serious business," not a hobby, yet they are allocated less than five percent of the usable spectrum space between 25 and 890 Mc. With the excessive crowding of stations on their frequencies, it is not very surprising that they are looking for more spectrum space into which they can expand, yet there is no unallocated space in that portion of the spectrum which can be given to them — anything which they gain will have to be taken from some other service.

The Amateur Radio Service is allocated 44.7 Mc. of space in the portion of the spectrum I have just mentioned. Fortunately, much of that is shared with the military which in the past has supported the amateurs against other possible claimants in the United States. The FCC also in the past has supported the amateurs both nationally and internationally, in their desire for the retention of spectrum space in which to operate. That support, on the part of the military and the FCC has been on the basis that the amateurs and the Amateur Radio Service have proven that the service and the operation of its stations was in the public interest. As to future support in the same measure, particularly by governments other than our own at the next International Frequency Allocations Conference, your guess is as good as mine. Certainly, the amateurs will need to continue to demonstrate, both nationally and internationally, their worth as a service to the public and not as an individual hobby. If you have not recently read the "Basis and Purpose" of the Amateur Radio Service, as contained in Section 97.1 of the FCC Rules, I recommend that you do so. It contains the only real reasons why we have an Amateur Radio Service in the United States, and the word "hobby" is definitely not included.

"Basis and Purpose"

Some time ago, in an effort to encourage the voluntary upgrading of the Amateur Radio Service from the standpoint of *demonstrated* technical and operating competence, the FCC issued the proposed rule making which is commonly referred to as the "Incentive Licensing" proposal, Docket No. 15928. The logic behind that proposal is probably clear to all of you — it is based on three of the five reasons for the Amateur Radio Service which are contained in the rule section I have just mentioned. Action on that proposal has now been completed, as you undoubtedly know. I will not attempt to discuss that action, since the full text of the Report and Order and the changes in the amateur rules which it effects will undoubtedly be printed in forthcoming issues of the various amateur magazines. It is now up to the amateurs to proceed to prove to the FCC, the military, and all others concerned that the Amateur Radio Service is of value to the nation and, yes, to the entire world, as a training ground for an ever increasing reservoir of competent radio operators, technicians and electronics experts. That is one way in which we can demonstrate that amateur radio meets the requirement of public interest, convenience and necessity. There are other ways.

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.

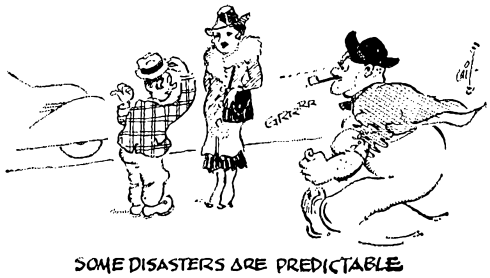
As you probably already know, I am now living in the Chicago area. As you also probably know, Chicago has been plagued during the past year by extremes in weather conditions; snowstorms, ice storms, floods and tornados. Shortly after one of the major visitations by tornados, which wrecked havoc in two 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 Chicago area. When the time came in the proceedings of the club meeting of a report on what part the club mobiles and the repeater had played in providing needed communications to and from the disaster areas, this was the report:

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

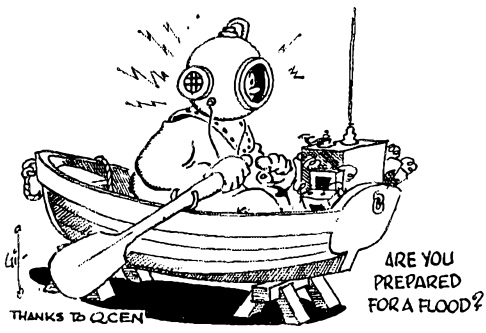
That, my friends, is on a par with the proverbial case of locking the barn door after the horse has been stolen. It demonstrates a lack of forethought, of prior organization so as to be able to take an active part in coping with the emergency which we hope never occurs but which may occur without notice.



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.

ARPSC

The Amateur Radio Public Service Corps (ARPSC) 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 ARPSC 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 operative 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 Nets, and the Eye Bank Net. All are organized and operative on a regular basis, ready to spring into instant action in cases of emergency. Any of these and many others could profit by your affiliation and by your 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 164*)

December 1942

. . . K. B. Warner, W1EH, 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, W8LUT, and D. L. Moody describe the activities and show a number of pictures and diagrams. It looks like a well thought-out program. Reonant 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, W2KHM, discusses standing waves on transmission lines and presents graphic methods for matching such lines to antennas.

. . . Sez 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 "Handie Talkie" to powerful truck-mounted rigs.

. . . In order to find out what a "Swoose" is, you have to read the piece by C. B. Wolfe, W9LJO. 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 Espy, W6UBT, takes us through a review of some fundamental mathematics. You get led real easy like into a little algebra, geometry and trigonometry. Logerithms are also explained. Altogether, this is well worth going over. Nothing too way out.

. . . John Huntoon, W1LVQ, is now Chief Radioman USCG 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.

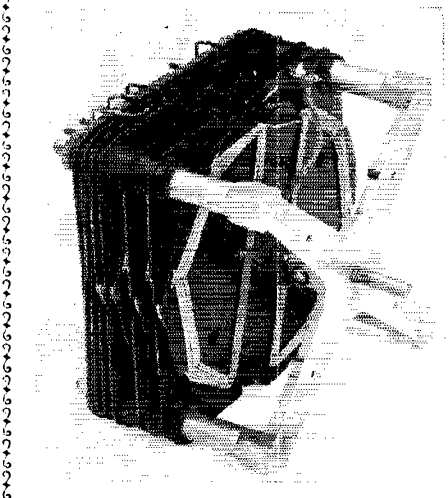
. . . John Bailey, W8UJB describes his 25-watt, 2½-meter mopa. This is a real good rig adapted to control stations in WERS.

— *W1AW*

COMING A.R.R.L. CONVENTIONS

April 26-27, 1968 — Michigan State, Lansing, Mich.
June 1-2, 1968 — New England Division, Swampscott, Mass.
June 7-9, 1968 — National, San Antonio, Tex.
August 3-4, 1968 — Central Division, Springfield, Ill.
October 12-13, 1968 — Hudson Division, Tarrytown, N. Y.

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, W5NQR, 308 Karen 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.

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION

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.

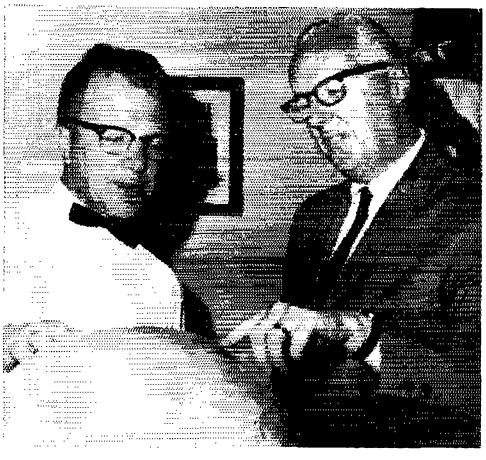
QSL BUREAUS OF THE WORLD

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 VP8s go to RSGB in Great Britain. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL. 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.**

Aden: Amateur Radio Club, Signal Squadron, RAF Khormasksar, B.F.P.O. 69, London, England
Algeria: G. Deville, 7X2RW, 21 Blvd. Victor Hugo, Alger
Angola: L. A. R. A., P.O. Box 484, Luanda
Antarctia: KC4AA cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to K1NAP, COMCBLANT, USN, CBCEN, Davisville, E. Greenwich, R. I.
Argentina: R.C.A., Carlos Calvo 1424, Buenos Aires, BA
Austral/Antarctic French 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, VK4JF, 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, VK6RU, Box F319, GPO Perth, W.A.; VK7 QSL Bureau, Mr. J. Batchelor, VK7JB, 39 Willowdene Avenue, Lower Sandy Bay, TAS.; VK8, VK9, VKØ, Federal QSL Bureau, 23 Landale Street, Box Hill E. 11 Victoria**

Austria: Oc. V.S.V., Box 999, Vienna 1/9
Azores: via Portugal
Bahama Islands: Bahama Amateur Radio Society, **Box 6004**, Nassau
Bahrein: (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awali
Barbados: Amateur Radio Society of Barbados, Highgate Signal Station, Flagstaff Road, St. Michael
Belgium: U.B.A., Postbox 634, Brussels 1
Bermuda: R.S.B., P.O. Box 275, Hamilton
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
British Guiana: D. E. Yong, VP3YG, Box 325, Georgetown
Bulgaria: Box 830, Sofia
Burma: B.A.R.T.S., P.O. Box 800, Rangoon
Burundi: via Congo (9Q5) QSL Bureau
Canal Zone: Ralph Harvey, KZ5RV, Box 407, Balboa
Cape Verde Island: Radio Club de Cabo Verde, CR4AA Praia, Sao Tiago
Ceylon: 4S7WP, P.O. Box 907, Colombo
Chagos: via Mauritius
Chile: Radio Club de Chile, P.O. Box 13630, Santiago
Colombia: L.C.R.A., P.O. Box 584, Bogota
Congo: (TN8) QSL Bureau, P.O. Box 2239, Brazzaville
Congo: (9Q5) U.C.A.R. QSL Bureau, B.P. 3748, Elisabethville
Cook Island: ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga
Costa Rica: Radio Club of Costa Rica, Box 2412, San Jose
Cuba: ANRAC QSL Bureau, P.O. Box 6996, Havana
Cyprus: C.A.R.S. QSL Bureau, P.O. Box 216, Famagusta
Czechoslovakia: C.A.V., Box 69, Prague 1
Denmark: E.D.R. QSL Bureau, OZ6HS, Ingstrup
Dominican Republic: R.C.D., P.O. Box 1157, Santo Domingo
Ecuador: Guayaquil Radio Club, P.O. Box 5757, Guavaquil
El Salvador: Club de Radio Aficionados de El Salvador, QSL Bureau, P.O. Box 517, San Salvador
Ethiopia: Kagnew Station Amateur Radio Club, ET3USA, APO, New York, N. Y. 09843
Faeroes Islands: P.O. Box 184, Torshavn, or via Denmark
Fiji Islands: P.O. Box 184, Suva
Finland: S.R.A.L., Box 10306, Helsinki 10
Formosa: (BV1US calls only) Taiwan American Radio Club USARSCAT, Box 8, APO, San Francisco, Calif. 96263 All other BV stations: QSL Bureau, C.R.A., Box 2007, Keelung, Taiwan, Rep. of China
France: R.E.F., Boite Postale 70, 75 Paris 12
France: (F7 only) F7 QSL Bureau, % Base MARS station APO, New York, N. Y. 09083
French Oceania: Radio Club Oceanien, P.O. Box 374, Papeete, Tahiti
Germany: (DL4 & DL5 only) MARS Radio Station, Hqtrs. 93rd Sig. Bn. APO, New York, N. Y. 09175
Germany: (Other than above) D.A.R.C., Box 99, 8 Munich 27
Ghana: G.A.R.S. QSL Bureau, P.O. Box 3773, Accra
Gibraltar: RAF Amateur Radio Club, New Camp, RAF
Great Britain (and British Empire): R.S.G.B. QSL Bureau, G2MI, Bromley, Kent
Greece: George Zarafis, P.O. Box 564, Athens
Greece (SV0s only): Signal Officer, Hqtrs. JUSMAGG, APO, New York, N. Y. 09223
Greenland: via Denmark
Greenland (KG1, OX1 and OX5 calls only): KG1A-KG1E (OX5) to MARS Director, OX5BX, APO, New York, N. Y. 09023. KG1F-GK1Z (OX4) to MARS Director, OX4FR, APO, New York, N. Y. 09121
Guam: M.A.R.C., Box 445, Agana, USPO 96910
Guantanamo Bay: Guantanamo Amateur Radio Club, Box 55, FPO, New York, N. Y. 09593
Guatemala: C.R.A.G., P.O. Box 115, Guatemala City
Haiti: Radio Club d'Haiti, Box 943, Port-au-Prince
Honduras: Jacobo Zelaya, Jr., HR1JZ, Bo. Buenos Aires, 13 Calle 505, 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: Islenzkir Radio Amateur, Box 1058, Revkiavik
India: A.R.S.I. QSL Bureau, P.O. Box 534, New Delhi 1
Iran: Amateur Radio Soc. of Iran, APO, New York, N. Y. 09205
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 Alberga, Jamaica Amateur Radio Association, 76 Arnold Rd., Kingston 5
Japan: (JA only): J.A.R.L., Box 377, Tokyo Central
Japan: (KA only): F.E.A.R.L.-M-, APO, San Francisco, Calif. 96525
Johnston Island: KJ6BZ, % MARS Stn., Det. 1, 1957 Comm. Gp., APO, San Francisco, Cal. 96305
Kenya: RSEA QSL Bureau, Box 30077, Nairobi
Korea: Korea Amateur Radio League, Central Box 162, Seoul
Korea: (HL9) HL QSL Bureau, Signal Section, USFK/EUSA, APO, San Francisco, Calif. 96301
Kuwait: Alhalf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphanh Saignasith, XW8AI, P.O B. No. 46, Vientiane
Lebanon: R.A.L. QSL Bureau, P.O. Box 1217, Beirut
Liberia: Liberian Radio Amateur Ass'n,. Post Box 1477, Monrovia
Libya: 5A QSL Service, Box 372, Tripoli
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber, rch sur/-Alzette
Macao: via Hong Kong
Madeira Island: via Portugal
Malagasy Republic (Madagascar): P.O. Box 587, Tananarive
Malawi: 7Q7RM, P.O. Box 472, Blantyre



During September, ARRL Hq. staffer W1IKE 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 Stanford 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
Malta: R. F. Galea, 9H1E, "Casa Galea," Railway Road, Birkirkara
Mariana Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, FPO, San Francisco, Calif. 96555
Mauritius: Paul Caboche, VQ8AD, Box 467, Port Louis
Mexico: L.M.R.E., P.O. Box 907, Mexico, D.F.
Midway Island: KM6BI, Box 14, FPO, San Francisco, Calif. 96643
Monaco: Pierre Anderhalt, 3A2CN, 49 rue Grimaldi
Mongolia: JT1KAA, Box 639, Ulan Bator
Morocco: A.A.E.M., P.O. Box 299 Rabat
Mozambique: L.R.E.M. QSL Bureau, P.O. Box 812, Laurenco Marques

(*Continued on page 160*)

Correspondence From Members-

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

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 200 kc., you're crazy." See my point? Let's do our best and not only accept incentive licensing, but lets make it a smashing success! The theory class this year is just the thing to help us get started. — *Dave Dreis, WAØNKJ, 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, WB2LDX, 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 day. It was in grave danger of becoming just another kind of CB operation. Now, we have an ordered system of progression 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 "appliance 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., W4EMP, Langley AFB, 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 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. Rust, WAØLKF, 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 1964, 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., WA1DDO, Whitman, Massachusetts.*

For your meddling in band allotment, you splinter heads should be exported to some remote deserted island. — *Lt. Col. James C. Richardson, W3CLJ, 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 licensee 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, W8LGI, 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. Stackhouse, KØEMB, 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 OTs 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 QRS. What a boost for my morale! You see, I have blown the FCC General code test three times, the last being just last Friday. — *Robert W. Malmquist, WN9TTS, Morris, Illinois.*

¶ 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; practically no one declared a foul! Only one fellow 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 Allison, KØEDK, Montrose, Colorado.*

¶ I believe this new law will hurt amateur radio more than it will do it good. — *James D. Smith, W4CQQ, Jacksonville, Florida.*

¶ . . . Incentive licensing is here I understand. Hurrah and congratulations on your part in 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. Paine, W7DNQ, Tuscon, Arizona.*

¶ Congratulations on fine job you did to help get incentive licensing passed. Keep up good work. — *W. Ernest Bosselman, W1OUZ, Farmington, Connecticut.*

¶ I do not condone your proposals to stifle the future growth of amateur radio by limiting its operation to a few electronic experts. — *Paul Barnes, WA3FUI, New Ringgold, Pennsylvania.*

¶ I support the incentive licensing bill 100% and think it will help amateur radio immensely. — *Richard Goeggel, WAØNOH/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, WA8PVN, 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 mean something in terms of privileges. It might take me a few years to get it, but maybe, someday. — *Thomas Carten, WA1DJC, Gloucester, Massachusetts.*

¶ I am personally pleased with the incentive licensing regulations just released by the FCC and want to congratulate the ARRL for its support in this matter. I hold a General Class ticket and may never find the time to advance myself but at least the incentive and recognition is available. In any 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., W8FXF, Williamson, West Virginia.*

TECHNICAL ADVANCEMENT — CONTINUED

¶ Your September editorial said: "Incentive licensing . . . brought 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 have 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 communications without wires 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 all those new advances in the state of the art!! Out'n 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 *QST* 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,

and that is a good thing. However, it is among those people that have exceptional capabilities in the field that amateur radio progresses, and even leads in the electronics and communications state-of-the-art. Amateur radio provides a medium for trying out new ideas and improving on old ones. In the past, amateur publications and most amateurs were eager to follow the lead of these people, and amateur radio enjoyed a most respected position of technical progressiveness.

The mere fact that the tube-versus-transistors controversy is just now breaking out shows how far behind we are. That issue was settled for all time in the electronics industry over 5 years ago. The *QST* record for this year is excellent in solid-state. I would have preferred to see this trend starting a few years earlier, but one can understand that the necessary articles must be submitted before they can be published. I still get that gnawing feeling when I see an article in a magazine with a 1967 date on it, where vacuum tubes are used without *justification. Justification* may be construction from old TV parts, add-on gadgets for existing vacuum tube gear, or in highly specialized cases where it is technically *justified*, such as high-powered RF finals or 'scope tubes. *Justification* does not include "the average ham has neither the experience nor the endurance." That argument is a flat admission that we aren't up to date.

The 12AU7 someone wanted replaced with a single transistor costs $1.18 in the latest Allied catalog (where I finally found it in the 16-page tube listing *after* the 100 page listing of solid-state devices). If you want to play that kind of game, show me the single tube that can replace the $2 Motorola dual J-K flip-flop with 24 transistors and 16 resistors, and not require additional parts to make it into a functional circuit. Or the single tube which can replace the single RCA CA3011 integrated circuit which costs $2 and has 10 transistors, 11 resistors and 7 diodes. The latter is the size of a single transistor and is a complete IF amplifier with 75 db of gain, good from 100 kc to 20 mc, and in temperatures from −55 to +125 degrees Centigrade! How much build effort and time would it take to duplicate these devices with tubes? What are we wasting our time for? Why mount all those tube sockets, build a big power supply, wire all those heaters and then get zapped from B+ while we are trouble-shooting it? Can you get a shock from 4.5 volts? When you are finished, why do we want equipment that needs maintenance and occasional tube replacement? Generates heat and is big. Draws power like there is no tomorrow — when a few penlight cells can do the same job — without any warmup time. Especially when it takes more of the hard-to-build tube stages for the same gain as single transistor stages (at any frequency), let alone complete integrated circuits?

This only scratches the surface. With smaller, more efficient devices, there is room for more functions — the same gear can *do* more — for less.

Don't be afraid of solid state. Don't join those of the spark-gap era who were afraid of vacuum tubes and wasted print decrying the new techniques. Solid state is the most exciting, dynamic thing that has happened to electronics and communications since the tube was invented and amplification demonstrated.

This *is* 1967. It is the age when solid state has taken over everywhere else. In this age it is vacuum tubes that need to be justified, not transistors. — *Gilbert Boelke, W2EUP, Ebenezer, New York.*

HAMMING ON THE HOPE

¶ The article "Hamming on the *Hope*" in the August *QST* crystalized 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 Fierston, KX6FJ/W1BRJ, 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.

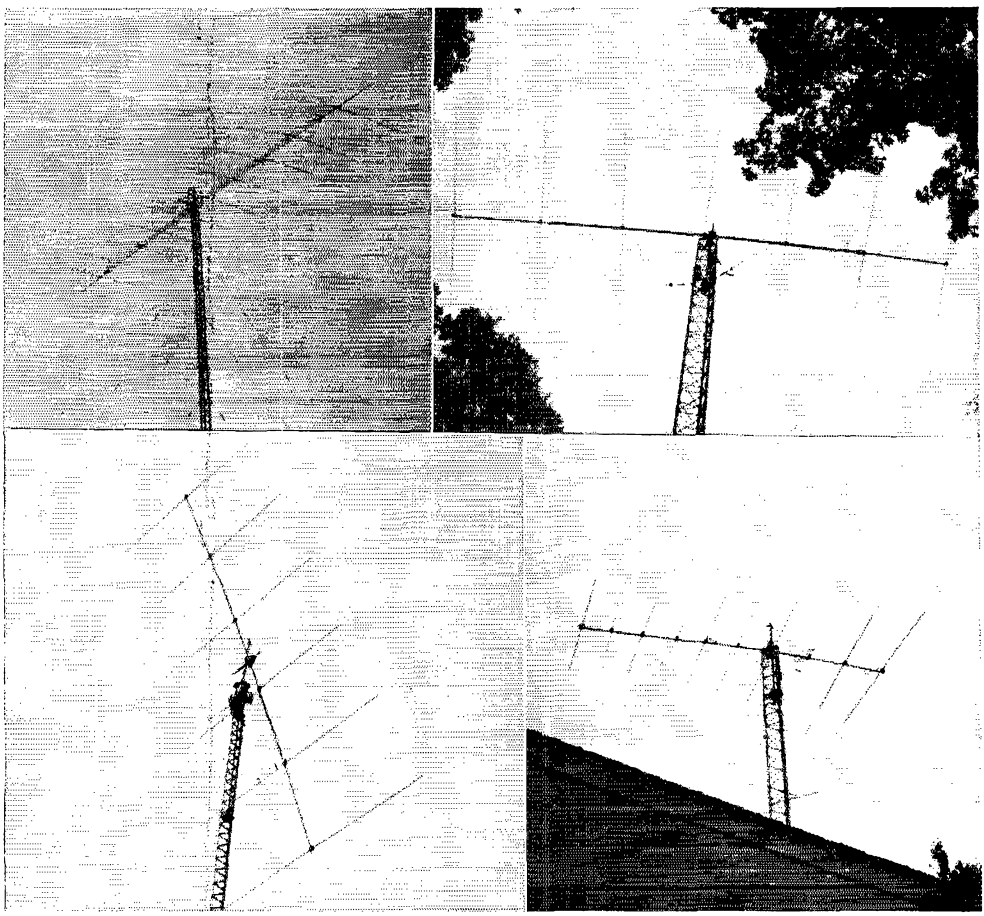
The cooperation of the ham fraternity was always of the highest caliber, and the personnel aboard the ship appreciated more than words can convey the communication which was provided back to the States from a rather isolated area.

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

TNX OMs

¶ This letter is being written to the "unsung heroes" of The North Jersey DX Association, who with WA2DIG, 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 land. At a recent picnic given by the North Jersey DX Association (ARRL W2-K2 QSL Bureau), I talked to Vic WA2DIG 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, W2BAI, Passaic, New Jersey.*

Strays



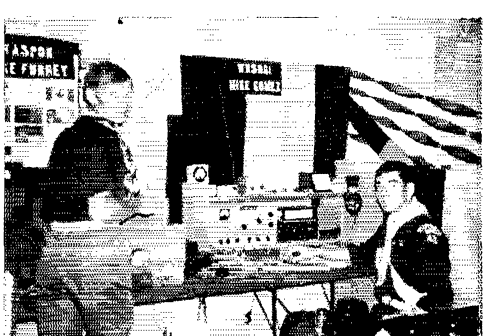
Big signals don't necessarily come from big antennas, but one thing is for sure: the antennas shown here are really big. We thought you would like to see a few samples of some behemoth beams. (Top left) 11-element 20-meter Yagi, 127-foot boom, 127-feet high, W3VBE. (Top right) 7-element 40-meter Yagi, 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-feet high, W3GRF.

Feedback

Belated discovery: In Fig. 3 of WØIYH's article on r.f. clipping, July 1967 *QST*, two switches were mislabeled. S_{1B} should have been S_2, and S_2 should have been S_{1B}. The switch in the grid lead of the 6EA8 pentode section is a single-pole unit for introducing 20 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. WA5POK (1.) and WN5RGI made contacts and answered questions. All participating Explorers helped with the various chores, from putting up antennas to setting up the booth.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

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

Dear Young Squirt:

Thanks for using my ancient crack about three-rigged hams. But you're trying to catch Niagara in a thimble, a wireless Don Quixote tilting at steel-paneled printed-circuit 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 1930s professional radio apparatus looked like professional apparatus, ham gear looked like ham gear, and hams were darned proud of it. Commercial stuff, built on the office-safe motif, trended up and down, for one thing. Amateur style wandered airily about the shack, often table-top along two or three walls. This ensured plenty of space for display of trophies of the hunt, one's best DX QSLs. 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.

After more than a quarter century of this ruggedly individualistic practicality, a sudden sophistication reared its siren 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 QSO results; even more important, judging from some of the signals emitted by those steel-clad monsters. No, BCI-TVI 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, slavishly commenced cable-lacing, crackle-finishing, terminal-stripping and steel-paneling to the point where attempting the old week-end fun rebuilds kept them off the air for a month or more — if they ever got back on. Fun? Those murderous steel chassis and panels alone quickly turned many a soldering bug into a confirmed appliance 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-mimicking sense, at least warmed up dormant soldering irons, and everybody loves a bargain. Sure, we banged away on make-do clunkers twice as long as it would have taken to build old-style non-compromise nonpaneled items from scratch. It was fun, though, and reasonably educational, and it dented our commercial-aping hypnosis temporarily. Amateur publications, for a pleasurable period, put aside their curious 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 Killerwatt" or "The Snuffbox Linear". One try may be enough. OTs who didn't have enough muscle in their youth to duplicate recommended commercial blacksmith and power-press techniques now find their eyes too far gone to compress 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 dumbly strive to emulate the new communicational 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 basics 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 tinfoiled masonite. But have you priced good breadboard lately?

What:

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

20 phone doings, described by "How's" correspondents **Ws** 2DY 2VOZ 3HNK 3JZJ/9 3LE 3SEJ 4NXD 4YOK 4ZSH 6AEM 8YGR 9LNQ, **Ks** 3MNJ 4HPR 4HQD 4TWJ 5VTA 7INE 7YDZ, **WAs** 1CYT 1DJG 1GGN 2LOR 2WIJ 3GJU 5PUQ 8MCQ 8SLW 9MQI 9SXQ 9THB, **WBs** 2RJJ 2ZUB 6KVA, DL4PV and s.w.l. P. Kilroy, feature folk like **AP2s** AD (14,104 kc.) 1900 GMT, AR* (173) 14, MR (117) 19. NMK (202) 21, **CEs** 1AQ 3DM 3TS 6AE (202) 3, **CN8s** FV (312) 21–22, MR 6, **COs** DL (199) 2, GG 12–17, **CP6FT** 2, **CRs** 4BB (102) 7, 4BC (208) 19, 5SP (195) 6, 6BX (193) 23, 6FY 6HI 23, 6IK (203) 15, 7AQ (192) 15, 7CI 7CO 7DS (204) 15, 7FM 7GO 4, **CTs** 1BT 1EE 2AC (195) 0–1, 2AO (201) 18–23, **CXs** 3BBD (215) 0, 7AB 9AAN 9CO (110) 0, **DI2LE** (224) 14, **DMs** 2BUD 2CZL 4ZOL 5, **DUs** 1FH (175) 16, 1OR 3SL 9FB (245) 16, **EAs** 6BC (200) 0, 8CB (227) 9,

*7862-B West Lawrence Ave., Chicago, Ill., 60656.

More merry-makers in this year's ARRL DX Contest, from left to right beginning at top: Brazil phone victor PY1BYK/7; YV4NS who placed third among Venezuela's bug-bangers; KP4AST, sole P.R. mike applicant with 4190 QSOs; CE6EZ, narrow winner over CE6EF on 3256 phone contacts; HK3BAE who pressed HK3RQ with 3133 code exchanges; and the layout at HP1BR, popular Panama perennial. (Photos via W1YYM)

8CI (150) 22, 9AZ 7, 9EJ (125) 1, EIs 2BG (200) 6, 4AN 4J (342) 20, 9Q (215) 3, ELs 2AC (213) 7, 2AG (240) 21, 2AT 2E 3C (240) 17, 3H, EP2s BE BQ (190) 7, EQ* HL, ET3USA (178) 15, Fs 2US/FC 2WS/FC (215) 20, 3CC/FC 3DD/FC (205) 10, 8XU/FC, FB8WW (202) 6, FG7s XL XT, FH8s CD (135) 12, CE, FK8s AB AC (203) 6, AU (235) 7, BC (223) 10, BG BK (236) 11, FL8FP (213) 21, FO8s AA 4, AG (142) 16, AQ 9, BL (202) 11, BQ (332) 5, BT (110) 9, BU BV BW 23, FP8AP (195) 13, FR7ZD (197) 3, FW8RC (112) 6, FY7s YI YL YM, GCs 3UMX 8HT (211) 4, GD3s FXN (225) 8, RFK (213) 16, HBs 4FE (202) 22, ØLL (201) 6, HCs 1MF 1MH 1TH 2JN 4BS (103) 7, 5BZ 5RP 8FN (150) 3, 8JG (159) 23, HIs 3JHV 12, 4ARM 7IZ 7WXS (310) 12, 8ALA (300) 12, 8XB 8XDA 4, HK0s AI (160) 16, BIS (250) 6, HL9s KF 4, KH 13, KI (222) 14-15, KO TE TK 13, HM1AJ, HP1s CJ ME, HRs 1CN 1DB (280) 3, 1JMS (123) 2-3, 1KAS 1MN 2AD 2CC 2HH (165) 23, 6EB (165) 23-0, HSs 1CB 1RZ/3 4AK (130) 18-19 off-limits for FCC/ITU signatories, HV3SJ (212) 18, HZ1CB, IS1s ALX (228) 2-3, LIO (211) 21, RUA, IT1ZGY, JAs 1ADN 1GTS 1KG 1KSO 1SEX 2ADH 2AVO 2BHG 2BTV 2CLI 3AZD 3CWW 3IOZ 3RQ 6ACZ 6AV 7NI 7MA 8AA 8BKG 9IJ ØAZE all around 12-13, JW5YG, KAs 2HC 2VT (270) 11, 7AB 14, 7RF 9MF (210) 12-13, KCs 4AAD 4USN (232) 6, 4USV (230), 6BY (248) 16, 6CL (320) 11, 6JC (211) 12, KGs 4AA 4AM (313) 21, 4CO 6AAY 6AQG 6FAD 6FAE (225) 10-11, 6IF (219) 12, 6IJ 6SA (296) 8, 6SB (245) 11, 6SF 6SL (230) 15, 6SN (225) 12, KH6EDY (201) 14, KJ6BZ (278) 8, eight KL7s, KM6BI (273) 7-8, some KP4s, KR6s AF AG AO (242) 22, BD CR (258) 12, IS KG (265) 19, KN (177) 13-14, MA MH 12, UD USA USQ, KSs 4CE 4CF 6BV 6BX 6CL (230) 21-22, 6CR (235) 13, KV4s BW CX EY, KW6EJ (219) 14-15, KX6s BQ BU 11, DC (230) 11, DR DQ FA 14, FD (300) 11-12, KZ5s CG NH TN, LX1s DB (342) 22, CO 21, LZs 1BZ 2, 1FO 2KKZ (230) 5, M1B (117) 13, MP4s BBA BBW (185) 3, BCC (180) 2, BGE (240) 3, MAW MAX, OAs 4AV 4CV 4J 4N 4ON 4SG 4SIX 4SO 8V, OD5BZ (198) 3, OE1SJ, OHØs AA 5, NI (223) 8, OXs 3CJ (118) 17, 3LP 4AA, OYs 2J 3H (235) 10-11, 7C (165) 0, 9IM (232) 20, PA9EO (225) 22, PJs 2AQ 13, 2MI (198) 11, 3CC 3CL (158) 23, PZ1s AP (150), 8I BW (196), BZ CF CK (150), SL1CP (129) 16, SP8s AJK AVK 5, SVs 1DL* ØWB (203) 5, ØWL (220) 20, TAs 2FM 4EK (102-243) 10, TFs 2WKM 3EA 3IC (342) 22, TG9s AD DF EP (185) 7, MB MO (105) 7-8, RV, ten TIs, TJ1QQ (131) 21-0, TL8DL (120) 20, TN8AA (110) 18-19, TR8AG (104) 20-21, TU2AY

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 coagulate it, so to speak." And coagulate it he has — and superbly, too.

Rod has been connected with radio operating since his first job with the government at WAR in 1942, 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 1946, with continuity broken only by full-time hitches with ARRL in Connecticut, and some radio schooling. Rod revels in 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-spun rig runs 400 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!

(170) 23, **UAs** 1AB 2AO (230) 5, 3CT 3KBO 4IF 4KED (142) 5, 6KOE 6XG **9**DT (173) 1, 9FC 9KTQ 0CO **0**KAP **0**NM **0**SK 14, **0**YL, **UB5s** FG* JD* 22, UN WF WJ 21. **UC2s** BF BU (205) 5, KBG, **UD6s** BR CC (195) 14, **UF6AS**, **UG6**AW (125) 15-16, **UH8**AE, **UI8s** AG LC (105) 16, MN (220) 2, **UL7s** JA NW, **UM8s** FZ (195) 3, KAB (201) 15, **UP2s** KNP (214) 5, NV OO (220) 16, **UQ2s** KBH* KFG 6, LL, **UR2s** AR (195) 6, KAW, **UT5**DA, **UWs** 9EF 9OV 0AA 0AH 0IE, **UY5XS**, **VE8s** MC MD RCS (210) 5, WW YC, **VKs** 1BA 1BD 12, 1GD (175) 8, 4HG (168, 220) 6 of Willis, 8AV 9AG 9AS 9DR (197) 15, 9DJ (205) 14, 9GN (180) 12-13, 9MJ 9MK (212) 13, 9RJ (198) 14, 9TB **9**VN (182) 11, 9WD (210) 11, 9XI (199) 16, **0**CR (170) 7, 0CS (175) 12, 0MZ, **VOs** 1IO 23, 2GA/0, **VPs** 1LL (200), 1PB 1TC 2AA 2AM 2AZ 2GAI (155) 21, 2GAR 2MH 0, 2MW (139) 21, 2SY (126) 21, 5AB (115) 2, 6KL 6RG (194) 23, 6WR (274) 7, 7DR (332), 7NA 0, 7NS 8CW 8FL 2, 8IA 8IE (217) 18, 8IU (180) 2-3, 8JB 8JC (125) 21, 8JI (148) 23, 9K 9FB 9FR (120) 12, 9FX, VQs 8AD 14, 8CA (190) 14, 8CC (105) 5-13, 8CG (105) 15, 9DH 9G 11, 9JW (120) 19, 9TC (199) 12, **VRs** 1L (150) 11, 2CC (163) 5, 2DI (281) 11, 2DK (195) 8-9, 2FM (230) 9, **VSs** 6AJ 6AZ 6JO (205) 13, 9ARS (220) 22, 9MB 17, **VU2s** BK DKZ 3, WB (175) 14, Ws 3DWG/**VR6** (201) 6, ØGTA/LA ØPOJ/**KS6** (280) 8, WA5NUJ/**KJ6** (235) 11, XE3LK, **XPs** 1AA (198) 6-18, 2AA, XW8s AX (330) 22, BV (215) 15, CE (246) 12, CH, **YAs** 1DAN 1FV (180) 13, 2RAR (313) 4, 5RG, **YJs** 1DL 8BW (193) 7, YN1s BKC CML RCP RTM 5, RTS (320) 3-6, **YOs** 2BB 5, 3ZM (146) 2, **YSs** 1BOB 1MSE 1RCP 2MFI, **YUs** 1BCD 4, 2NFJ (200) 5, 7LAF, **ZB2s** AP BC 19, **ZC4**CN, **ZDs** 3G (191) 6, 7DI (215) 17, 7FF (231) 22, 7KH (213) 21, 8JES 8RH (195) 0, 9BE (263) 19, 9BH (195) 17, **ZEs** 2JE 5JJ (203) 15, **ZF1**GC (152) 23, **ZK2**AU 3, **ZL5**AC (250) 8, **ZPs** 3AB 3CW (342) 23, 5JB, **ZSs** 2MI* (198) 5, 3HT (195) 14-18, 3HX 14, 3JJ (193) 14, 3XG 14, 9II, 3A2s EE MJC (122) 18, **3B2**HA (300) 19-20, **3V8**BZ (192) 7, **4S7s** BR (195) 18, NE (198) 11, PB (127) 18, YL*, **4U1**ITU (200) 7, **4Xs** 4BC 4BL 5, 4CW 4, 4FQ 4JU 4SW 4UJ 1, 4VB 4WB 3, 4ZR 6SW 8HW 4, **5A4**TH (300) 9, **5H3**KJ, **5N2s** AAJ (213) 23, ABG (122) 6, **5R8s** AS (221) 5, AX (240) 5, BC (138) 18, **5T5**AD (326) 21, **5U7s** AK 21-22, AL (180) 21, **5V**Z1 (148) 17, **5W1s** AA AS (192) 7, AX (230) 5, **5Z4s** IW (215) 19, JW 21, KL (133) 23, KO 13, KN LO (238) 19, **6W8s** BB BQ (120) 18, DQ (210) 0, DX (120) 18, EB, **6Y5s** AK DM GG 14, GS LA RA, **7P8**AR (202) 6, **7Q7s** EC (218) 14, LZ (216) 15, **7X0**AH (300) 7, **7Z3**AB, **8R1s** C 2, C (120) 23, S (192) 23, **9G1s** BF 0-8, GA (342) 22, LT (215) 8, YJ, **9J2**ME, **9K2s** AD (332) 20, AG BY, **9L1**GQ (201) 8, **9M8s** 2CL (115) 16, 2CP 2LN (105) 15, 2NF 2PO 2TC (175) 15, 2XX (280) 16, 6LR 8RY (213) 14, **9N1s** BG MM (243) 16, **9Q5**PI, **9U5**BB, **9V1s** MY 17, NT NV, **9X5s** CE MH (230) 20, WE (155) 18, **9Y4s** DS (110) 21, LO 4 and VT 1, the few asterisks going for non-s.s.b. emitters.

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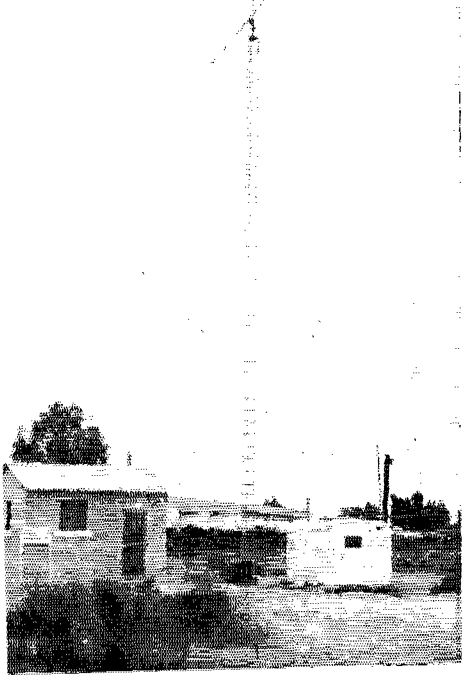
Next month, space permitting, we'll inspect the 14-Mc. c.w. scene courtesy **Ws** 3HNK 3JZJ/9 4NXD 4YOK 4ZSH 7VCB 8YGR 0CVZ, **Ks** 3MNJ 4HQK 4IEX 4TWJ 4UTI 0DEQ 0RHK, **WAs** 1CYT 1FHU 2LOR 2WTJ 3CJU 4WWT 5AER 5PUQ 6JDT 7BOA 7BOB 8MCQ 8SLW 9QBM 9SXQ 9THB 0FRM, **WB2**RJJ and **DL4**PV. We'll follow with reports from (15 phone) **Ws** 2DY 3HNK 4YOK 4ZSH 8YGR 9LNQ, **Ks** 3MNJ 4TWJ 0DEQ, **WAs** 1CYT 2LOR 5PIF 5PUQ, **WB2s** LDX RJJ, **DL4**PV, P. Kilroy; (15 c.w.) **Ws** 3HNK 3JZJ/9 4YOK 5QGZ 7VCB 8YGR 9LNQ 0CVZ, **Ks** 3MNJ 4HQK 4IEX, **WAs** 1CUN 1CYT 1FHU 1GXE 2LOR 4WWT 5AER 5PIF 5PUQ 8GFT 8JRL 8MCQ 8SLW 9MQI, **WBs** 2LDX 2RJJ 4EFE, **DL4**PV, **WNs** 1HHO 3HRV 8VZS 9TIL 0RJY 0RVK; (10 phone) **Ws** 1GGN 4YOK 8YGR, **WAs** 2LOR 5AER 5MIN 5PUQ 9MQI, **WB2**RJJ, **DL4**PV; (10 c.w.) **Ws** 4YOK 0CVZ, K4IEX; (40 c.w.) **Ws** 3JZJ/9 7VCB 8YGR, K4IEX, **WAs** 1CUN 1FHU 1GGN 8MCQ 8PVN, **WN0**RJY; (40 phone) **WA0**PTC; (80 c.w.) W1SWX, **WAs** 1FHU 1GXE and 8MCQ. Don't forget those 160-meter Transatlantic/Transpacific & World-Wide DX Tests, starting the first week end of this month as detailed in November's "How's"!

Where:

ASIA — TA1AM says any TA1 can be QSLd through the Turkish Radio Amateur Club, P.O. Box 699, Karakoy, Istanbul . . . . . "I'm handling QSLs for HL9AA, formerly K1YPE/XV5, XV5AA and 7X2VX," writes W4UWC. "I still have logs on hand covering Bill's operation as K1YPE/XV5 which ended April 14, 1967." . . . . . "Arrived back in the U.K. after 1700 QSOs as HZ1AT," records G3DYY. "All QSLs were posted by mid-September." . . . . . "I've taken over QSL chores for club station KA2KS at [the address in the list to follow]," announces K1SCQ, stationed in Japan. "Anyone who sent us a card in the past without response should send a new one direct or via FEARL. Those who include self-addressed stamped envelopes will receive fast answers."

AFRICA — "I'm QSL manager for ET3REL, Asmara," advises W5LEE. "Cards without s.a.s.e. must be answered via the QSL bureaus mule train." . . . . . "Apologies to all who patiently awaited my QSLs through the good offices of friend W7VRO," pens ZS1XR whose log transcripts were delayed by urgent family and business matters . . . . . "Living in a trailer while building a new home, I've been unable to get at my logs, QSLs, etc.," regrets VE3FJZ, recently VE3FJZ/SU-3C3FJZ/SU at Gaza. "I received some 3000 cards which will be taken care of as soon as I'm settled down." This from Jack via W1WQC . . . . . "I no longer handle QSLs for SU1AL," declares K4IEX. "That call apparently has been reissued." . . . . . P.O. Box 860, Las Palmas, may reach some of the newer EA8 licensees . . . . . *DX News-Sheet* indicates that F2OH can confirm FB8XX QSOs achieved in '66 . . . . . According to LADXA's *DX Bulletin*, CT1SO may be consulted for confirmation of TR8AG and TU2BD QSOs . . . . . "EA9EJ puts in part of each day trying to keep up with QSLs," applauds K5QHS . . . . . "As of September 20, 1967, I am QSL manager for VQ9TC, North America only," affirms W4HUE, requiring the customary s.a.s.e., or s.a.e. plus IRCs . . . . . "I will confirm every QSO," guarantees ex-CN8FC-KG6ALU-WA6LED/KG6 whose new QTH appears in the catalog to follow.

OCEANIA — "QSLs are still being forwarded to me from Fiji," writes ex-VR2FF, now ZL1TU. "They will be answered as quickly as possible. Anyone who missed



VEs 6QG/SU and 3FZJ/SU, shown (l. to r.) co-operating in the '67 ARRL 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. VE3FJZ now may be found mobiling around Ontario on 75 phone. (Photos via W1YYM)

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; KX6ER (with son) representing the Marshalls on c.w.; OY2H, sole Faroes code entrant; OD5EJ whose 694 c.w. QSOs nosed out OD5FC; and ZD8BUD (K4DEN), Ascension c.w. runner-up to ZD8J. (Photos via W1YYM)

receiving my card may write to my New Zealand address." . . . . . WA6MWG, QSL proprietor for FO8BQ, HC5NW, HM2BD, KH6s BIH and DKA, now can confirm FK8AC contacts accomplished after August 1, 1967. This via W1WPO . . . . . W3HNK says WB6LED is not responsible for ZK2AU confirmations. WB2PXU suggests WA9OMR as one possibility . . . . . KS6CN confirms, "As of September 25, 1967, W3LMA will act as my QSL manager, Stateside and DX. My operating logs will be mailed to him monthly." . . . . . K5QHS, observing operation of VK9DJ's bureau at Arkansas DX Assn., P.O. Box 3323, Little Rock, Ark., 72207, protests lack of s.a.s.e. enclosures, especially in mail from WB2s and WB6s. Sanford also stresses allowance of at least one month for log transit from Papua . . . . . "I've handled KS6BH's cards since April, 1966," observes K6CYG. "His on-the-air activity now appears to be too low to justify the services of a QSL manager, so all records will be returned to KS6BH on January 1, 1968."

EUROPE — "I'll accept QSLs for QSOs beginning about September 19, 1967," specifies K5QHS, new QSL aide to EI7AF . . . . . K6ICS promises thorough QSLing for his own G-GC-GM-GW5AJG operation scheduled for last month and this . . . . . WA8QAG writes from bonnie Scotland, "WA8RTP handles W/K/VE QSLs for my GM5AIW QSOs. Unless s.a.s.e. are supplied, answers will go via the bureaus long path." . . . . . K6CYG advises, "Only very infrequent QSL requests are being received for the 3A0DX/CT3AR DXpedition of WB6CTY, June-July of '66. Logs will be returned to him at the end of this year."

SOUTH AMERICA — "I regret to inform you that due to lack of cooperation from VP8s I cannot accept QSLs for them in the future," states CX2AM, long a pasteboard path to that region . . . . . "OA4KF prefers to handle his own QSLs direct," corrects W2JBL, previously misidentified as Evert's QSL tender, George can, however, expedite confirmation of past OA1PZ contacts . . . . . "I am now CE0AE QSL manager for QSOs after October 1, 1967," affirms WA5PUQ. "S.a.s.e. and GMT are absolute necessities, and cards will go forth in batches about every two weeks." For prior contact with CE0AE try the address in October's column.

HEREABOUTS — DXpedition of the Month proprietor W2GHK lists CN8s FF FV, CR5SP, FM7WQ, G5AAM, HK0AI, I1s RB RBJ, DJ6QT/LX, OK4CM, OYs 2GHK 7ML, VK9s DR XI, VPs 7CX 7NY 8IE, VQ9G, YV9AA, ZDs 8AR 9BE, 7Q7PBD, 9J2BK and 9X5GG as QSL clients currently or recently active. QSLing for GD3VBL, I9RB, VP8IE and 9X5GG is current or completed but 9U5ID's logs are still awaited . . . . . WA8RWU wants s.a.s.e. and GMT courtesies while performing as VP2MO's QSL agent . . . . . "Those who QSOd me from the Canal Zone in July have patience," pleads K6KDS. "Special QSLs are being made up for my KZ5DX and ZF1DX operation." S.a.s.e., to be sure . . . . . WA0FRM wishes ex-QSL managers would suggest alternate routes when returning cards stamped "no longer handled here." . . . . . "Effective January 1, 1968, I will discontinue handling QSLs for KZ5AY," says K6CYG. "WA6LIM, who used that call from June '65 to October '66, now resides at 8703 Brae Brook Dr., Lanham, Md., 20801." . . . . . Our "QSLers of the Month" are DJ6MN, EA9EJ, F8s TC TT/FC, FG7XT, Gs 2BUJ 2FFO 2RO 3SR 4CP 8PL 8TD, HI8XAL, HR1KS, KJ6JC, KG6AQI, KM6BI, KP1BJM, KZ5FX, OA7BI, OZ1LO, PY1BTX, VK6IZ, VO1JF, VQ8CC, W3DWG/VR6, XE0YL, YS2RC, ZE1CX, ZL3s IS OR and 7Z3AB, all cheered by "How's" reporters Ws 4YOK 8YGR, Ks 4YBE 5QHS, WAs 1DJG 2HIU 5MIN 5PIF 7GFT 8SOV/1 and WB2PYZ for confirmations chop-chop. Any quick QSLers for such compliments out your way? . . . . . *Atpl* W8AFN hunts hints on coaxing QSLs from F9UC/FC, KG6s AAY APD, TU2BK, VU2AJ; WA3DCM likewise for EP2BQ, FM7WD, 11AV/AM1, OH0NM, OY3SL, SV0WZ, VP2AZ, 7X3VJ, 9Y4LC; WA0FRM will settle for scoop on VP6YF; and WB2PYZ wants word on YA2RBH. Suggestions for the brethren? . . . . . WA0JYJ, WB2s FXB RJJ and W2IDY volunteer QSL managerial help for DX stations in need, the latter particularly interested in servicing VU2 and 4S7 colleagues . . . . . Now we'll milk the mail for individual specifications but be mindful that these items are necessarily neither "official", accurate nor complete. . . .

AP2AD, A. Ebrahim, P.O. Box 94, Lyallpur, W. Pakistan
CE0AE (via WA5PUQ; see preceding text)
CM5AP, P.O. Box 77, Matanzas, Cuba
ex-CN8FC-KG6ALU-WA6LED/KG6, Lt. W. Broder, Radiomen A School, SSC-NTC, Bainbridge, Md., 21905
CT1SO, J. Branco, Rua Eng. Carlos Amarante 209, Porto, Portugal
DL4PV, J. Alpern (WA4IKR), U.S. Army, Special Publications Det. APO, New York, N. Y., 09757
DL4PX, J. Fisher, Co. A, 32nd Sig. Bn., APO, New York, N. Y., 09757
DM3IGY, Observatorium Collm, 7261 Collmberg, E. Germany
EI7AF (via K5QHS; see preceding text)
EP2DM, Javad Mesbahee, P.O. Box 1116, M.U., Macon, Ga., 31207
FK8AC (via WA6MWG; see preceding text)
FY7YM, J. Chenga Long, P.O. Box 63, St.-Laurent de Maroni, Fr. Guiana
G5AJG-GC5AJG-GM5AJG-GW5AJG/m (to K6ICS)

GC2LU, H. Chater, No. 1 Flt., 14 Clarendon Rd., St. Heller, Jersey, C. I., U. K.
GM5AIW, G. Berrich (WA8QAG), Laburnum Grove, Torbrex, Stirling, Scotland, U.K. (W/K/VE/VOs via WA8RTP)
HC4BS, Aptdo. 615, Bahia, Ecuador
HK0BIS, Box 81, San Andres, Colombia
HMs 1AP 9AP, Byong-joo Cho, Box 235, Kwangwhamoon, Seoul, Korea
HR2JJC, P.O. Box 217, San Pedro Sula, Honduras
HS1HC, P.O. Box 2008, Bangkok, Thailand
KA2KS, USNSGA, Box 27, FPO, San Francisco, Calif., 96668
KG4DH, Box 12, FPO, New York, N. Y., 09593
KG6AQI, Box 116, FPO, San Francisco, Calif., 96630
KS6CN (via W3LMA; see preceding text)
ex-MP4BGG-VS6BJ-ZD8BJ (to ZL1TZ)
OK1AFB, Box 179, Plzen, Czechoslovakia
PA0AFN/W1/VOI, H. Ingersen, 202 Westgate Apts., 16 Pearl St., Woburn, Mass., 01801
PJ3CJ, P.O. Box 690, Curacao, Netherlands Antilles
TI9LM, Box 1518, San Jose, C. R.
TT8AR, P.O. Box 466, Ft. Lamy, Tchad
TU2CA, *Yasme* Foundation, P.O. Box 2025, Castro Valley, Calif.
ex-VE3FJZ/SU, J. Argyle, VE3FJZ, Gen. Del., Angus, Ont., Canada
VQ9DH, Box 191, Mahe, Seychelles
W0VXO/XE, H. Schoenbohm, WØVXO, 515 Olive St., Hannibal, Mo., 63401
WA2RKR/mm, M. Raynor, OC Dvn., USS *Austin*, FPO, New York, N. Y., 09501
XE2YP (non-W/K/VE/VOs via DL7FT)
YI2AB, Box 30, Baghdad, Iraq
YO5AIR, P.O. Box 182, Orader, Roumania
YU7LAF, Box 53, Idrija, Yugoslavia
ex-ZD6BX-VQ3HD (to ZD5X)
ZE1CX, M. Mapson, Box 2229, Bulawayo, Rhodesia
ZL1TU, 898556 Cpl. Johnstone GVO, Comm. Flt., RNZAF Base Whenuapat, Auckland, N. Z.
ZS3LU, W. Franke (DJ8LU), Box 1153, Windhoek, Southwest Africa
5VZ1, P.O. Box 33, Atakpame, Togo
5Z4KX, Box 30137, Nairobi, Kenya
5Z4LD, Box 2276, Nairobi, Kenya

CE0PC (to DL9KRA)
ex-DL4LA (to W5QGZ)
DL4RM (via DL4FS)
EI2NYC (via EI7AR)
ET3REL (via W5LEF)
F3DD/FC (to F3DD)
FØBQ (to ON5SF)
FØBZ/p (to DL9XW)
FP8CT (via WB2FXB)
GB2AA (via G3RUV)
HB0ADP (to HB9ADP)
HL9AA (via W4UWC)
HP2BZ/mm (to PY2DBN)
JY2NZK (to HB9PL)
KS4CF (to W4ZXI)
KS6BH (see text)
ex-KZ5AY (see text)
KZ5DX (to K6KDS)
OX3VX (via OZ8KW)
PJ2CQ (via WB4EHX)
PX1KT (to F3KT)
TA1AM (via K4EPI)
TA2JX (via W1CKA)
TF3SL (via OH2BDG)
VK2ADY/9 (via KØTCF)
VP2GBC (via VP2GW)
VP2MO (via WA8RWU)
VP5AA (to W1WQC)
VQ9TC (see text)
ex-VR2FF (to ZL1TU)
VS6FX (via W2CTN)
XE0ICS (to K6ICS)
YU7LBA (via 8M7CRJ)
YU7LBG (via DL3AA)
ZF1DX (to K6KDS)
ZF1GC (via VE4XN)
ZS6XM (via VK2QM)
4X4VO (via G5AAD)
5Z4KO (via WA1GIA)
ex-9J2MM (to ZE1CX)

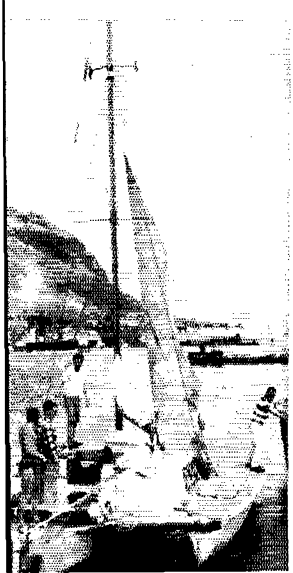
Your QTH committee this month: **Ws** 1WPO 1YYM 2DY 4UWC 4YOK 7UVR 8YGR 9LNQ, **Ks** 2OJD 4HQK 4IEX 9CVO/1, **WAs** 1CYT 1DJG 4IKR 4WWT 5EFL 7GFT 8JRL 8RWU 8SLW 8SOV/1, **WB2s** FXB PXU, **DL4PV**, P. Kilroy, Columbus Amateur Radio Association *CARAscope* (W8ZCQ) DARC's *DX-MB* (DL3RK), DX Club of Puerto Rico *DXer* (KP4RK), *DX News Sheet* (G. Watts, 62 Belmore Rd., Norwich, Nor. 72.T, England), Florida DX Club *DX Report* (W4BRB), International Short Wave League *Monitor* (A. Miller, 62 Warward Ln, Selly Oak, Birmingham 29, England), Long Island DX Association *DX Bulletin* (WB2EPG), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (W7LEB), and VERON'S *DXpress* (PAØs FX LOU TO VDVWWP).

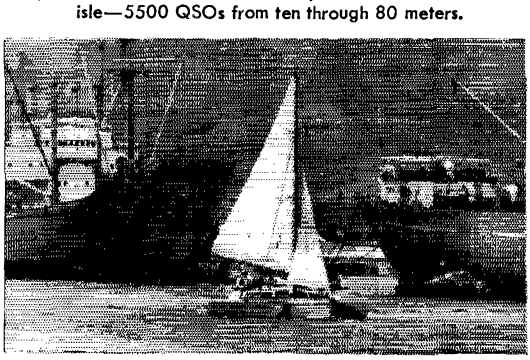
Whence:

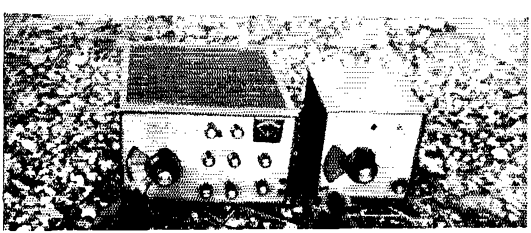
ASIA — HM1AP writes, "I am chairman of our new Korea DXers Society at P.O. Box 235, Kwangwhamoon, Seoul, which issues the WAK (Worked All Korea) award." Cho's encouragement sped YLs HM1s DG and DR toward their tickets. HM1AP looks for W/K/VE/VOs on 14,040-kc. c.w. each week end at 1200-1400 GMT. He credits K6QPG for getting him started toward ham status after Mary confirmed his reception of her 20-c.w. signals years ago . . . . . Turkey's TRAC now has about 300 members, some fifty already on the air. TA1AM says the club (address in "Where") needs amateur literature of all kinds, old or new. TA1AM's HW-16 usually stays near 14,010 kc. while neighbor TA1KT runs 200 watts to three 807s on 7005 or 21,015 kc. at 2200-0200 GMT . . . . . HL9AA, U.S. ambassador to Korea, commenced 14-Mc. s.s.b. operation in early September, according to W4UWC . . . . . "Club station AP5HQ runs 100 watts to an inverted vee with a 12-tube receiver," finds WA8RWU. "Operator Fida hunts Ariz., Mont., Nebr., Nev., N. Dak. and Wyo. for WAS on 14,005-14,020 kc. at 0100-0300 GMT, and 14,045-14,070 at 1200-1800. He knows English well and is a good c.w. man." . . . . . "YA1DAN says he's on daily at 0130-0230 GMT near 14,180 kc. on sideband," informs W4ZSH. "A quad will soon replace his dipole." . . . . . VU2LE reports fine DX results with a new Swan 240 courtesy W6BCT . . . . . Club station KA2KS, lately operated consistently by K1SCQ, has a Collins combo hooked to a 500-ft. Vee aimed Statesward. The boys like s.s.b. and c.w., 10 through 20 meters . . . . . WN3FUR does a lot of listening with an R-390 at Danang and expects the Army to rotate him home from Vietnam this month . . . . . Asian items courtesy the clubs press: VS9ABL indicates that most VS9s will be gone by '68. . . . KR6TAB radiates a 29,000-kc. beacon marker with a ground-planed 30 watts when not QSOing with a KWM-1 and quad. . . . FCC-talker HS1HC teases on 20 sideband with an SR-150 and HT-45. . . . MP4BBA knocks off for U.K. leave next month, following MP4BGL. . . . 9K2s AM on 14,100, 14,335 and 21,346 kc., and BY on 14,120 kc. keep Kuwait comin' on s.s.b.

AFRICA — "ET3REL is very active on the low phone end of 10, the high end of 15, and also 20 meters," remarks W5LEF. "Dick runs an SB-100 into a 42-ft.-high triband beam." . . . . . W1BB hears of a king-sized 160-meter first, W2RAA's QSO with VQ8CCR on September 12th at 2300 GMT. VK5KO also caught Rodriguez on

Preparation, sailing, gear and quarters for the recent VQ8CBB operation of VQ8s CB CH and WA6SBO on St. Brandon isle—5500 QSOs from ten through 80 meters.







FP8AP greets hordes of W/K/VE DXpeditioners each summer in St. Pierre. Gus, who enjoys seeing eager FP8s come and go, is the only native-born ham in the islands. (Photo via W3VEM-K3WAZ-FP8DG)

top band. VQ9JW of the Aldabras and 6W8CW (DL9KRA) are other 1.8-Mc. goodies on tap . . . . . "Threw the big switch in October after 230/215 countries worked/confirmed," states ex-CN8FC, now posted in Maryland . . . . . 9J2IE, according to K4YBE, seeks Iowa, N. Ill., S. Dak., Utah and Vt. to sew up his WAS on 20 c.w./s.s.b. around 0400 GMT . . . . . "5Z4LD says he's active daily on 14,270 kc. at 2000 GMT," relays WA1DJG. Dick also learns that ZS3LU, 14,065 kc. at 0500 GMT, signed DM3KLK till '61 . . . . . More Africana via literature of aforementioned clubs and groups: 5U7AL hopes to reactivate TY6ATE now and then. . . . W6s DOD and KG, lately TU2CA, will try a California Christmas. . . . Marion isle's ZS2MI schedules ZS6BFW at 1700 GMT, 20 a.m. . . . Ex-VS6FS tries his DX luck as 9J2NW next month. . . . W4MIYE wants FB8s XX and/or ZZ to borrow FB8WW's sideband sender. . . . ST2PO, 14,040-kc. c.w. at 2100 GMT, helps ST2SA supply Sudan.

OCEANIA — VK2NS and WA6UNF scored their 1100th 7-Mc. contact October 10th after first clicking in May of '63. VK2NS writes W1YYM of Hq., "No skeds were missed through QRM, QRN, storms, contest, etc., although Ed did doze off on two of them. He can hardly be blamed, as we meet at 0800 GMT and he must have lost about 1500 hours of sleep over the period." WA6UNF uses a kilowatt and ground-plane, VK2NS 150 watts and a sloping twinlead dipole. The pair are occasionally joined by such "guest speakers" as Ws 3QT 6UHY 6OTH, KH6EFW, WB6PRY, VKs 2AGN 2BSJ 2XQ and 3MH, especially on such occasions as QSO No. 1000, May 10th. Trev and Ed, both OOTC members, have so much in common to chat about that few contacts are much shorter than half an hour . . . . . VK5XK turned his trusty 25-watter loose on Lord Howe isle in October . . . . . K4TWJ reports that KW6EJ lost his beam in a recent typhoon . . . . . "ZK2AU stays mainly on 20 and 15, phone or c.w., and sometimes tries 40," notes WB2PXU . . . . . "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," pens ex-VR2FF. "I look forward to renewing acquaintances now from ZL1TU." . . . . . According to W1BB, ZL3RB heard W9UCW on 1813 kc. in late September. Mick says many times when 160 is wide open to the States no W/K/VEs bother to tune 1875-2000 kc., the ZL range . . . . . Pacific tidbits thanks to club newshawks: Five Peace Corpsmen run KX6PC, 20 sideband preferred. . . . W9WNV moved to VK2ADY/9 in October after a Rodriguez romp as VQ8CBR. . . . VK4SI, 14,140 kc. at 0930 GMT, keeps Thursday isle audible. . . . 9M8IT's 100 watts and g.p. poke through around 14,035 kc. while neighbor 9M8RY likes sidewinding on 14,175 or 14,201 kc. at 1500-1600 GMT.

EUROPE — From Yanks in Germany: "The Rhein-Main Air Base Gateway to Europe MARS-Amateur Radio Club is being rejuvenated under the leadership of DLs 4BE 4WQ 5LI 5LR 5MH, WA0NDP and myself," announces DL4FS. "Our club call is DL4RM, our chief skyhook a rhombic directed Stateside." . . . . . "DL4EF hopes to DXpedite during the coming ARRL Test," hears WB2RJJ, "possibly to Andorra or San Marino." . . . "Ex-DL5DZ-DL5HH is now WA4RMX/5 here at Ft. Hood, Texas," reports ex-DL4LA (W5QGZ). "Ex-SP5ALG signs 4X4UJ/W5 from these parts. I finished with 140 countries from DL4LA." . . . "I'm active from Germany as a civilian technician using the same call I had in 1955–'56 while in the service," comments DL4PV (WA4IKR). "DX is great on 10, 15 and 20 with an SB-401/301 and 75-ft.-high TA-33." Jay also signed W2EJC for twelve years and did earlier DX work from OE13JA and HS1-JA . . . . . WN1HHO chuckles, "Finally discovered that not all British hams are G3s. G2HOT was No. 19, my first non-G3." . . . . . WA1FHU finds old-timer G6ZO going strong as ON5ZO. Jim regales old W/VE pals on 10 c.w. once more . . . . . "You'll find me on 15 sideband as well as 15 and 40 c.w.," informs GM5AIW (WA8RTP). Another arrival in the U.K. is vacationing K6ICS, franchised as G-GC-GM-GW5AJG . . . . . K5QHS says DL7FT is determined to sign a ZA call in '68. Luck, OM! . . . . . According to K4IEX, Hawaii, Nev. and Wyo. will wrap up SM6AFH's WAS project . . . . . Check with Delegation URE, Aptdo. 86, Zaragoza, Spain, for details on a certification attainable by confirming QSOs with one Zaragoza station plus 30 IARU countries since October 31st and before 2400 GMT, December 31, 1967. The sheepskin is sponsored in conjunction with the IARU convention due in that city next May . . . . . K9CVO/1 reminds us of the availability of Russia's R-15-R, R-10-R, R-100-O, W-100-U, R-6-K and R-150-S certificates, details available from Central Radio Club, Box N-88, Moscow . . . . . Continental cullings from club periodicals: UP2KNV's gang signs 4L7A from the Georgian S.S.R. during major DX contests. . . . 9H1s AL and AM manned exhibition station 9H1SD in October. . . . JWs 2BH and 5YG supplement JW3NI's DX output on 20 sideband. . . . Those UA1K calls bear surveillance, for KAE radiates from Antarctica, KED Franz Josef Land, and KFT Nova Zemlya. . . . CT2AP makes the Azores easier on 21,150 and 21,250 kc. at 1200 and 2300 GMT, straight a.m. . . . UV4HB displays a variant Russian label on 40 c.w.

HEREABOUTS — "About those Slinky antennas," remarks W8KPL, "mine was strung on attic rafters in the form of a vee 'way back in '46. With two parasitic elements, an 807 and 50 watts I earned a QSL from W2OUB/C7, Tsinan." . . . . . "I'll operate mostly 15 c.w., some s.s.b.," figures 9Y4TW (WB4DWB) . . . . . WA1FHU was delighted to be called by W4VNE recently. "Mac remembered working me years ago as HA4s EA and SA when he was NY4CM and KP4HU." . . . . . K4TWJ says, "KC4AAD's kilowatt and rhombic pound through on 14,223 kc. around 0100–0200 GMT. Mike will be there till spring." . . . . . "WA9QXY and I plan possible FS7 PJ5 CR4 or CT2 operation next summer," discloses WA9PYY. The boys warmed up as FP8s DH and DJ in late August. "FP8CS has a new Swan 500 up there, and FP8CT's 15-watt HT-18 does well." . . . . . W2GT and the old school were saddened by the sudden passing of DXpert W2JT on the eve of a club dinner honoring guest G2MI . . . . . W1BB is told that CE0PC (DL9KRA) was W2EQS's 55th 160-meter country in late September. Multioperated CE0AE, favoring 15 s.s.b., should be workable through most of '68 . . . . . K0s GZN and GZO may be back at PJ5s BC and BD any time now for a three-month ionospheric idyl . . . . . PZ0AA was on October display at a Paramaribo industrial fair . . . . . FR7ZI/mm is mentioned here and there as a likely Clipperton prospect . . . . . Our Gripe of the Month, turned in by the *CARA-scope's* W8ZCQ, is beamed at kooks who keep calling DX stations they obviously aren't hearing . . . . . Utah DX Association congregates around 14,240 kc. at 0400 on Tuesdays, offering certifications to non-U.S.A. stations who confirm contacts with ten Utah stations including five club members . . . . . Confirmed QSOs with 200 Californians *plus* twenty NCDXC members can qualify non-California hams for Northern California DX Club's coveted California Award . . . . . For the 20th time your "How's" conductor wishes you a DXceptionally merry Christmas! QST

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* WB4HIP

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 vhfers. The e.m.e. path was covered on 144 Mc. by W6DNG and F8DO and on 432 by W2IMU/2 and HB9RG and G3LTF. W2FZY/2, using the same Crawford Hill V.h.f. Club station as W2IMU, worked OZ8EME 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 an available resource for the benefit of amateur radio. Remember when a similar situation existed with KP4BPZ? Who would deny amateur radio the benefits that such work offers?

Interest in 50-Mc. 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.

W0BFB: First to work 45 states on 144 Mc.

W0DQY: Experimentation with s.s.b. techniques for meteor-scatter communication.

3C2TQ, W4GJO, WB6NMT/KH6, W6PUZ, K6EDX: 50-Mc. propagation observations.

K6MYC: Continued interest in e.m.e. and promotion of that means of communication.

W0ENC, W0DRL: Outstanding accomplishments from less-than-favorable geographical locations.

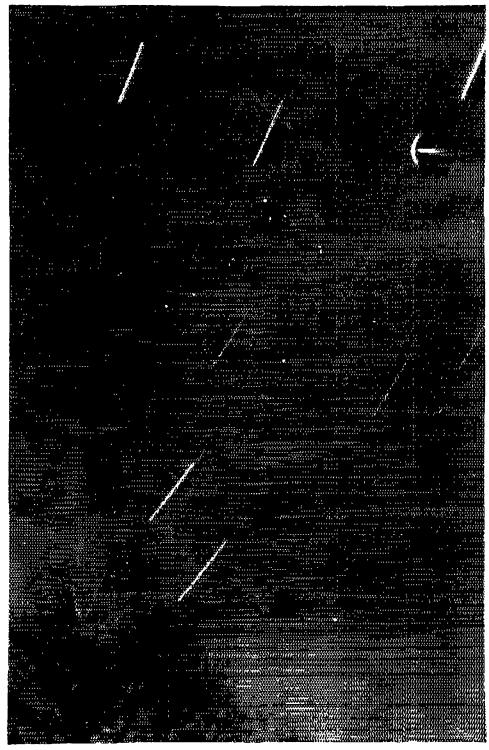
W5GKP, W5ORH, K7ICW, W7IQN: Contributions to this column of general interest.

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 W4HHK and W4WNH 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



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.

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

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, 33; 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 Olcott, 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 reconfirm 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/exciter 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 "Cantenna" and three additional parts. The modification takes only a few minutes.

Another possibility is to use the Cantenna 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 Cantenna 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.

LU8EF 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: KS6CC, American Samoa; KW6EJ, Wake, and KH6NS, Hawaii. VK9GN 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,

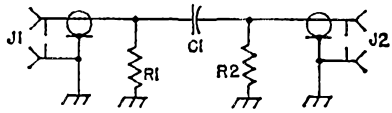


Fig. 1.—Adjustable attenuator for h.f. sideband exciters used in heterodyning to v.h.f. bands by W3GKP.

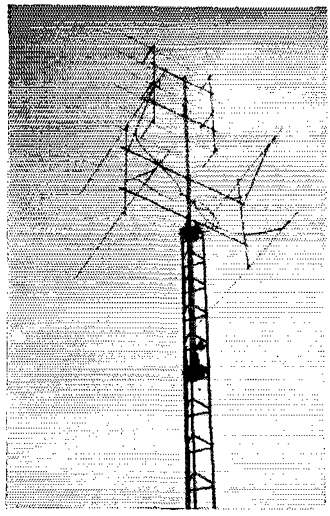
C_1—10 pf fixed or small trimmer.
$J_{1,2}$—SO239 fitting.
R_1—50-ohm power type resistor.
R_2—56 ohms, 1 watt.
J_1 and R_1 are part of the original Cantenna. Remove all the parts from inside the minibox on the top of the can and install C_1, R_2 and J_2. Increasing C_1 increases the drive to the mixer.

KR6TAB has a 30-watt beacon on 52.975. The beacon identification consists of the call, KR6TAB, followed by a 3½-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.

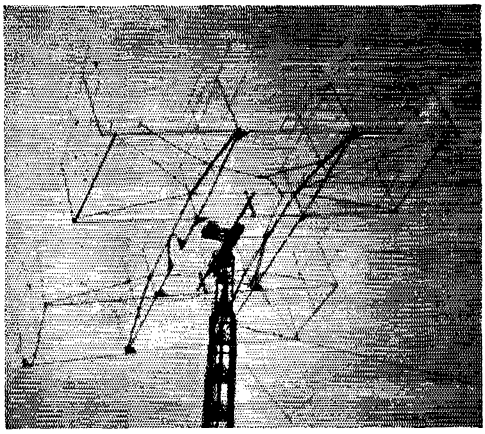
Alaska will be represented this winter by W7CNK, who has moved to Anchorage. He also plans to be active on 144, 220 and 432 during auroral disturbances. And we understand that W7UAB has moved to Hawaii.

Numerous late season *Es* reports have been received, indicating fairly good openings through September and into October. XE1PY was worked by WA6WKF, W6PUZ and K4FKO, Tennessee. VE3CUA in Ottawa, Ontario reports VP9WB and WB6SEW/VP6 continue to be active in Bermuda. WA9FIH, near Chicago, reports working VP7DD, Bahama Islands.

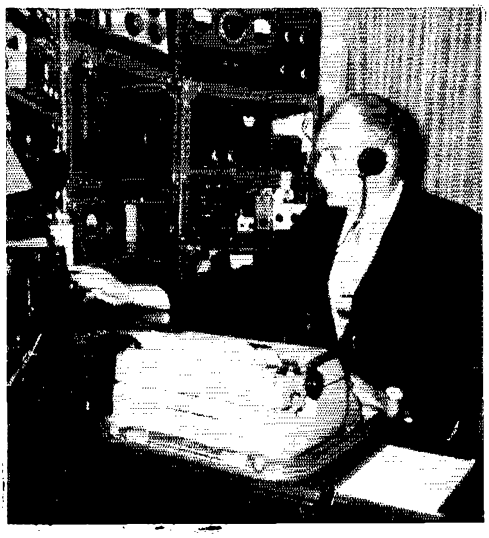
Dick Allen, K1IGY/WA5KPU, Bellaire, Texas, is one of those who prefers his six-meter contacts on a "closed band." Dick schedules W4UWM in Roanoke, Virginia, and says scatter signals average 5 to 10 db. above the noise over the 845-mile path. Other schedules are successfully kept with K8MMM, Ohio, 112 miles; WØEYE, 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.



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.



W8QOH, Cincinnati, Ohio, has a pair of Yagis on 6 and a single one on 2 in addition to this array of commercial equipment in his shack.

K4NTD, Oakland, Florida, is one of the small number of v.h.f. stations using ATV, and most of his equipment is homebrew. We'd like to hear from other ATVers.

WA5CZM, New Mexico, 750 miles. WA5KPU says schedules with W5OAR in Louisiana, and W5WAX and W5ORH 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, OZ9CR is preparing for e.m.e., after having done considerable satellite tracking. OZ6OL and OZ9OR are reported involved in a joint e.m.e. project with a rhombic, and another team, OZ1PL and OZ9AC, continue work on 432 as OZ8EME.

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

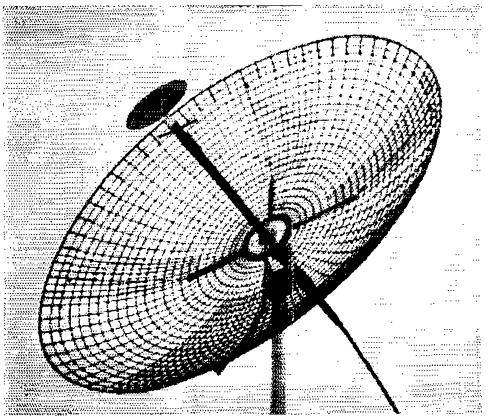
SV1AB, Athens, may be back on the air by now if difficulties there are resolved. During time off the air, SV1AB has entertained himself by tracking various satellites and improving his receiving system. F8DO is reportedly at work on another detection system and perhaps some antenna changes in favor of 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. KØIJN 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 experimentors. 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 m.s. 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 WØJXK/7, Keith Armstrong, P.O. Box 91, Boise, who is also on six meters. Victor Rivers, WØCPS, 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 432. Leonard Gordon, WN7GQT, is interested in 144-Mc. DX and wants schedules. His address is Box 508; Rawlins, Wyoming. *Welcome to 2 meters, OM, and I'm sure the DXers will encourage you to stay.*

Jack Woodruff, W8PT, 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., worked his 21st state during the session, W1YTW in Maine. W3BDP, Delaware, hooked his 21st, WA9DOT in Wisconsin. K4YYJ, Salisbury, N. C., says he heard W5HFV near Tulsa, during the September 21st aurora, but signals faded before an exchange could be completed. WA9DOT worked KØGJX, K2YCO, VE3EZC, K8DEO, KØCXJ, WB2KYQ, WØDQY and WØNXF on Oct. 9.

At Nashville, K4TAX has a kw. on c.w. and s.s.b. He will schedule and mentions that WA4VIR 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: KØGJX in South Dakota and KØIJN in Minnesota. WA8TYF in Cincinnati worked 10 states during a two-hour period.

WA5MFZ and K5TQP say they will run their beacon transmitter again next summer from Tijeras, New Mexico, for *Es* observation. Negative results were reported this past summer, although numerous stations reported the 144.073 signal via meteors. K5TQP is running weekly schedules with K7NII in Arizona. W6PUZ scheduled WB6NMT/KH6 in Hawaii this past summer and early fall but heard nothing. WØLER and WØLCN, both in the Minneapolis area, are active with good power and will schedule those needing Minnesota. KØMQS 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 260 pounds. He and K4IXC should tear each others receivers apart! Dick suggests that those owning the HyGain 15-element Yagi check page 19, July *QST*, for W4KAE's method of matching, for a considerable improvement in performance.

VE3EZC reports working K4IXC on October 11th during the Giacobinids shower. Did anyone else have good results on this one? The Orionids shower proved disappointing, and the peak apparently came on October 20th instead of the predicted 21st. K9UIF, Indiana, and K1HTV, 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. proves most valuable. The general opinion of the m.s. clan was that the Orionids was very poor.

220 Mc. may not be the most active v.h.f. band, but K1YON, Connecticut, reports contacts with W1ALE, New Hampshire; W1OOP, W1QXX, K1SFF and W1EBU/1, all Massachusetts; WB2CNK and W2SEU in New York; WB2BCQ, New Jersey, and W1AJR in Rhode Island. K2DNR, Hopewell Junction, New York, is running schedules with W1AZK in New Hampshire, and reports working K1JIX, Massachusetts; W3ARW, Pennsylvania; W2DLT, New Jersey, and W2HF in New York. In Florida, K4IXC is preparing for meteor scatter and is interested in schedules.

432 Mc. interest is definitely on the upswing. VK3ATN says work on his 50-foot dish has slowed while he moves. Ray purchased 80 acres some 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. WA6SXC is project director. And in Colorado, WØEYE 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 20. WA2EMB was running 400 watts and a 32-element collinear. His receiver is a K2AOP converter and a 75A4. W2CNS runs a 4CX250B, an array of four 5-element Yagis 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.

WAØIQN, 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 VE3BPR near Toronto frequently and VE2LI, VE2SH and VE2HW in Quebec regularly. On September 19th, K2UYH and VE2LI connected for the first known 432 contact between New Jersey and Quebec. K2UYH also schedules K2CBA, K2YCO and W3RUE. He runs a 4CX250B and a 24-element collinear patterned after the K6MYC 2-meter collinear. Earlier in September, on the 10th and 11th, K4EJQ, Tennessee, worked K9UIF and W9BRD in Indiana, W8PT in Michigan and W9AAG, Illinois, with 7 watts! K4EJQ wants 432 schedules for his new 4CX250B rig.

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

(Continued on page 162)

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

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.

"Alice"

One requirement is the Code, and instead of its 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 24, 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 WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001.

OPERATION:

All bands may be used. Crossband operation is not permitted. Net contacts do not count.

PROCEDURE:

OMs call "CQ YL." YLs call "CQ OM."

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 mutliply 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 *postmarked* 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. Bardon, W4TVT
2238 Morgan Lane
Dunn Loring, Virginia. 22027

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

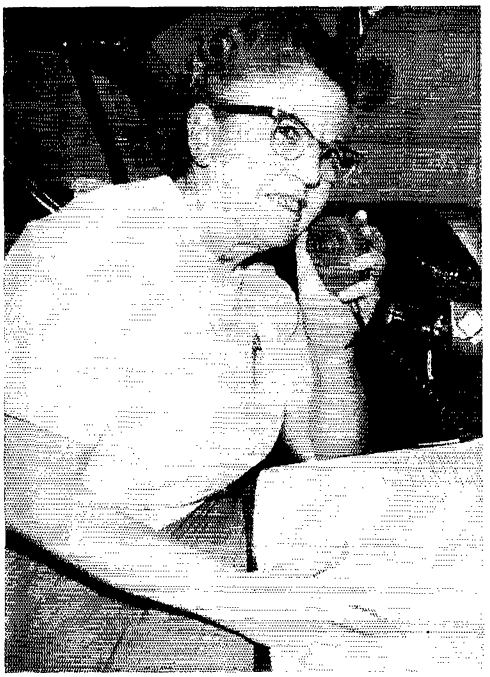
AWARDS:

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, WAØGHZ, 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.



WA6ISY, Myrtle Cunningham.

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 one 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, W6PIF, 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. QST

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:

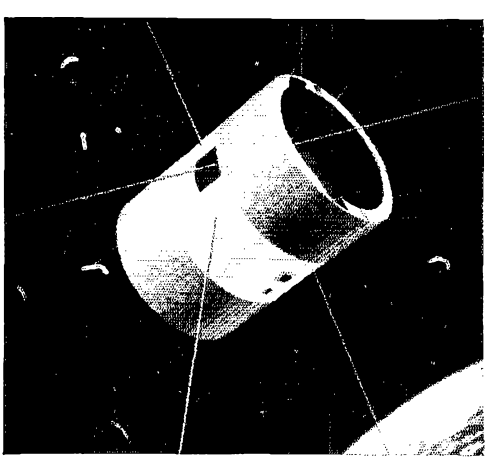
- For APT crystal tuned receivers, a crystal is required to receive the WEFAX transmission frequency of 135.60 Mc.
- If an antenna filter is required to reduce local noise and interference for the reception of APT transmissions from Nimbus 2 (136.95 Mc.), ESSA 2 & 4 (137.5 Mc.), and ATS I WEFAX (136.6 Mc.), the following options are available:

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

  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*)



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.

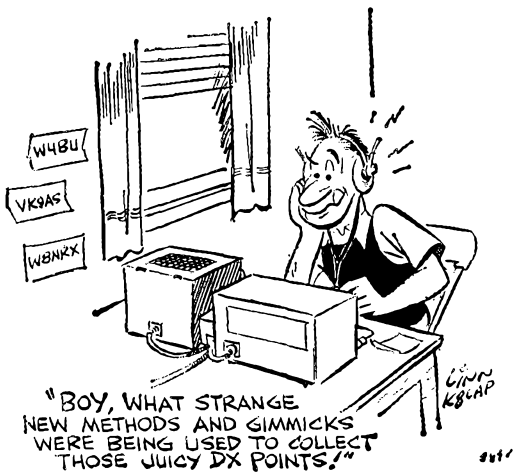
Retune of the Native

BY TOM PHILLIPS,* WØKUP ex-W8EUP, -W3WST

IT 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 slipped 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 JS6 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 I 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 walloping signal. 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 WØs 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 confided 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 WØ. 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 VP8. 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 1TT and shot back my 549 KS. I don't know if he QSLd my exchange because an S8 signal was tuning zero beat with him and another station zeroed on my frequency and was calling an SP8 with the same call-letter suffix as my VP8! 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 6146s were still getting out. Probably "just luck" on my first 40-meter VP8 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. QST

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.

* 9930 Metcalf Ave., Shawnee Mission, Kansas 66212

Operating News

GEORGE HART, W1NJM, Communications Manager
ELLEN WHITE, W1YYM, Deputy Comms. Mgr.
Administration: LILLIAN M. SALTER, W1ZJE
Public Service: WILLIAM A. OWEN, W1EEN
DXCC: ROBERT L. WHITE, W1WPO
Training Aids: GERALD PINARD

GMT. 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. Mid-day 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 bi-lingual 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

OPERATING EVENTS (Dates in GMT)
ARRL-IARU-SCM-Affiliated Club-Operating Events

December	January	February
1 **Qualifying Run, W6OWP**	4 **Qualifying Run, W6OWP**	2 **Qualifying Run, W6OWP**
2 **LO Time** (League Officials only).	6 **LO Time** (League Officials, only).	3 **LO Time** (League Officials, only).
2-3 Alexander Volta RTTY DX Contest (p. 86, last issue).	6-7 **VHF SS**	3-4 **DX Test** (phone)
9-10 9Q5 DX Contest (p. 96, last issue).	6-8 Virginia QSO Party (p. 132, this issue).	3-18 **Novice Roundup**
9-10 Boy Scout QSO Party (p. 17, last issue).	11 **Qualifying Run, W1AW**	10 **Frequency Measuring Test**
13 **Qualifying Run, W1AW**	13-15 **CD Party,** phone*	16 **Qualifying Run, W1AW**
16-17 West Virginia QSO Party (p. 134, last issue).	20-22 **CD Party,** c.w.*	17-18 **DX Test** (c.w.)
	26-28 Old Old Timers Club QSO Party (p. 43 Oct. *QST*).	23-25 QCWA QSO Party
	27-28 **Simulated Emergency Test**	24-25 YL/OM Contest (phone)
	27-28 Arizona QSO Party	
	* League Officials and Communications Dept. Appointees only.	

directly in terms of GMT. For example, if you live in the midwest you start thinking of rising time as 1300 (instead of 7 A.M.), or lunch time as 1800 (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 2400 (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 38 members, the largest being Ohio with almost 4,000. The "average" section has 1037 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 300 (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 rubber 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:

Call	Orig.	Recd.	Rel.	Del.	Total
K6BPI	5638	1857	1673	184	9352
W3CUL	392	1526	1314	191	3423
K5TEY	15	1212	667	10	1904
K9ONK	137	829	795	7	1768
W5OBD	20	822	822	0	1664
W6RSY	26	787	629	144	1586
W7BA	6	706	649	54	1415
W6GYH	187	567	563	3	1320
W0LGG	8	558	504	10	1080
WA7DXI	55	483	393	50	981
W5BNH	41	473	317	81	912
K9IVG	31	444	338	1	814
W0IES	0	380	380	0	760
W7ZIW	32	334	332	7	705
W3EMIL	33	335	245	2	615
WB6BBO	14	294	257	5	600
W3VR	97	246	210	15	568
K3MYS	32	284	239	5	560
WA2IGQ	22	256	229	27	534
W0LCX	26	243	232	11	512
WA4BAIC	392	61	54	1	508
W6EOT	1	250	250	0	501
WB6GGL	11	245	224	21	501

More-Than-One-Operator-Stations

Call	Orig.	Recd.	Rel.	Del.	Total
W4BS	614	9	6	3	632
K4KRG	32	565	0	0	597

BPL for 100 or more *originations-plus deliveries*

K7NQX 215	WB2SSZ 137	W8NAL 112
KH6GHZ 213	WB6TYZ 137	W6QJW 105
W8EY/8 207	K3NSS 133	W2OE 103
WA0CCP 193	WA8MCQ 131	W9EFT 103
W8IV 172	W6LNZ 130	WA1FVH 102
WB4HKP 162	WA6BYZ 119	WA8MAM 101
K3NSN 159	K3VBA 113	

More-Than-One-Operator-Stations

W5AC 138 W0ZIN 103

BPL medallions (see Aug., 1954, p. 54) have been awarded to the following amateurs since last month's listing: WB6HVA, W6LNZ.

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. All messages 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 'em 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. — *W1NJM.*

—••—

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

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 resumption 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 (ARPSC), 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 in life appears to be to criticize other organizations, often when they know nothing of the doctrine or principles of that group. Fortunately, these persons represent only a minority group and the source of their harrassment 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* readiness percentage lately?

I challenge you to honestly answer these questions for yourself.

Are you mentally, physically, and psycologically 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 plans 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 frequencies of MARS? Do you recognize and support the ARRL? Are you a member of the AREC, RACES, or other emergency communication group? Are you, by habit, 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, NET schedules, operating habits of others, etc.? Will the amateur bands be strange to you when the chips are down?

Do you have the ARRL 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 BPL medallion? 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 repair and maintenance of your own equipment and, do you stand available to assist others? Would you be qualified and willing to conduct classes in communications/electronics if you were asked to do so?

Are you ready for unscheduled field operation? 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, inventorying 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 with the AREC? 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 dissention 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?

* 1804, 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 group counts and questionable spelling *before* you QSL? Do you originate traffic? In an emergency, will you be the polished traffic handler or will other operations 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 do you take the "I was already on here" attitude when asked to QSY? Do you stumble on 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 "QSD"? 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 tho many members of our ranks 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 apathy 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?

CLUB COUNCILS AND FEDERATIONS

Affiliated Council of Amateur Radio Clubs, Inc., Ronald D. Mayer, W7NGW, Secy., 6115 S.E. 13th Ave., Portland, Ore. 97202.

British Columbia Amateur Radio Association, Inc., Mrs. Eva Green, VE7BBB, Secy., 528 McMartin St., New Westminster, BC, Canada.

Chicago Area Radio Club Council, Inc., Karl Kopetzky, K9AQJ, Secy., 1052 Loyola Ave., Chicago, Ill. 60626.

Council of Connecticut Amateur Radio Clubs, James Parker, Secy. K1VII, 17 West Main St., Niantic, Conn, 06357.

Delaware Valley Council of Radio Clubs, Jon Balch, W3AES, Secy., 145 Third Ave., Newtown Square, Pa. 19073.

Federation of Eastern Massachusetts Amateur Radio Associations, Eugene H. Hastings, W1VRK, Secy.-Treas. 28 Forest Ave., Swampscott, Mass. 01907.

Federation Long Island Radio Clubs, Inc., Warren H. Mayer, W2OUQ, Secy-Treas., 25 Aldred Ave., Rockville Centre. N. Y. 11570.

Foundation for Amateur Radio, Granville Klink, Jr., W3AFV, Secy., 1013 Noyes Dr., Silver Spring, Md. 20910.

Hudson Amateur Radio Council, Fred J. Brunjes, K2DGI, Secy., 22 Ivy Dr., Jericho, N. Y. 11753.

Indiana Radio Club Council, Inc., Hewitt Mills, WA9LTI, Secy., 289 West Sumner Ave., Martinsville, Ind. 46151.

Los Angeles Area Council of Amateur Radio Clubs, Inc., Gene M. Kistler, WA6OKZ, Secy., 10218-10th Ave., Inglewood, Calif. 90303.

Michigan Council of Amateur Radio Clubs, Evelyn Penny, W8HYL, Secy. 17422 Kinloch, Detroit, Mich. 48240.

Ohio Council of Amateur Radio Clubs, James W. Benson, W8OUU, Secy., 2463 Kingspath Dr., Cincinnati, Ohio 45231.

Puget Sound Council of Amateur Radio Clubs, Herb Graham, K7ZEP, Secy., 12030-68th Ave., Seattle, Wash. 98178.

The Radio Society of Ontario, Inc., William Bissell, VE3CTJ, Secy., 22 Brunner Dr., Islington, Ont., Canada.

Tennessee Council of Amateur Radio Clubs, William E. Bates, W4PRY, Secy.-Treas., 3810 Bedford Ave., Nashville, Tenn. 37215.

A.R.R.L. 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 honor-shrouded 100% list?

Anderson Radio Club, Anderson, S. C.
Bandhopper Radio Club, Inc., Ferguson, Mo.
Binghamton Amateur Radio Association, Binghamton, New York
Blossomland Amateur Radio Assn., Inc., St. Joseph, Michigan
Blue Ridge Radio Society, Inc., Greenville, S. C.
Central Iowa Amateur Radio Club, Marshalltown, Iowa
Chetimachi Amateur Radio Club, Houma, La.
Connecticut Wireless Association, Inc., Newington, Conn
East Kootenay Amateur Radio Club, Cranbook, B.C., Canada
Friendship Amateur Radio Club, Lutherville, Md.
Massillon Amateur Radio Club, Massillon, Ohio
Maydale Amateur Radio Club, Silver Spring, Maryland
North Alabama DX Club, Huntsville, Alabama
The North Augusta-Belvedere Radio Club, Inc., North Augusta, S. C.
Rome Radio Club, Inc., Rome, New York
St. Louis Amateur Radio Club, Inc., St. Louis County, Mo.
Southington Amateur Radio Assn., Inc., Southington, Conn.
Walton Radio Association, Walton, New York
Washington Radio Club, Washington, D. C.

DX TEST FEEDBACK

That 494-K c.w. score in Los Angeles (leading off page 63 of the October DX Test results) belongs to none other than W6TZD. Sorry about that Gene! W6ERS of 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 PY2DXI who shared honors with PY2NM for well over 1½ million phone points. Although we initially received the log for W1YU multioperator/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, based on 263 multipliers and 834 exchanges and a raft of f.b. operators namely K7AAW WB2RDJ KH6DKD KØKII and WA2RHC.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW 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 W6OWP only will be transmitted Dec. 1 at 0500 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT Dec. 13 becomes 2130 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 at 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 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sundays, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 0030 GMT daily, speeds are 10 13 and 15 w.p.m. The 0230–0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230–0320 GMT practice on those dates:

Date	Subject of Practice Text from October *QST*
Dec. 4:	*It Seems to Us*, p. 9
Dec. 7:	*More Ideas for 50-Mc. Portable Arrays,* p. 15*
Dec. 12:	*Save Those Transistors,** p. 25
Dec. 15:	*Antenna Switching For Beginners*, p. 36
Dec. 19:	*Amateur Radio Public Service Corps,** p. 74
Date	Subject of Practice Text from *Understanding Amateur Radio*, First Edition
Dec. 20:	*Oscillators*, p. 77
Dec. 29:	*Oscillator Tubes*, p. 77

*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: A) 1A6SBO, Bishop's Rock, because it has not been shown that the operation came within Rule 8 of the DXCC Rules, B) 1B9WNV, Blenheim Reef, because of inability to establish actual presence on Blenheim Reef.

Ready to submit cards for a DXCC application/endorsement? The recently revised CD-164 (R1067) 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 *full* mailing address, 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.

W1AW SCHEDULE, DECEMBER 1967

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 3 P.M.-3 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.

*GMT**	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	.....	.....	.....	RTTY OBS[3,7]	.....	.....
0030	**Code Practice Daily[1] 10-13 and 15 w.p.m.**						
0100	.....	C.W. OBS[1]	C.W. OBS[1]	C.W.OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]
0120–0200[4]	.....	.....	7.080	3.555	7.080[6]	3.555[6]	7.080
0200	.....	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]
0205–0230[4]	.....	.....	3.945	50.7	145.6	1.82	3.945
0230	**Code Practice Daily[1] 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.**						
0330–0400[4]	.....	.....	3.555	7.080	1.805	7.080	3.555
0400	RTTY OBS[3]	.....	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]
0410–0430[4]	.....	.....	3.625	14.095	7.045	14.095	3.625
0430	Phone OBS[2]	.....	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]
0435–0500[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0500	C.W. OBS[1]	.....	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]
0530–0600[4]	.....	.....	3.555[7]	7.080[6]	3.555	7.255	3.555
0600–0700	.....	.....	7.080	3.945	14.100	3.555	7.080
0700–0800	.....	.....	14.280	7.255	3.945	14.100	14.280
2000–2100	.....	14.280	21/28[5]	14.095	21/28[5]	14.280	.....
2100–2200	.....	14.100	14.280	14.100	14.280	14.100	.....
2300–2345	.....	7.255	21/28[5]	21.1[6]	21/28[5]	7.255	.....

[1] C.W. OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 50.7 and 145.6 Mc.
[2] Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 Mc.
[3] RTTY OBS (bulletins) on 3.625, 7.045, 14.095 and 21.095 Mc. 170/850 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, 21.1, 21.41, 28.08 or 28.7 Mc.
[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 QIS WPR NPG.* Times/days 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, K3NYG	Oct. 10, 1967
Alberta	Harry Harrold, VE6TG	Oct. 10, 1967
Manitoba	John Thomas Stacey, VE4JT	Oct. 10, 1967
Virginia	H. J. Hopkins, W4SHJ	Oct. 11, 1967
Vermont	E. Reginald Murray, K1MPN	Oct. 17, 1967
Hawaii	Lee R. Wical, KH6BZF	Nov. 11, 1967
Wisconsin	Kenneth A. Ebneter, K9GSC	Dec. 10, 1967
Western Florida	Frank M. Butler, Jr., W4RKH	Dec. 15, 1967
Illinois	Edmond A. Metzger, W9PRN	Dec. 15, 1967

In the Indiana Section of the Central Division, Mr. William C. Johnson, W9BUQ, and Mr. Hewitt C. Mills, WA9LTI, 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 on or before 4:30 P.M. on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, *zip code* and station call of the candidate and signers 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 signers 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 [Place and date]
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the.....
.....ARRL Section 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*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Santa Barbara	Dec. 11, 1967	Cecil D. Hinson	Aug. 10, 1966
Oklahoma	Dec. 11, 1967	Daniel B. Prater	Oct. 11, 1967
Eastern New York	Dec. 11, 1967	George W. Tracy	Feb. 10, 1968
East Bay	Dec. 11, 1967	Richard Wilson	Feb. 10, 1968
Southern New Jersey	Dec. 11, 1967	Edward G. Raser	Mar. 4, 1968
Georgia	Jan. 10, 1968	H. L. Schonher	Mar. 26, 1968
Ohio	Jan. 10, 1968	Wilson E. Weckel	Mar. 28, 1968
Connecticut	Feb. 9, 1968	J. J. McNassor	Apr. 11, 1968
Saskatchewan	Feb. 9, 1968	Mel Mills	Apr. 11, 1968

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 onmidirectional. 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 4369, 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.
6. Names and addresses of Publisher, Editor and Managing Editor: Publisher, The American Radio Relay League, 225 Main Street, Newington, Connecticut. Editor, John Huntoon, 574 Hills Street, East Hartford, Connecticut, 06118. Managing Editor: Laird Campbell, 18 Mohawk Drive, Unionville, Connecticut, 06085.
7. Owner: (If owned by a corporation, its name and address must be stated and also immediately thereunder 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).
8. Known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities. None.
9. Not applicable.
10. Extent and Nature of Circulation.

	Average No. Copies Each Issue During Preceding 12 Months	Single Issue Nearest To Filing Date
A. Total No. Copies Printed (Net Press Run)	110,109	109,554
B. Paid Circulation		
1. Sales through dealers and carriers, street vendors and counter sales	7,788	7,063
2. Mail subscriptions	98,447	97,634
C. Total paid circulation	106,235	104,747
D. Free distribution (including samples) by mail, carrier or other means	1,869	1,905
E. Total distribution (Sum of C and D)	108,104	106,652
F. Office use, left-over, unaccounted, spoiled after printing	2,005	2,902
G. Total (Sum of E & F should equal net press run shown in A)	110,109	109,554

I certify that the statements made by me above are correct and complete: JOHN HUNTOON, *Editor*

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 24-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.

G3FKM....321/337
W6AM.....321/345
W7GUV....321/343
W8EWS....321/344
W8JBI....321/339
W8KIA....321/344
HB9J.....320/343
HB9MQ....320/336
OE1ER....320/341
ON4DM....320/338
W1HX.....320/339
W2AGW....320/343
W2HTI....320/334
W2JT.....320/338
W5ABY....320/336
W8BF.....320/340
W9NDA....320/343
W9YFV....320/343
WØDU.....320/341
WØQVZ....320/340
DL3LL....319/334
K6ENX....319/335
LU6DJX...319/342
PAØFX....319/338
VK3KB....319/341
W1CLX....319/341
W1GKK....319/343
W1JYH....319/341
W1MV.....319/335
W2BXA....319/342
W2WZ.....319/341
W3GAU....319/341
W4ML.....319/338
W4VPD....319/335
W6CYV....319/336
W8JIN....319/343
W8MPW....319/336
W8PQQ....319/335
W8UAS....319/339
DL1IN....318/333
G4MJ.....318/334
G8KS.....318/335
K6EVR....318/334
LU4DMG...318/333
VE3CFG...318/331

W1BIH....318/341
W2LAX....318/334
W2NUT....318/333
W2SSC....318/333
W2SUC....318/334
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W2YTH....318/335
W2ZX.....318/336
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W3WGH....318/332
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W4LRN....318/329
W4PLL....318/332
W4TM.....318/339
W5UX.....318/332
W6CUQ....318/342
W6GPB....318/338
W6WWQ....318/334
W7AC.....318/341
W7PHO....318/335
WØELA....318/340
WØSYK....318/335
DL3RK....317/333
DL6EN....317/331
DL7BA....317/333
IT1TAI...317/332
K2DCA....317/333
K2LWR....317/329
K4LNM....317/330
K4TJL....317/325
W1BAN....317/329
W2BOK....317/333
W2BQM....317/329
W2CTO....317/336
W2FZY....317/329
W2OKM....317/334
W2SAW....317/333
W2ZGB....317/332
W3EGR....317/333
W4AIT....317/339
W4BJ.....317/328
W4OM.....317/338
W4OPM....317/331
W5CKY....317/335
W5KC.....317/339

W5MMK....317/337
W6BZE....317/336
W6EPZ....317/337
W6KZL....317/332
W6NJU....317/330
W6RKP....317/330
W7ENW....317/340
W7GBW....317/340
W8DAW....317/340
W8IRN....317/334
W9HUZ....317/336
W9SFR....317/330
WØNLY....317/332
ZL1HY....317/340
CE3AG....316/339
K2OEA....316/331
K4AIM....316/329
K4TWF....316/321
W2FXN....316/329
W2RGV....316/331
W2TQC....316/334
W3LMO....316/328
W4DQS....316/322
W4LVV....316/335
W5AFX....316/340
W5KBU....316/333
W5QK.....316/326
W5UKK....316/329
W6KEV....316/337
W6OSU....316/327
W6YY.....316/335
W8BRA....316/338
W8DMD....316/337
W9AMU....316/332
W9LNM....316/338
WØAIH....316/330
WØQG1....316/331
4X4DK....316/333
G2PL.....315/337
K2BZT....315/331
K6EC.....315/328
K7GCM....315/322
W1BIL....315/331
W1FH.....315/340
W1FZ.....315/333

W2FXA....315/327
W2LV.....315/333
W2PCJ....315/331
W2QHH....315/335
WA2IZS...315/331
W3CGS....315/333
W3LMA....315/336
W3NKM....315/331
W4LYV....315/334
W5OLG....315/335
W5PQA....315/332
W6ID.....315/333
W6LDD....315/335
W6UOV....315/328
WA6EYP...315/328
W8HGW....315/339
W8NGO....315/331
W8PHZ....315/329
W9GIL....315/331
WØBMQ....315/327
WØMLY....315/336
WØPNQ....315/330
DJ1BZ....314/331
DJ2BW....314/330
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G2BVN....314/331
G3HCT....314/324
HB9TL....314/329
K3UPG....314/337
K6LGF....314/325
VE2NV....314/330
VK4QM....314/336
W1CKA....314/323
W1HZ.....314/331
W1ZW.....314/320
W2AYJ....314/332
W2CYS....314/335
W2DXX....314/319
W2HO.....314/329
W2LPE....314/334
W2MES....314/321
W2RDD....314/327
W2SHC....314/328
WA2ELS...314/318
W4AAU....314/332

W4BYU....314/331
W4MR.....314/333
W5LGG....314/333
W6TZD....314/334
W8WZ.....314/335
WØBFB....314/331
DL7AA....313/334
I1AMU....313/331
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K2SHZ....313/324
K4ICK....313/324
K4RPK....313/321
LA7Y.....313/334
VE7ZM....313/336
W1ME.....313/335
W2CR.....313/329
W2DOD....313/330
W2EXH....313/318
W2JVU....313/333
W2UVE....313/330
W3JNN....313/336
W3RNQ....313/330
W4AVY....313/324
W5CE.....313/328
W5IGJ....313/330
W5OGS....313/328
W6HOC....313/325
W7CMO....313/323
W8LKH....313/332
W8ONA....313/328
WØPGI....313/328
G2BOZ....312/329
G3AAM....312/335
G3HDA....312/323
K6VVA....312/320
WA2OJD...312/325
W4SSU....312/319
W5EGK....312/331
W7AQB....312/325
W7UMJ....312/319
W8KPL....312/329
W9DWQ....312/324
W9YSX....312/328
WØAJU....312/325

Radiotelephone

W3RIS....321/345
W2ZX.....320/338
W8BF.....320/340
W8GZ.....320/342
ON4DM....319/337
W6AM.....319/342
W7PHO....319/336
W2BXA....318/339
W2JT.....318/331
LU4DMG...317/332
PY4TK....317/333

W6GVM....317/337
W8PQQ....317/333
G3FKM....316/329
VK5MS....316/335
W6YY.....316/335
W9WHM....316/331
WØJYW....316/332
DL1IN....315/329
DL3LL....315/330
G8KS.....315/328
K4AIM....315/328

K4TJL....315/323
K8RTW....315/323
W2HTI....315/329
W2TP.....315/320
W4PDL....315/324
W8HGW....315/336
W9NDA....315/334
4X4DK....315/332
HB9TL....314/328
OE1ME....314/326

TI2HP....314/335
W1BAN....314/325
W1JFG....314/328
WØQVZ....314/328
5Z4ERR...314/335
DJ2YI....313/327
DL6EN....313/325
W1ONK....313/328
W3JNN....313/333
W3WGH....313/321

W6RKP....313/321
W9JJF....313/329
DL9OH....312/322
I1AMU....312/330
VK3AHO...312/323
W1FH.....312/332
W1LLF....312/324
W2VGZ....312/320
W6BAF....312/321
W8MPW....312/320

331	W3EPV	W9KOK	**326**	**324**	**322**	**321**	W7ADS	K6RWO	W2ZVS	W7CNM	W4CFD	W9HB	W3AFM
G3DO			W2GNQ	W9GFF	SM3BIZ	GI3NPP	W9JUV	K8LSG	W3GRS	W9UXO	W4HUE	W9MQK	W3MWC
OH2NB		**328**	W5MMD		W2GLF	K9EAB		ON4NC	W3OP		W4JDR		W6HYG
W6PUY	**329**	G3FXB		**323**	W2GT	KH6CD	**320**	PAØLOU	W5FFW	**319**	W4MS	**318**	W6KUT
	DL1KB		**325**	K5BGB	W2TQR	W1JNV	CR6BX	VE2BV	W5PM	K9ECE	W8ANN	K6KII	
330	W3EVW	**327**	GI3IVJ	W6CYI	W6BSY	W1MQV	DL7EN	W1AZY	W5PSB	W1GYE	W8DQH	K8IKB	W8KBT
G3AAE	W6FOZ	W8PUD	W9WHM	W6UJ	W9FKC	W2WMG	JA1DM	W1IAS	W6CAE	W3IYE	W6LN	K8ONV	W9RCJ
G5VT	W6IBD	W8QJR	WØVBQ	W8ZCQ	W9WYB	W6ULS	K2UVU	W2MJ	W6CHV	W4BBR	W6MVL	W1RB	WØBTD

317
F3YR
W5TIZ
W6SQP
W7BTH

316
W1CBZ
W5BRR
W5PWW

315
K2MGE
K4PDV
W6BVM
W9TKD

314
G6XL
W2IRV
W4EEE
WA6SBO
W9KXK

313
W4ZRZ
W6REH
WØLWG

312
G6TA
K9KYF
W2EQS
WØIJW

311
K4ASU
K4HNA
OK1FF
VE3BWY
W2JAE
W2ZKQ
W6WX
W8CUT
W8SZS
W9RKP
YV5AB

310
DL1JW
DL3BK
G8JM
GI3JIM
HB9EO
K1SHN
K2YXY
VE3RE
W1HA
W1OJR
W1TS
W1VG
W2AEB
W2BBS
W2KIR
W2PDB
W3GJY
W3INH
W4NJF
W4PAA
W6KSM
W7AH
W7DLR
W8CLR
W8JSU
W9ILW

309
DL1BO
I1ZL
K4HYL
K9LUI
W2BMK
W2CKY
W4EPA
W4IF
W4RLS
W5IYU
W5LCI
W5WZQ
W6OME
W8QNW

308
DJ3KR
K4SCT
VE6JR
W2GQN
WA2DIG

WA2RAU
W5VSQ
WA6TGY
WB6OOP
W8KIT
W8YCP
W9FVU
WØNVZ
WØSNL

307
KP4RK
SMØCO
W3PN
W8EVZ

306
W4BFR
W5KTW
WA5EFL

305
K8OHG
LU5AQ
W8GLK

304
W1WDD
W4HA

303
K9BGM
PY2CQ
PY2SO
TG9AD
W4ZYS
YV5BPJ
ZL1AH

302
HB9KB
K8VUR
K9CJK
ON4FU
W2OIB
W5ARJ
W5EZE
W5RDA
W6ABA
W9FJB

301
OE1FF
SM7MS
SM7QY
UA2AO
VE3ES
W1RAN
W2GKZ
W2PTM
W3DJZ
W4HKJ
W5ENE
W5NMA
W6UM1
W8LY
W9TKV
YS1O

300
DL7AB
JA2JW
K2CPR
K2ZKU
K5ADQ
K6BPR
K6JIC
K8WOT
PY1HX
SM5CCE
VE2YU
VK3AHQ
W1DGJ
W1KXU
W1ORV
W1YYM
W2CWK
W3DRD
W3KBC
W5BUK
W5EJT
W6PHF
W6TXL
W7EJD
W8KMD
WØDEI
ZS6LW

299
G3KZI
I1UA

287
K1HVV

286
I1CQD
JA6AD
K9WTS
OK1ADM
W4EEU
W5HJA
W6VUW
YV5BZ

285
K2GUN
W8IBX
W9IHN

284
HB9DX
W3PH
W3YZI
W4GRP
W7CSW
ZS6YQ

283
OH2YV
OY7ML
SM5BPJ
W1EOB
W2FAR
W2GDX
W4QVJ
W6EUF
WØANF

282
DL1DC
K6EDE
SM3AGD
VE6TP
VE7CE
W1ICP
W1QJR
W2IOT
W3DKT
W4DLG
W6NWI
W9BZW
WØSMV

281
DJ4TZ
DL7HU
G6RH
IT1ZGY
JA1BN
W2EMW
W5AI
W6ERS
W6OF
W8ARH
W8WT
W9PQA
W9UZS

280
K1DIR
K1YZW
K4TWK
K8AJK
K8EHD
KP4YT
OK3MM
PY2BKO
W1EVT
W2CZF
W2PXR
W2PZI
W2QKJ
W4EEO
W4FRO
W4HKQ
W4JJL
W5VA
W6PLK
W7HDL
W7TDK
W8IJZ
W9EHW
W9RQM
WØOAQ

279
HB9X
K4EDF
K4RZK
OZ7GC
VE3ACD
WB2CKS
WB2FMK

W4AXE
W5IPH
W5LEF
W5UVR
W6BYB
W9TQL
WØNGF
WØQKC
XE1CE
ZL3IS

278
K3HQJ
K4BVQ
K6POC
W4NO
W6AAO
W6RGG
WA4WIP

277
K9PPX
W1WQC
W3TMZ
W9AZP

276
K6BFZ
K9BVR
W2CES
W3LPF
W4HOS
W7BGH

274
JA8AA

272
PY7YS
W6JKJ
WA6MWG

271
DJ1ZG
G2FFO
G3FPK
HB9MO
K1IGO
K8DYZ
OZ3Y
SP9KJ
W7AUS
W9IVG

270
LA5YE
W4EJN

269
W3BVL
W6BIF
WA2HUV

268
W4THZ
YV5BOA

267
VE3WT
W2MEL
W6BIL
W6DYJ
WA2CBB
WAØKDI

266
DJØKQ
K4CEB
SM6CAS
W6BCT
WØWRO
WB6LFR

265
F3FA
K4YYL
LA6U

264
G2GM
OK1MP
OZ7BG
SM5WI
W3VKD
W9WKU
WØLBB
WØYCR

263
DL6QW
I3AT
OH3UO
SM5RK
VK3YL
W1IKE
WA6QGW
W9ZTD

262
DL1HH
G6VQ
W2RA
W6VVR
W9IRH
WA6HRS
WA6OET

261
G3RO
HB9AAF
HB9PL
K4SHB
K7CHT
OK1GT
W1RLQ
W2BXC
W2LJF
W3FLY
W7MX
YU1AG

260
GM3CIX
I1BAF
I1ZJG
K1GAX
K5KBH
OH2BC
OH2BQ
ON5ZO
PY2BGL
SM1CXE
SM5BCE
SP7HX
SP8CK
W1ECH
W2GHK
W3KA
W3KDF
W3QQL
WA4WAO
W6PZ
W8KSR
W9HKL
W9KXZ
W9PIO
ZS2RM

259
CP5EZ
DL1QT
EP3AM
I1PP
K5GOT
OK1ZL
SM6VR
W2AZX
WA2JBV
W4BHG
W8ETU

258
HK3RQ
JA1ADN
K7MKW
SMØAJU
W1CJK
W4ZXI
WA4HOM
W6EOZ
W7WLL

257
K2KER
K3HHY
KØMAS
OE1FT
W1BFA
WA4GCS
W6FET
ZL3AB

256
G4JZ
JA3UI
VE3DDR

YV5AE
W9QQN

255
UC2AR
ZB1CR

254
W1LQ

253
K4ET
W5OBS
ZL4BO

252
K1DFC
OK1KTI
W9EGQ
W9RH

251
DL1IA
OE1HGW
VE1WL
VU2MD
W1AW
W5MUG
W6EHV

250
DL1GU
KØZEC
ON4LX
VE1AFY
W1GDQ
W1IKB
WA4PXP
W5LZG
W7ABO
WØJRI

249
W1CUX
ZL1AJU

248
K4YFQ
W2GRY

247
EA2CA
G3HSR
K1CDN
K2JFV
W7FUL
WØVQ

246
CR6AI
DJ5LA
HB9TT
K5JZY
SM7ANB
VE3ADV
W1AUR
W4TFL
W6NWZ

245
HK3LX
K1LWI

244
DL3ZA
K9JJR
W1FJJ
W1QV
WB2MFX
WA3ATP
W6FZJ

243
I1ZPB
K6HOR
W1FTX
W2ZY
W4NML
W5LJT
W8HDB

242
K4OEI
K4WMB
K6IEC
K9COS
KØBLT
OK3EA
PAØFAB

VE3TB
W1SXQ
W3ZQ
W4NBV
WB6AKZ
WB6GOV
W8GMK

241
DJ1VS
DJ4DN
DJ5DA
DJ7CX
F8EJ
I1FO
LA5Q
LU8BAJ
K2OUS
K4AUL
K4IKR
K5LIL
K6SOK
UA3CT
W1HWH
W1KXP
W1WLZ
WA2FQG
W4SNU
W9MZP

240
DL9RK
EA4CR
F3ZU
G5VU
HB9NL
K1TUQ
K2INP
K6HZP
K9OTB
K9QIE
OE2EGL
OE8KI
SM5AM
UA3HI
VE3AGC
W1UUK
W2FVI
W2VYX
W4BRB
W4EFX
W5CK
W6CUF
W6ONK
W7ATV
W8ILC
W9GXH
W9HQF
W9LJU
W9VZP
W9WNB
WØCAW
ZL1ARY

239
F8SK
G2FYT
HB9NU
HK3AFB
HP1BR
K2KBI
W6GAJ
W7DIS
W8RCM
W9LNQ
WØPAH

238
G3OZU
K1ZSI
K4ZCP
ON4QT
VE3IR
W2ROM
W8ROC

237
JA4BJO
K2LAF
KZ5LC
SP4JF
VK5RX
W8MCC
W9WGQ

236
WA5CBE
W6NUU

VK5HO
W1DEP
W1RLV
W2IQH
W6FLT
W7RVM
WA8DXA
ZS2U

235
W3WJD
WA8LSO

234
DL1TA
W8LAV
ZD5R

233
KØGVB
LU5ABL
VE6SF

232
K3UZY
K5BXG
K9TZH
VE3EUU
VR2DK

231
JA1CIB
W5RU

230
G3JOC
SP5ADZ
W3PVZ
WA5CBL
W7LZF
WØCKC
W5ERY

229
DJ3HW
K3FGO
OZ7KV
PAØVO
W1AH
WA4LXX
W5NGW

228
K6ALH
OH2SB
VE3LZ
WB2FOV
W6OAQ
W6OUN

227
I1CWN

226
DL1CF
DL9KP
K2IEG
W8JXY
W8VLK
W9LKJ
W9UXS

225
DL4KD
I1EVK
SM6AEK
SM7BHF
W4OEL
WA4FKJ
W7UZA
W9IGW

224
CR7LU
K2DJD
K2ISP
W6BZ
7XØAH

223
DJ5IM
DL1PM
K3MNW
K4IEP
K9CSW
W2LWI
W8IQS

222
DJ5AA
F8CW
G5DV
K4IIF
K4BVD
K5SSZ

236
OH3TH
SP6FZ

VK5HO
W1DEP
W1RLV
W2IQH
W6FLT
W7RVM
WA8DXA
ZS2U

235
W3WJD
WA8LSO

234
DL1TA
W8LAV
ZD5R

233
KØGVB
LU5ABL
VE6SF

232
K3UZY
K5BXG
K9TZH
VE3EUU
VR2DK

231
JA1CIB
W5RU

230
G3JOC
SP5ADZ
W3PVZ
WA5CBL
W7LZF
WØCKC
W5ERY

229
DJ3HW
K3FGO
OZ7KV
PAØVO
W1AH
WA4LXX
W5NGW

228
K6ALH
OH2SB
VE3LZ
WB2FOV
W6OAQ
W6OUN

227
I1CWN

226
DL1CF
DL9KP
K2IEG
W8JXY
W8VLK
W9LKJ
W9UXS

225
DL4KD
I1EVK
SM6AEK
SM7BHF
W4OEL
WA4FKJ
W7UZA
W9IGW

224
CR7LU
K2DJD
K2ISP
W6BZ
7XØAH

223
DJ5IM
DL1PM
K3MNW
K4IEP
K9CSW
W2LWI
W8IQS

222
DJ5AA
F8CW
G5DV
K4IIF
K4BVD
K5SSZ

221
HB9YL
K2HVN
VE2BCT
VE3BHS
SM5AJR
W3FIU
W3HDZ
W3MSR
W4ID
W5HTY
W6OMR
WA6QWN
W7DQM
WØCU
ZL1HW

220
DJ1QP
DL1YA
HB9AHA
K1LBH
K1LPL
K1OZR
K4GSS
K8IQQ
K8RDE
K9AWK
KØJPL
OH2BCZ
SM5BVF
SM7ACB
SP9ADU
W1BGD
W1MDO
W1WAI
W3HQU
W4GTS
W4JDW
W6KEK
W8ELE
WØTDR
ZL3GS

219
K3MVP
VE4XJ
W2MOF
WA2BRI
WA2LMW
W4WHF
W6ANB
WA6FTM
WA6GFY
WB6EED
W7MH
W8NPF
W9ALI
WØGNX

218
G3CEG
K5QVH
KR6JZ
W5DMR
WA6PMK
WB6CIY

217
K6CTV
K6OT
K7CVL
K9WDY
W8DGP
W8UCI
YV2CJ

216
W1HRI

215
JA1IBX
OH3JY
VE6AAV
VE6ABP
W9LQF

214
G3JEC
JA8ADQ

K8SWE
W4JVU
W5WLD
W7OEV

213
K4WJT
W5CGR

212
I1IR
VE1AE
VO1BD
WB2FON
W3JW
W6QDE
WA8LST

211
CR6CZ
KL7MF
LA7H
VE3NE
W1KGH
W2CQ
WØDIB

210
ON4FL
W1NTH
W2RSJ
WB4BDO

209
DL1CR
JA1CRR
SM6AMD
W1GVZ

208
K1SCQ
WA2IEK
W5KHL
W7UZE
WA9NUQ

207
K6BIA
MP4BBE
OK3KAB
9Q5AB

206
DU7SV
OK3IR
VE4MP
W7GDS

205
DJ2HI
DL4LF
W8HEV
WA4QBX
WB6ADY
YV5BNR

204
CR7BC
I1SF
K1JHX
K1OOJ
K4ZJF
KR6BQ
W1YRC
W2BXY
WA2PXI
WA4FDR
W5AJY
WØLBS
XE2YP

203
DJ4HR
DL1FZ
JA1ZZ
JA3CWV
JA3RQ
K5STL

202
DJ2SR

EA2CR
OE7UD
OK2OP
PAØXPQ
SM7TV
WA9IBT
4X4CJ
4X4TP

201
CE5EF
DL1KS
DL1LD
DL3OH
G2AAN
I1ARS
OZ9N
VE7BW
W1FPS
WB2CON
WA6CAL
W8LZV
W9OW
W9SCZ
WA9LZA
WØDGH

197
WA4SUR
K4RLO
SP8YA
W4BRE
WB6HGH

196
W7MVC
W7QON
W9BGX
W9MCJ
YU1BCD

195
K4MOJ

194
WA8HFN

193
EI5F
K5LNN
KØWKE
VE3XK
W2JSX
ZS5UP

192
DJ2WN
KØTYO
LA1H
LA9CE
OH2VZ
SM3BNV
SM4CLU
SP8SZ
SP9DH

191
LA3UF

190
DL1AM
UA3FT
W1LBA
W9BZB

189
K6SDR
KG6AAY
LA1K
SM7CAB
SP2HL
VE2JC
VE8BB
W4DVT
WA6OIU
WA6VAT
W7FKK

188
I1ZYM
OE1KW
LA8WF
WA4NBC

187
SP3AIJ
ZS1ACD

199
K2AFY
K4PVZ
K8DBW
K9YOE
VE3MZ
W1EOA
W2KIT
W2MZV
WB2PGM

W3AG
W4FPW
W5EJV

184
DJ2BG
K1SLZ
K4EWG
K8DTZ
VE1RB
W6MPY

183
K3BNS
OH3QC
SM5CAK
VE4SK
W1MRQ
W6ABJ
W7GJ

182
F2PO
K1PNL
K5IIN
LA1KI
OZ4H
PY1BTX
SM4ARQ
W2ABL
W4FZO
W7YBX
W8EW

181
DL1CF
G3RFE
HB9AT
K2DXV
K7PJF
PY5ASN
SP2IU
VE3EU
VQ8AI
WA2CLQ
W3LN
W4UHC
WA4DZU
W5NXF
W6TZN
W7YEX
W8NAN
W8OKB
WØCVZ
ZL1QW

180
DJ4XA
DL1ES
DL1MD
EA7CP
HB9T
IT1AQ
JA1HGY
K2QIL
K3JCT
K3PDC
K8GHG
OH5VF
OK1VK
OK2BCI
OZ7X
SM5BIU
SP6AKK
SVØWAA
UR2KAA
VE2DR
VE3FAW
W1PNR
W2GUR
W2IP
W2OCL
WA2RUB
WB2AMO
W3QCM
W4KJL
W4ORT
W4ZSH
WA1KXC
W5EGS
W7VRO
WA7FIG
W8TRN
WA8GUA
W9FJX
W9QQG
WA9JDV

179
OK1ABP

W1NF
W2HL
W2GJR
W5QIX
W7NNF
W7QY
WA9KQS

178
K3TRZ
K4GLA
KL7BZO
PY2BJH
SP6RT
VE3FKL
WB2KTO
WA2UBC
W4DII
W5NLP
WB6CFO
W8GQU
WA9IVL
WØHNA

177
K4LFC
LA7JF
W4ETO

176
W5BPF
W9ZWH

175
K1AQI
K9JJS
OK2KJU
WØOMM

173
K5BZU
VE3KP
W5HTM
WA4NST

172
K8YCM
W4SXE

171
DJ5MX
JAØAC
K5JVF
K6SVQ
KØBHT
SP9PT
W2NIN
W2NR
W4CQI
W4KN
W6QQW

170
G3ETU
HK3AVK
I1BAY
I1TM
K2QOU
K3LJZ
K8ZIP
K9OYD
K9WJU
LA5ID
UT5CC
VP7NY
WA2PWI
W3ZAQ
W4JUJ
W6WGC
W8BQV

169
DL6TQ
F2NB
I1LGR
K4AQQ
VE3ZN
W1EHT
WA2MTI
WA7BOA

167
WA2FJW
W6BRW/
WØMVG

166
CR6AU
K8LNL
K8UDJ
KH6FBJ
LA8LG
OK2KMB
WØNWX

165
HB9AAW
K1NHR
K3MCO
VO1AW
W4FNS
W4JD
9J2IE

164
F8OP
JA1ACA
K1YPN
K3HTZ
KH6BIH
VK3BG
W2LQP
W4MZP
W9NNX
WØGTU

163
DJ5JH
DL1XZ
DL6KK
I1CSA
JA2TH
K3ZCA
K7JVF
UC2WP
WA2RMP
WB6GMN
W8SH
WØNCK

162
EI8H
F8OQ
HA5KDQ
HZ3TYQ
K4ELK
K6TZX
SM7CXH
SP5AEF
W1OQP
W2KOY
WA2KSD
WB4BMV
W6HJ
W7VSM
W8GGE
ZS5RS
4X4HK

161
DJ6RX
G3EIX
I1WT
K1NWE
K1RQY
K4KJD
K5JCC
K5TYW
VE1PL
WA2ZKO
W3HTW
W5DWB
W6SUD
WB6CPE
WB6FYW
W8BRL
W8MSG
W9NVJ
W9YYG
WØSUU

160
DJ2AJ
DJ4SS
EA3KI
I1PPI
JA1LQC
JA7OD
K1OBT
K4KLR
K4OA
K8YEK
KØGSV
KP4BJM
LA8PF
OE1ZL
OH3TA
OZ6RL
SM5BF
SP8MJ
VE3AU
VE3CDX
VE3CWE
VE3HL
VE3OR
VE5JS
VP6PJ
W1DYE
W1HNI
W1PYM
W1QUS
WA1ABW
W2BTG
W2HPV
W2NCG
W2RIR
WA2BEX
WA2CGW
WB2CDZ
WB2CKO
WB2GHI
WB2JYN
WB2OZW
WB2PXU
W3IOP
W3KID
W3KJ
W3TVU
WA3CGE
W4YKH
WA6KMF
WA8JCD
W9BMD
YU2NEG

159
JA7MN
K6PJT
ON4OR
OZ2NU
SM2BYW
WB2JJF
W4LIU
W4USQ
W5EIL
W6AJB
W7NPU
W7OQO
W8QBG
W9ALP
ZD8HL

158
DJ3GG
OZ4FF
WA4JLY
WØKZJ
9Q5QR

157
K2YTC
W7BCV

156
UA1DI

155
HK3NQ
OK1ADP
OK2KOS
UB5DQ

154
K9KGF
W6AEM

153
DJ4OQ
EP2RC
K6JAJ
SM5AIO
SP6ALL
VE7BFN
WA6TQK

152
DJ5DU
DJ7YR
K2ZCD
K8QYA
OK1BP
WA1ERM
W2DVC
W4FWG
W5RY
W8UM
WA8GUN

151
DL8AJ
F9EP
HB9ADP
JA8GR
OZ5KU
SVØWPP
UA6FJ
UA9BZ
VE3BCF
W1AJO
W1DIT
W3ZNB
WA6YVW
WAØDUB

150
F9BB
G5PQ
HB9RB
I1AVD
I1TIC
K1CEC
K3JHG
K9DKU
KØQYD
LA5YJ
OH2SF
ON4ZU
UA3KAO
W1COI
W2HZS
W3KGU
W9ADV
WØCDV

149
G2DCG
HB9RX
I1LCL
K3AMI
OH7PJ
UD6BW
WA2CFG
WA4IWC
W6GTE
9Q5HD

148
VE6MF
W2GKW
W4HEG
W6NAT
WA6UZA

147
DL1DAA
DL1GK
DU1OR
K4TUA
VS6AJ
WA4OSM
WAØEMS

146
JA3BG
K9ZXG
OK1HA
W3AAZ
WA4VAI
WØQEV
9M2UF

145
HA5AW
K4GSX
K4KIF
KZ5IP
SP2LV
U5ARTEK
W2BWC
WA2CYQ
W9NHP

144
DJ5BW
W4HHN

143
DJ4VX
DL9PE
HA5FE
K4EOP
K5DCO
K6EBB
KØCER
OK1AEZ
OK1PG
SM6ARH
SM6CAW
UC2AF
W1ODI
WB2HZH
W6KPM
WB6KPR

142
DJ1AK
DJ1PK
DJ5IH
DL9PR
JA7ARZ
K7PBM
K9KBW/4
OH3XZ
OK2YF
ON4NM
OZ3KE
PAØLV
PY2BNX
SM7ANE
SM7BHH
W1CNU
W2OQS
W3DBF
W4YZC
WA5ALB
W6VUN
WA8GPX
WA8SNM

141
DL9KJ
K1CTQ
K1EUW
K1VSK
K2CHS
K2JJK
K3BSY
K4BYN
K8AEX
LA9HC
OE5CA
OH2PB
PAØULA
UA3DV
WB2OAE
WA2VFU
W5KTB
WB6GVV
W8GOC
W8KC
WA8CZH
WA8NDL
W9RUB
WØGQL
ZD8BC

140
DJ9SB
DL1VN
DL7CT
HB9ABN
HK7UL
HM5BF
I1HL
JA1BJS
K1QGC
K1UDD
K1UHY
K2AGU
K4HPR
K4SXD
K6RSY
K8BPX
K8EHU
K8PYD
K9CZV
K9KKU
K9PTW
KP4BAJ
OE3SJW
PY1FH
SM3YF
SM7DQK
SMØUU
SP8SR
TG9GZ
UA3KBO
UI8LB
VE2TJ
VE3CEA
VE3CLK
VE4BXY
VE5JI
W1ØSP
W1DDO
W1STW
WA1DJG
W2BAI
W2BOT
W2CNQ
W2TKG
WA2GHW
WA2HJF
WA2QHK
WA2TJA
WB2GYD
WB2NYM
WB2POH
W3ABT
W3HNK
W3MHR
W3UHN
WA3GTX
W4NTE
WA4CZM
WA4HHW
WA4IRR
W5GZR
W5OER
WB6IUH
WA7BOB
WA8NYB
WA8OVC
WA8TPL
W9OPD
W9QWM
W9UTQ
WA9JDT
WA9SUJ
WØPFG
YU2NFJ
ZL2VN

139
DL1RA
K1EIN
K1OTA
K4CK
SM6CKS
UD6BZ
UG6AD
VE5DP
VP7CX
WA2WEE
W3MYE
W6GEB
WA8RWU

138
DJ8FF
DL8RL
I1SZE
K2GTF
K4ORQ
UW9OU
W4MRT
W6ETR
W9ARV

137
K6AJ
UF6KPE
WA9MHQ
5B4TX

136
K9PQG
YU1AA
WA2UWA
WA9CYV

135
OH5SS
ON5AX

134
K2KTK
KØBUU
SM3CJD
LA3XI
VE2ATU
WA2KHD
WA8MCR
ZD3G

133
K2DNL
OE2JZ
PY2BBO
PY5QE
SM7CSN
UA4KKC
VS6BJ
WA5LES
W6QNJ
ZS6CW

132
JA1KFN
K2DQI
OK1KTL
OK3KAS
OZ5MJ
W8CAG
9K2AN

131
DL3VR
GM2DPW
K3AIG
KH6BJ
WA9MHI

130
DJ8JY
DJ9KG
EA3IH
I1RL
K1KDP
K3EUR
KØMLM
OK1AII
W1AGF
W1PLJ
W4YSY
WA4RAK
W5AKI
W9FRS
W9KYK
7Z3AB

129
HB9NY
K4MQL
K7VYU
OK2PO
SM2CXU
SP6AZY
VE3DDX
VE7AC
W4CRW
W4WSF
W8CRI
XW8AS

128
DJ4KU
JA1OIO
K4WSE
LA7WI
SP8AJE
UB5KJE
W4HZI
WB6NWW
WB6OLR
W7LBN
W8AL

127
KØWTT
UA9KOH
W1HQO
W6PGM

126
DJ9NX
HB9AIJ
HB9IX
JA2AB
JA4AQR
JA5AB
K9YPW
W1WSN
W2IYW
W6KNE
WØDCA

125
DJ6BW
JA1GTF
K5LMG
KP4CQZ
SM6CUK
UA4LM
VE3CZC
W4GHN
WA5IIS
W8EGR
W9ECF
WØKAW

124
DJ7MI
DL8ML
F3TK
JA1AKH
K1FHL
K1PVB
K8YTY
OE3SGA
SL6BU
SM7CWW
UB5TQ
WA4IJH
W9SGI
YU3AT

123
CE6EZ
DJ8FW
F9AP
K1MRP
K9YBC
LA6EF
UW3CX
W1LEL
W2MXN
W4TXE
WA4FJM
W5ZVU
WA5AUZ
W6ZER
WA8CIA
W9ZEN

122
DJ7LD
DL1PN
DM3SBM
EL2S
FG7XX
HB9AGI
JA2XI
K1ZHJ
K5BYV
LA9TG
TU2AE
VE3DBB
VE7AGC
W1JN
W2COT
W3FNV
W3QZA
W3TVB
WA4END
WB6HGU
WA9KVA
WØJWD
ZS6AJO

121
DJ7AY
DL6HP
DL7HT
G3TKK
I1BOL
K1LMS
K1ZND
K2KXW
K3QJE
K9WEH
OK2DB
OZ3PO
SM7CRJ
SP6AEG
VE2CK
VO1HH
W2LFL
W3IWS
W3TIE
W4LXX
WA4MDA
WA4ZMH
W5KZA
W6HS
WA6NYK
WA6TKQ
W8TBZ
WA8PYL
W9HFB
XE1TQ
ZS6BIJ

120
DJ1QT
DJ1QX
DJ8IF
DL1NC
DL1VG
DL5JJ
DL7LJ
DM3ZBM
G2ZR
G3LUW
G3OXI
JA8EL
K1EWL
K1LDK
K1MBM
K1MXY
K1QZV
K2LAI
K2MGM
K2UMM
K2VAC
K3EKO
K3GUR
K3JGJ
K3QVV
K3SGE
K3SLP
K4FRM
K4JSZ
K4LDR
K1CDN/5
K5KYD
K5VTA
K7QMK
K7QWI
K8LRK
K9DWG
K9GEL
K9JLJ
K9QVB
K9VYT
KØARS
KØEEL
KA2RJ
KA5RC
LU2EN
PAØPAN
SM6CZU
SMØBTS
UA3KZO
VE2JD
VE2RB
VE3BBB
VE3DKE
VE3FYF
VE5PM
VE7SE
W1ETV
W1GF
W1GTO
W1SEO
W1SWX
W1ZLX
W2HAZ
W2IWP
W2NEP
W2RSO
W2VIR
WA2CUI
WA2HIU
WA2LGX
WA2LOR
WA2LRI
WA2PLZ
WA2SDH
WA2YFB
WB2HHZ
WB2HJW
WB2OLN
WB2OQU
WB2PBI
WB2PCF
WB2PWU
WB2RJJ
WB2YQH
W3HCW
W4IA
W4JJX
W4KAT
W4PGK
W4WHK
WA4EPL
WA4EPM
WA4PFD
WA4SYA
WA4TLI
W5DZA
W5HTG
W5KFN
W5MOQ
W6BNK
W6HCX
W6MTP
W6TMP
W6VEB
WA6BBJ
WA6FOF
WA6HKG
WB6CEP
WB6SEV
W8GGQ
W8QXQ
W9CBD
W9JCK
W9POC
W9VBU
WA9GQT
WA9LUD
WAØDKA
WAØHVR
YU1SF

119
K6HWC/1
K3CNZ
K7QXG
K8CBK
K9HUY
KØAXU
KA2CM
OK1BMW
PY1BYK/7
W2UFT
W3DHO
WA6YMX
W8BEK
W9MRX
WAØCGS
WAØHXW
XE2OK
ZL2AQV

118
F9RA
JA2BP
K1IEM
K8TVO
K8UHB
UA4KEA
UA6LI
VE3PE
VE7JF
WA2LRK
WA4WUD
WA6AUD
YU1NOH

117
DL1ND
KØEIA
W1FEF
WA5KAJ
WAØGQI

116
JA2LA
KA9MF
LU2CF
SP8ABQ
UA3KYA
VS9AZ
YU1SJ

115
DL6ZT
DL7EL
DL9OA
HK3AH
K9KGC
KZ5AY
UA3DB
UB5JR
UW3FD
W1GBW
W2MBU
WB2NXL
WB2QKT
WB4CII
W6ECM
WAØFQZ

114
DJ9VW
DL1DH
VS9AWR
WA5JSI
WB6FCR

113
DJ6NS
DM2BLJ
G3POR
K5VLO
UJ8AB
W2FYS
W4ZFE
W6MZH
YU1NIG
ZD4AM

112
G3JQC
GI3RXV
GM2HCZ
HA7KPF
JAØCCE
K6ZDL
KZ5AG
OK1OO
SM5RI
VE8AA
K5YAA/V
W1AA
W1ATP
W3NJV
WA4HTR
WA6IBL
4X4QA

111
EI4AN
K1QPN
K1UTC
K5OLJ
KR6MM
LA2IG
LA7VE
ON4MW
UB5FL
UB5KIX
UB5LU
UB5SP
W1DHL
W2SJM
W3NNX
W7QYA
YU1YG

110
DJ7GJ
DJ8OT
DL2DK
DLØST
G3NWG
G3OHG
JA2BHG
K2CWQ
K2DDK
K2MPS
K3ILC
LA2KD
OE8DM
PAØPO
PY1NEW
PY7GV
UF6FN
VE3DJK
VE6AET
W1ILV
W2EYJ
WB2NDI
WB2QKG
WA3BXJ
W4JUK
WA4ICB
W6USV
WA7AHH
WA8ETX
WAØAMC
YO4WU
YU1QBC
ZS6BIG

109
DL6DR
DL8KJ
F3RG
G3SYC
JA6HW
K8ELF
KØZGC
KL7AIZ
LZ1KDZ
OK1KUL
UF6FE
UW3AM
VE3GCO
VE6ALX
VO1IB
W2DGZ
W4FTB
W8LXU
W8SXG
YU3CDE
ZS6AUZ

108
DL9OY
G3NKQ
G3OAG
JA1DZY
JA1ITX
K4AVC
K4PRT
K4VFY
K7VAL
K9MWE
KØDYM
KX6DR
OHØVF
OK1BB
OK2KBR
SP9YP
UA3IM
UA6KJG
UA6MT
W1AFM
WA2WIU
W6CRT
W7HRH
WØCQC
YU3FZ
ZC5AL
5B4PC

107
DJ1VY
DJ3YU
DJ6OZ
DL1TV
DL9DH
JA1BYL
JA3BCC
JA8AJM
JA8KB
JA8NU
K4KWE
OK1GO
OK1WV
SM3DSE
UP2CT
UP2OK
UAØJF
VE3EUX
W2OHF
WB2GMN
WB2RSW
W6ZGZ
WB6CGA
W7CAL
WAØAHL
WAØBWM
YU1EXY
YU2RAK
ZS6AXU

106
DJ4KO
DJ7OM
DL8CA
F2RK
HA7LF
HB9AFI
HB9KP
HI8LC
JA8ZO
K2CC
K3UMM
K8AXK
K8NSE
KL7FMM
LU6FBR
OH3MF
OH5PX
OK1IQ
OK1VB
OK2KGD
PAØJAL
PI1KM
UA1KIA
UA3KET
UA6BV
UB5PG
UB5QA
UD6BV
UN1BK
W1OER
W1ROM
W2EBW
W2SZ
WB2FBN
W3ZPO
W4ILE
W4SMU
W5LJY
W6EZL
W6WWD
W9TV
WØCYY

105
CE3LB
DJ5EY
DJ5JK
DL4OP
DL7MQ
DL8BL
DL8UP
DM2AIO
G2HAO
G5ABA
HA5AF
HA7PJ
HAØHC
HK3SO
I1FOS
JA1FAF
JA1QCA
K1RQE
K1WJL
K1ZQL
K3FDQ
K8WIJ
K9BHT
KP4MO
LA5GC
LZ1BC
LZ1KAA
LZ1KPW
OD5EL
OK1ALZ
ON4CE
OZ8JD
PAØWDG
PY4UG
UB5KNH
VE3FID
W2EGI
W2VJO
W3FWI
W4WGI
W4ZBW
WA4OJN
W5AC
WA5HEC
WA6JYJ
WA6NYJ
WB6NBU
W7JIH
WA8FKD
WA8MQE
WN8TND
YO4KCA
YO5LC
YO7DL
YU3DQ
YU2LA
5A1TY

104
DJ1KOA
DJ4FZ
DM2AXO
DM3JML
G2BXJ
G3FVC
G3HSL
G3RHM
HA3MB
HA5DJ
JA1FI
JA1JAN
JA6CNL
JA7MJ
K1DNW
K1NBO
K3UXY
K3VZV
K4SWO
K4YZR
K6YNB
K7TCL
K8YDR
K9DJQ
K9UEY
K9YTP
KØJGH
LA8D
LU1DQB
OA4CG
OH2DW
OK1PT
OK1VU
OK2YJ
OZ2CE
SM5BGB
SM5BOE
SP6GB
UAØTD
UC2AZ
UF6LA
VE6ABR
VE6AQL
VK5OL
W1GIV
W2JMZ
W5IJQ
W6KWU
W6RMM
WØUJK
WA1AKL
WA2VWI
WA2YRV
WB2FIT
WB2HWH
WB2MDU
WA3BHY
WA3DFV
WA4EKF
WA4LUG
WA4TUF
WB6SHL
WA9HBA
WA9OMR
WAØMOB
4X4NY

103
CR6EI
DJ6TS
DJ7XC
DM2CDO
DM3AYH
F5GV
F7CK
G3ESF
G3RWQ
HA1SD
HA1VE
HB9ABH
HK3HY
I1CCZ
I1WL
JA1PTX
JA4CNS
K1JKT
KL7FEF/1
K2JFE
K2VFX
K4BUJ
K4HPP
K6LBV
K6VTC
K7STK
K8NQP
K9AXE
K9CJU
K9OSO
K9RDY
KØGJX
KØQCT
OE8IS
OH1NM
OK3CCC
OZ5CV
PAØKOR
SM3WB
SM6AFH
SM6CPG
SP7AOD
TI2KR
UA3KTV
UA4KHN
UV3TQ
UW6LZ
UA9JS
VE3ACU

(*Continued on page 152*)

Station Activities

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

ATLANTIC DIVISION

DELAWARE—SCM, John L. Penrod, K3NYG—RM: W3EEB. Delaware nets:

Sat.	3905 kc.	1800 EST
Sun.	3905 kc.	1300 EST
Mon.	145.260 Mc.	1930 EST
Tue.	50.4 Mc.	2100 EST

Renewals: K3OBU as OVS; W3FPJ as OVS; W3RDZ as OO. Col. Sullivan of the Office of Civil Defense, wishes to thank all the amateurs that provided emergency communications during Hurricane Doria. W3DEO is on a two-month trip to Australia. W3BGE has been appointed RACES Asst. Radio Officer. W3EJU is putting up a new telephone pole. K3FPB and WA3DDW are building 2-meter stations from the ground up. Traffic: W3EEB 95, W3DKX 14, WA3DYG 7, WA3DUM 6, W3HKS 1, K3NYG 1.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3ELI—SEC: W3AES. RMs: W3EML, K3YVG, K3MVO, W3MPX. PAM: K3MYS. V.H.F. PAM: W3FGQ. EPA, QNI 403, QTC 343; PFN, QTC 511; PTTN QTC 279; EPA V.H.F., QNI 208, QTC 145; EPA P&TN, QNI 646, QTC 327. OO reports were received from K3RDT, W3NNC, W3FGQ, K3MYS, K3PSW, WA3AXV, W3KEK, K3TXG; OBS report from WA3AFI, OVS report from K3VAX. A report was received from W3IVS! W3AXA is back from a West Coast vacation. WA3AXV reports working CE4BP on 6. W3NNL has a new 500-watt final. WA3ATL is starting off with a bang. W3VR, K3MYS and K3NSN made the BPL. W3YPF moved to a new location. W3MPX made WAS. W3ADE is getting back into the swing. K3VBA made BPL No. 2, one to go. WA3GUL has a new quad on 50-ft. tower. K3WEU is busy teaching at Big Brothers. WA3EMO is getting the high school club station going. WA3EXB is a new aspiring OPS. WA3BSV will be on from P.S.U. W3CUL still is at it and made the BPL as usual. WA3CKA has a new inverted "V" on 80. WA3FPM reports that soccer is cutting into his ham time. W3CL sends code practice nightly at 7 P.M. on 50.2 Mc. for license up-grading. WA3AOJ is being pressed into service. W3RV's XYL had another setback. We are all pulling for her, Tom. W3EU is ready to be active again. W3YYO has a new jr. operator. K3MVO reports tired fingers; now he is scrounging parts for an automatic keyer. A section meeting was held at the QTH of K3WEU. W3AES still is looking for ECs. If interested give Jon a buzz. W3FGQ reports the Del. Co. ARPSC Net meets on 28.990 Mc. at 8 P.M. Thurs. and on 50.64 Mc. at 9 P.M. Thurs. Phila Co. ARPSC is using the new EPA V.H.F. Net for its meeting and news releases. Traffic: W3CUL 3423, W3EML 615, W3VR 568, K3MYS 560, K3NSN 406, W3FGQ 304, K3MVO 241, K3VBA 210, W3MPX 164, WA3CTP 156, WA3EMO 140, WA3GAT 139, WA3ATQ 137, K3YVG 124, W3AIZ 121, K3WAJ 95, KØWEU/3 89, WA3ATZ 78, WA3FZP 76, WA3GLI 73, W3ELI 66, WA3EEC 65, WA3AFI 64, WA3BSV 63, WA3FPM 62, W3AXA 60, K3RUA 59, W3KJJ 56, W3YP 56, WA3CKA 54, WA3EXW 54, W3FPC 54, W3KQE 43, WA3FVK 36, W3NNL 36, WA3AIB 34, WA3EXB 27, WA3CFU 26, WA3EIO 24, W3HNK 24, W3JKX 22, W3OY 22, K4HKW 20, K3WEU 20, K3MDG 19, K3BHU 18, K3KTH 18, WA3HGX 17, K3TNL 17, K3KKO 15, W3FSV 12, W3RV 11, W3IVS 8, W3BUR 7, K3UZO 7, W3ADE 5, W3ID 4, W3BFF 2, WA3BJQ 2, WA3IAZ 2, W3OML 2, WA3AXV 1, W3CL 1, W3EU 1, K3FOB 1, W3JCQ 1, W3KEK 1, K3VAX 1, W3YPF 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Carl E. Andersen, K3JYZ—SEC: W3LDD.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Mgr.*
						Ave.	
MDD	3643	0000Z	Daily	30	198	9.0	K3OAE, RM
MDDS	3643	0130Z	Daily	30	30	3.0	W3ZNW, RM
MEPN	3920	2300Z 1800Z	M-W-F S-S	22	90	27.5	K3NCM, PAM
MTMTN	145.206	0100Z	M-W-F-S	18	10	8.1	K3NOQ
CVTN	145.615	0200Z	Sn-F	7	11	3.86	WA3CFK

New appointments: WA3CCN as OPS; W3TXQ as OO Class IV; W3DPJ as OO Class IV. Renewed appointments: K3GZK as ORS; K3NCM as OPS. MEPN turned out for a Hurricane Watch and was on for 17 hours and 18 minutes with 123 stations QNI and passed 5 messages. The ARRL Booth at the Washington, D.C., Foundation Hamfest was a success as well as the hamfest, which was enjoyed by all. W4ZM, pres.; and W3TMZ, vice-pres.; have mapped out the moves for the PVRC to again make a clean sweep of the coming contests. New AREC members in Washington County are W3EPV and WN3IJR. WA3EOQ and WA3CFK spent a cold V.H.F. SS Nite on Blue Knob to work 50 stations in 14 sections. K3CYA sends 8 Intruder reports. W3DPR reports the completion of WAS and DXCC during his year's stay in Baltimore. W3MVB has passed the Extra Class exam. K3OAE may have to set up a station in Florida to remain active. K3QDC is on the air with wall-to-wall Heathkits. K3UFV is attending Md. U. WA3HEN, a new licensee, already is active on v.h.f. traffic nets. WA3HQE reports a new AREC Net on 145.3 Mc. at 0800 local time Sun. K3LFD is getting the AA County AREC organized. WA3GTX participated in the Sept. FMT. K3ORP has been QRL on various Hurricane Nets. WA3CCN is going high-power with an 813 Class C amplifier. W3UE will be back shortly as NCS of MDD. W3TN, as NCS of MDD, sounded like old times. W3ATQ is trading traffic for teaching at Hagerstown JC. W3PRC is a new Extra Class licensee. WA3EWT, of St. John's College High ARC, reports 3 new Novices, WN3s ING, IHP and HBI, as well as a new weather facsimile station receiving pictures from Tiros and Nimbus satellites. K3NSS made the BPL for the first time, W3GKP is disposing of his excess equipment to make room for more new equipment. Traffic: (Sept.) K3NSS 270, W3TN 220, WA3CFK 190, W3ATQ 82, W3CBG 73, K3JYZ 60, K3QDC 48, K3GZK 47, K3LFD 40, WA3ERL 28, WA3HQE 17, K3NCM 14, WA3HEN 13, WA3CBC 12, WA3CCN 9, W3PRC 9, WA3CEK 8, WA3EOP 8, K3LFN 8, K3ORP 8, K3FKU 7, K3OAE 5. (Aug.) K3NSS 178, W3ZNW 21.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles B. Travers, W2YPZ. SEC: W2BZJ. RMs: WA2KIP, WA2BLV. PAM: and NJPN Net Mgr.: W2ZI. EC WA2ANL has moved from Burlington County and is now located in Bridgeton. He will take over as EC for Cumberland Co., but we now need a volunteer to take the Burlington Co. assignment. NJN reports a QNI of 411, total traffic 287, 30 sessions. NJPN reports a QNI of 577, total traffic 126, 30 sessions. We have just heard of the passing of W2BIN, who became a Silent Key May 17. Please report these things to your SCM *promptly*. The New Jersey Phone & Traffic Net has had problems since a 5-kw. broadcast station moved within 3½ miles of Trenton. I have been unable to work into or with the net lately. The FCC surveyed the territory and found that a 56 m/v signal appeared at the reciever of W2ZI on 3rd harmonic. Therefore, I've been unable to properly administer the net, and have turned it over to my assistant net mgr. W2PEV. Because of this and the new regulations we have moved to *3930 kc.* for all those who wish to hold membership in NJPN. NJN was alerted by Net Mgr. WA2KIP during Hurricane Doria. W2ZI made a trip to ARRL Hq. and enjoyed the Wireless Museum. He also attended the 5th Annual Historical Wireless Convention at the Ford Science Museum Sept. 22/23/24 at Dearborn, Mich. W2KGM is a new OPS. W2BAY is working s.s.b. on 160. Traffic: (Sept.) WA2KIP 127, WA2UPC 58, W2ZI 11, K2JJC 7, W2BZJ 5, K2SHE 5, WB2APX 4, K2BG 2. (Aug.) WA2UPC 53. (July) WA2UPC 50. (June) WA2UPC 56.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVI. RMs: W2EZB and W2FEB. NYS C.W. Net meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 2200 GMT, NYS C.D. on 3510.5 and 3993 kc. (s.s.b.) at 0900 Sun. and on 3510 kc. at 1930 Wed., TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT, NYS County Net on 3510 kc. Sun. at 1400 GMT and 2345 GMT on Mon. WB2VSL was appointed OPS. Endorsements: K2DNN as EC Chemung Co. and ORS, K2RTQ as OPS, K2RYH as ORS. The Rome Radio Club elected WA2QAV, pres.; W2PRY, vice-pres.; W2MSM, secy.; W2IXR, treas.; WA2FLX, chmn. of board. Congratulations to W2OE on making the BPL this month. Our SEC visited Glens Falls and Massena in Oct. W2RUF is doing a fine job as SEC and I'm sure we all appreciate her efforts. The central District RC elected WB2AVY, pres.; W2PRY, vice-pres.; WA2ANE, secy.-treas. K2TXB is moving to Ithaca. Please note that Form 1 reports cards may be obtained from ARRL on request. The Chemung AREC elected WA2HFL, pres.; WA2FJJ, vice-pres.; WA2ZBD, secy.-treas.; K2DNN, EC. W2SSC helped K2LWR erect a utility pole for AC service on top of Gradl Mountain, 4 acres in the clear at 2000 ft. K2VOX's antenna got hit by lightning. The South Towns ARS is a new club south of Buffalo. The STARS elected WB2YNR, pres.; K2KQC, vice-pres.; WN2WCT, secy.; WB2TGL, treas.; WN2CEF, sgt. at arms. WB2YNR also edits the club paper, *Tell-Stars*. K5IIX/2 is a visiting Professor of Law at Sunyab (U.B. The *Chautauqua Hammer* reports that new amateur clubs are being organized in the Dunkirk and Fredonia high schools. The *RARA Rag* reported that 37 new members have joined the club. The Fulton ARC held a 10th birthday party. For twelve years members of the Syracuse V.H.F. Club have presented an annual v.h.f. roundup each Oct. This year there was none. This event was attended faithfully by v.h.f.ers from all over the northeast. Your SCM attended all twelve sessions and I realize the time and painstaking effort expended by this group. Many thanks are due to W2RHQ and his helpers and we hope they will come back strong next year. Traffic: (Sept.) W2OE 372, W2SEI 350, WA2NDC 184, WB2GAL 178, W2RUF 160, WB2OYE 125, W2FEB 85, K2RYH 64, K2JBX 50, WB2SMD 35, W2MTA 28, W2PNW 28, K2IMI 22, K2SSX 22, K2OFV 20, W2RQF 14, K2DNN 13, WA2ANE 9, W2FCG 9, W2CFP 8, WA2AWK 7, W2PVI 4, WB2VND 4, WA2GLA 3, W2EMW 2. (Aug.) K2RYH 14.

WESTERN PENNSYLVANIA—SCM, Robert E. Gawryla, W3NEM—SEC: K3KMO. PAM: K3VPI (v.h.f.). RMs: W3KUN, W3MFB, W3UHN, K3SOH. Traffic nets: WPA, 3585 kc. daily at 7:00 P.M. local time; KSSN, 3585 kc. Mon. through Fri. at 6:30 P.M. local time. W3KQD is back on the traffic nets after a long term on night work. WA3IQT is a new ham in the area. *Radial* reports the Annual Hamfest (South Hills Brass Pounders and Modulators) was a tremendous success. WA3HCE went straight from SWL to General Class. WA3FPE is chasing DX with a new SB-101. W3LDB is back on the air with his Viking. W3WFR is the proud owner of a new 2-meter "transverter" that operates on all modes of transmission. K3HKK, NARC station, is back on the air with two regular operators checking into NTS. The NARC also reports via "QST de K3HKK" that W3PUT and K3CXZ spent the summer in California increasing their brain power. The 10th Annual Pennsylvania QSO Party was a great success again this year. WA9QKE is now WA9QKE/3 in Elwood City and looking for his Milwaukee friends on 2 meters. WA3APD walked off with the R4A top prize at the Warren Hamfest. K3EBX is mobile with an HA-410. K3VYO has a Swan 350 now. K3HZL has a four-element 20-meter beam. W3LOD has a new Cushcraft eleven-element 2-meter beam up to aid him in his AREC activities. W3MFB, RM WPA, reports a nice increase in QNS with 403 plus 5 visiters but a decrease in traffic for Sept. with a total of 201 messages handled on WPA. Traffic: (Sept.) W3NEM 212, W3MFB 140, WA3BLE 122, W3KUN 108, W3LOS 92, K3PYS 76, WA3AKH 58, K3HKK 27 (W2KAT and K3AHT, ops), K3SOH 25, K3ASI 23, W3IYI 23, K3SMB 23, W3LOD 14, K3RZE 12, K3SJN 7, WA3IPU 6, W3KQD 6, W3YA 6, W3UHN 3.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. RM: W9EVJ. PAMs: W9VWJ, WA9CCP W9KLB and WA9BLA (v.h.fs.). Cook County EC: W9HPG.

Net	*Freq.*	*Times*	*Days*	*Tfc.*
IFN	3940 kc.	1400Z	Sun.	8
ILN	3760 kc.	0000Z	Daily	137
NCPN	3915 kc.	1300Z	Mon.-Sat.	170
NCPN	3915 kc.	1700Z	Mon.-Sat.	236
111 PON	3925 kc.	2300Z	Mon.-Fri.	306
111 PON	50.28 Mc.	0200Z	Mon. & Thurs.	8
111 PON	145.5 Mc.	0200Z	M.W.F.	0
TNT	145.36 Mc.	0200Z	Sun.-Fri.	219

The 75-Meter Interstate Single Sideband Net had a traffic count of 617. W8IWF is the new net manager replacing W9NWK, who retired after many years of service. This column's sympathy is extended to the family and friends of W9IBI, of Mattoon, who recently passed away. He was one of the early organizers of the IEN. K9BJE is convalescing after a four-week stint in the hospital. The Sterling-Rock River Amateur Radio Society is outfitting a donated truck with necessary gear for emergency work. The Starved Rock Radio Club has announced that June 2, 1968, will be the date of its annual hamfest. WA9PPY, WA9RPX, WN9VOC and K9BZL were elected officers of the Glenbard East Radio Club. WAØKVC is now WA9VPF, in Oak Park. The Chicago Suburban Radio Association enjoyed its annual smorgasbord Nov. 4. The 9th RN traffic for Sept. was 457. The new officers of the Sangamon Valley Radio Club, Inc. (Springfield), include W9UYP, K9LVB, WA9SID and W9PPM. WA9GUM received his A-1 Operator award. K1GXZ/9 is a new station at Chanute Air Force Base at Rantoul. WA9EPS is being stationed at Guam. WN9TAP, WN9TDL and WN9RHF are now WAs. W9UHD has a new Galaxy IV MKII for fixed and mobile operation. K9UIY has moved to Galena, Ill. A 432-Mc. moon bounce group is being formed by W9IPO, W9VWY and K9RVG. WA9RSN's new QTH is Deerfield. WA9UHA has a new low-band station. K9BMD left the single ranks and was married in Sept. WA9QXT is interested in starting a Novice net. All interested should contact him. WA9VKX (ex-WN9REX) is back on 2 meters. W1ICP, of ARRL Headquarters, spoke at the W9DXCC dinner on Sept. 16 at Melrose Park. WA9CCP and W9EET are recipients of BPL certificates. Traffic: (Sept.) WA9CCP 318, WA9MHU 222, W9EET 214, WA9SEO 202, W9JXV 168, W9DOQ 128, WA9QXT 123, WA9OTD 107, W9NXG 101, WA9RSN/9 75, W9CGC 67, W9EVJ 65, W9HOT 43, K9AUD 40, WA9PFB 35, WA9SPA 35, WA9VKX 30, WA9SFB 26, W9YCH 25, K9BTE 24, W9PRN 24, K1GXZ/9 22, K9KOI 19, W9UHD 17, WA9FIH 15, W9IDY 12, WA9POZ 10, WA9LDC 9, K9WMP 8, K9HSK 7, W9LNQ 6, WA9UHA 6, W9SXL 2, K9HRC 1. (Aug.) K9WMP 4.

INDIANA—SCM, Mrs. M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: WA9GKF.

Net	*Freq.*	*Time*	*Sept. Tfc*	*Mgr.*
IFN	3910	1330Z Daily 2300 M-F	290	K9IVG
ISN	3910	0000Z Daily 2130 M-S	548	K9CRS
QIN	3656	0000Z Daily	178	W9HRY

W9PMT, mgr. of the v.h.f. nets, reports Sept. traffic of 71. K9EFY, mgr. of IPON, reports Sept. traffic of 110. WA9KAG, mgr. of RFN, reports Sept. traffic of 44. W9ILU, mgr. of the Gr. Lakes Emerge. Net, reports Sept. traffic of 56. K9YFT, mgr. of the WRV AREC Net, reports Sept. traffic of 13. The Randolph Co. Club call is K9ECW. The club is going to hold code classes with WA9OAO and K9QJP as instructors. W9UPI and K9FZX are enjoying new Swan transceivers. Congrats to WA9TAL and WA9VXT on passing the General Class exam. WN9VZX is a new Novice heard in Mooresville. DJ6RD/9 and his XYL are the proud parents of a YL harmonic. W9DGA has been promoted to captain and W9MWM has been promoted to inspector in the Evansville Police Dept. W9QLW is building an SB-401. That's a switch for Carty. K9KFS has been promoted to Chief RO of Lafayette Post of Ind. State Police. W9MIO won a high speed code contest with a straight key. W9JYO again is the Ind. Army MARS Director; W9DGA is the Procedure Director for same. WA4RBQ/9 is now WA9VPC. New officers of the IRCC: K9OXA, chmn.; W9DNQ, vice-chmn.; WA9LTI, secy.; W9IMU, treas.: W9BZI and K9KFM, directors. New officers of the RCA ARC, Rockville, are K9CGA, pres.; W9BUQ, vice-pres.; WN9VWT, secy.; W9TGH, trustee. QIN Honor Roll: WA9FDQ 30, K9VHY 28, W9BDP 26, WA9KOH 25, W9UQP 23, WA9KAG and W9QLW 20, K9HYV and K9WWJ 19, WA9VZM 18. *Amateur radio exists because of the service it renders.* K9IVG made the BPL. Traffic: K9IVG 814, WA9FDQ 251, W9JUK 236, W9QLW 204, W9HRY 126, K9FZX 124, WA9LTI 123, WA9KOH 120, K9HYV 77, WA9AXF 70, WA9GNA 69, K9CRS 66, WA9KAG 63, W9VAY 62, W9BUQ 53, WA9VZM 47, W9SNQ 45, W9DKR 43, K9EFY 37, W9YYX 35, K9CBY 34, K9RWQ 34, W9UB 30, K9VHY 30, W9FWH 25, WA9BWT 22, WA9GJZ 21, W9PMT 20, W9CMT 18, W9DZC 18, WA9BGI 17, W9RTH 16, K9ILK 15, WA9KVP 15, W9FJR 14, K9GBR 14, K9HZY 14, K9KTB 14, WA9BNX 12, W9DOK 11, K9JQY 11, W9LG 11, K9QVT 11, K9STN 11, K9YFT 11, K9KFM 10, WA9FSZ 9, K9WGN 9, WA9CHY 7, W9CUC 7, W9FJI 7, WA9MVW 7, W9BDP

6, K9UEO 5, K9FUJ 4, W9HWR 3, WA9JIX 2, WA9-UUE 1.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9NGT. RM: WA9MIO. PAMs: W9NRP, WA9-QNI and WA9QKP.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
BWN	3985 kc.	1300Z	Mon.-Sat.	352	177	W9NRP
BEN	3985 kc.	1800Z	Daily	699	109	WA9QKP
WSBN	3985 kc.	2315Z	Daily	1176	237	WA9QNI
WIN	3662 kc.	0115Z	Daily			WA9MIO
SWRN	50.4 Mc.	0300Z	Mon.-Sat.	124	4	W9JZD

Net certificates went to K9KSA, WA9LRW and W9DXV for BEN; K9KSA for BWN; WA9SVF, WA9TXT, W9-LFC, WA9LRW, K9FYM, K9ZMI, WA9OAZ, WA9PSW, K9KSA, KØICE/9 and WB6PEE/WØBXR for WSBN. New appointment: K9KSA as OPS. Renewed appointments: W9BCH, W9EWC, K9PKQ, W9SZL, WA9LHJ and K9KJT as ECs; WA9MIO as RM; K9ZMS, W9RQM and W9CXY as ORSs; W9HWQ and W9RQM as OPSs; K9MKC as OO; W9NRP as OBS. The Horlick High School Ham Radio Club has become affiliated with ARRL. W9SCM is back on 2 meters. WA9AQE is off to Notre Dame. K9GDF led the OOs with 6 notices sent. The morning session of the BEN has changed its name to Badger Weather Net "BWN." K9CPM has a new 75-meter antenna. WA9NDV is tacking some NCS duties on CAN. W9OTL has a new 10-15-20-meter beam up. W9BCH reports 14 mobiles in his Winnebago County AREC group. Traffic: (Sept.) WA9QKP 219, WA9NDV 165, W9DYG 136, W9IFS 121, WA9QNI 112, W9ESJ 104, WA9NPB 102, WA9NVY 100, WA9RAK 97, K9GDF 78, W9DXV 58, W9DND 47, W9YT 36, W9AYK 34, W9CBE 31, K9CPM 31, K9KSA 29, K9FHI 26, W9BCH 21, WA9-LRW 13, K9GSC 11, K9LGU 10, K9EMG 9, W9HWQ 9, W9OTL 9, WA9PKM 9, W9IRZ 6, W9JFP 5, K9FYM 4, WA9SAB 2. (Aug.) W9RTP 2. (July) W9RTP 1.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopishke, Jr., WØ-TCK—SEC: WAØIEF. RMs: KØORK, WAØEPX. PAMs: WAØMMV, WAØJKT. MSN meets daily on 3685 kc. at 0030Z. MJN meets Tue.-Sun. on 3685 kc. at 0100Z. Noon MSPN meets Mon.-Sat. on 3945 kc. at 1805Z, Sun. and holidays at 1500Z. Evening MSPN meets daily on 3945 kc. at 2315Z. Minn. WX Net meets daily on 3830 kc. at 2400Z and on 3690 kc. at 0100Z. Net changes: MSN and MJN move to 3685 kc. Dec. 1. MSPN has moved to 3945 kc., with the evening section meeting at 2315Z. The Minn. Weather Net has started a slow-speed c.w. net on 3690 kc. at 0100Z daily. Congrats to new OPS WAØOEJ and OBS WAØPXT. Renewed: WØ-AIH and KØZZR as OOs, WAØCQG as OBS, WAØIAW as ORS, WØFIT as EC. WAØEPX has a new Drake T4X. WAØDOT built a solid state electronic keyer. WAØKFJ is operating an NCL-2000. The Lake Superior AREC Net, which operates Sun. on 3872 kc. at 2000Z is looking for more check-in stations. Congrats to new Generals WAØSSO and WAØSUI, and to new Novice WAØSVD. I want to wish all of you a Merry Christmas and a Happy New Year, and especially thank those participating in Communications Dept. activities. Through the activities of the AREC, nets, radio clubs, appointees, etc., amateur radio has kept active and progressive. With the ever-increasing need to hold our frequencies and privileges 1968 will give us a greater need to promote our own interests. Traffic: (Sept.) KØORK 297, KØZRD 172, WAØJKT 42, W9YT 41, WAØPXT 40, WAØMMV 38, WAØOEJ 35, KØFLT 31, WAØEPX 29, WØBUC 27, WAØPPY 24, WØTCK 23, WAØKFJ 21, WAØODB 21, WAØMFW 18, WAØOLA 16, WAØHRM 14, WAØ-LVK 12, KØMGT 12, WØSZJ 12, WAØDOT 11, WØ-UMX 11, WØKLG 10, WAØDFT 7, WAØEDN 5, WAØ-JPR 5, WAØNQH 5, WØATO 4, WAØQAK 4, WAØFFU 1. (Aug.) WAØIAW 342, WAØOEJ 68, WAØDFT 6, WAØ-FFU 2.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH.

RACES	Mon.-Fri.	3996.5 kc. 6:30 P.M.	KØSPH
PON	Sun.	3915 kc. 9:00 A.M. and 5:30 P.M.	WAØHUD
C.W.	Tue.,Thurs.,Sat.	3650 kc. 9:00 P.M.	WAØELO

The C.W. Net was launched and is functioning well. WAØELO is NCS for the time being while WAØBIT and WAØHUD are helping out as alternates. We need a couple of Official Observers in the section. There are four classes and if you have a frequency meter or a good calibrated receiver you could qualify. The Bismarck gang held a farewell picnic for KØQYD, who has moved to Fargo. The Bismark Club met at the home of WØ-PHC. WØDXC has a new Swan 500 and is back in RACES and PON again. He also collected a WAC on s.s.b. WØRTK and KØTYY/Ø provided communications for the annual cross country races held at Medora. WAØ-REW has s.s.b. now with the addition of an SB-10 to his Apache. WØGFE has a new Henry 2K-2. WØTUF is dealing for an SR-150. WØDM came out of retirement and is teaching radio classes after school in his old school, Valley Junior High. The Grand Forks 2 meter gang is back in business. KØPYZ reports that the theory and classes being held have come up with two families with three hams in each. RACES, 21 sessions, 619 check-ins, Traffic 66; PON, 8 sessions, 130 check-ins, traffic 7; CW, 4 sessions, 21 check-ins, traffic 9. Traffic: (Sept.) WAØELO 150, WAØAYL 27, WØHJU 24, KØSPH 19, KØDLB 14, WØDM 12, WØEFJ 8, WAØBIT 4, KØPZK 4, W9QNI/Ø 2, WØBHT 2, WAØGZA 2, WAØJPT 2. (Aug.) W9QNI/Ø 6.

SOUTH DAKOTA—SCM, Seward P. Holt, KØ-TXW—SEC: WØSCT. RM: WAØAOY. PAM S.S.B. Net Section: KØBSW. Net Manager NJQ Net: WAØLLG. A new license in Vermillion is WNØSJK, using a DX-60. WAØCKH and XYL Shirley have a new baby girl. Congratulations! KØFKK was home on leave during Oct. and then went to Germany for two years. The Nine Jacks & Queen Net reports 236 QNI, 5 QTC and 54 informals. S.D. C.W. Net reports 46 QNI, 23 QTC in 13 sessions, 254 min. SSB Net reports 928 QNI, 76 QTC, 122 informals during Sept. Traffic: KØVYY 71, WAØ-LLG 30, KØTNM 27, WAØPNB 14, WØFJZ 13, WAØ-QMV 12, WØSCT 12, WAØRIQ 10, WØRWM 6, WØDVB 4, WAØBWJ 1, KØKOY 1.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: WA5HIS. PAM: WA5PPD. RM: W5NND. NMs: K5ABE and W5MJO. Our thanks to K5GKN for his good job as SCM the past two years. The Central Arkansas Amateur Radio Club is holding code and theory classes for the Advanced and Amateur Extra exams. WA5OSC reports a new net on 3825 kc. at 1430Z called the AM International Net. EC KØBHO/5 reports progress with c.d. plans in Drew County. WA5QPI has a Model 15 RTTY and hopes to be on soon. Net reports for Sept.:

Net	*Freq.*	*Time*	*Sess.*	*Traffic*	*QNIs*
OZK	3790	0100Z	30	57	226
RN-SSB	3815	0030Z	30	82	668
APN	3885	1200Z	26	12	595
APON	3825	2230Z	21	133	293

Net activity should pick up soon. Plan to originate and help relay Christmas traffic. You are welcome on any of the above nets with or without traffic. Do not forget to send in your traffic report by the fifth. Traffic: W5OBD 1664, WA5KEF 194, W5NND 114, W5DTR 99, W5MJO 96, KØBHO/5, 15, WA5KQU 14, WA5OSC 14, WA5PKO 9, WA5QPI 8, K5TYW 6.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: W5CEZ. V.H.F. PAMs: WA5DXA, W5UQR. Many of you will be saddened by the passing of W5NZ. W5LHS reports there are over twenty members on the West Bank active as ARPSCers! The Baton Rouge ARC will award a certificate to anyone making contact with a Baton Rouge club member Dec. 3 through Dec. 9, any mode any frequency. This is to celebrate BR's 150th year. WA5STM, ex-WB4DYE, is new to the NO area. His activity centers around 15 c.w. and traffic-handling on LAN. We understand that Monroe has eight mobiles operating. The Louisiana QSO Party will be held Jan. 27 and 28. Contact W5NQR for info. The GNOARC, W5UK, holds OPS, ORS, OVS and OBS appointments. Central Louisiana ARC is now League affiliated. WA5-OXK is now on duty with the Marine Corps Air Reserve. WA5DXA is EC for Orleans Parish (less Algiers). The LARC will hold its Annual Banquet Dec. 2 in Hospitality Room at the Sheraton Town House. WA5-CPD and WA5EMP are working on an RTTY project. W5MBC is now net mgr. for LAN and needs active stations in the Shreveport Area. W5IQM has built a new linear. WA5QCX, of the OARC, has been awarded an ARRL Public Service citation for assistance rendered during the uprising in Nicaragua this year. K5MOQ is moving to BR. W5EA is quite busy on LAN. WA5LGO reports a Novice class will be started at Winnsboro High shortly. K5ANS has moved to Monroe from California. WA5KLF reports WA5SSE is a freshman at La. tech. WA5OJG has the new HW-12A working like a house afire! W5CEZ spent 81 hours on emergency frequencies during "Beulah's" rampage. WA5MJM and WA5RCS are looking for some 2-meter f.m. equipment. Can anybody help? WA5NYY is joining Navy. MARS. Traffic: (Sept.) W5CEZ 250, W5KRX 120, K5ANS 115,

W5MBC 99, W5MIXQ 60, WA5NYY 33, W5GHP 25, WA5-OHH 21, W5PM 21, W5EA 18, WA5KLF 5, WA5DXA 4, WA5LGO 2. (Aug.) W5KRX 172.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. Glad to welcome W4PJB to Meridian. K2-DEM/5 is the proud father of a new daughter. K5TYP really is in business with new gear, consisting of a 75S-3, a 32S-3 Clegg 22er, Swan 250, Drake 2NT and 2-C and a BT1 linear. WA5KEY is doing a fine job as net manager of the Miss. Sideband Net, just as W5JHS is doing with the Gulf Coast Sideband Net. WA5OKI is always available for traffic-handling. WA5RDA is now active on 80 through 2 meters in Prentiss. WA2WBA/5 now has a second station in Columbus with the call WA5SKI. WA5SKI and WA5DGO are doing a fine job telephone relaying for Air Force personnel on Guam to their wives over here. Check into our nets: Gulf Coast Sideband Net, 3925 kc. daily at 2230 GMT; Miss. Sideband Net, 3888 kc. daily at 2315 GMT; Miss. C.W. Net, 3647 kc. daily at 2345 GMT. Ask about League appointments that are available. Traffic: WA5OKI 482, W5JDF 50, WA2WBA/5 4.

TENNESSEE—SCM, Harry A. Phillips, K4RCT—Asst. SCM: Lloyd Shelton, WA4YDT. RM: K4UWH. PAMs: W4PFP, WA4CGK, WA4EWW.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*	*Mgr.*
TSSB	3980	Tue.-Sun.	0300Z	26	1374	192	WA4CGK
TPN	3980	M-Sat.	1245	31	1117	120	W4PFP
		Sun.	1400				
ETPN	3980	M-F	1140	21			WA4EWW
TN	3635	Daily	0100	31			K4UWH
TCN	3980	1st Sun.	1330				W4OGG

W4OQG is now a radio operator in Vietnam. Pat's address is available on request. The Delta Radio Club of Whitehaven operated a traffic station at the Mid-South Fair with primary emphasis on messages to Vietnam. We regret to report that K4HGL has joined the Silent Keys. On Oct. 1 W4PFP and W4DRI/M assisted W4IRK in the delivery of a message to a family camped in the Smokies concerning a death in the family. If you are not registered with the ARPSC, please contact your local EC or K4RCT. All ECs are requested to send in a complete report for Dec. WB4EKI has a new 70-ft. tower and 20-meter beam. K4FKO has a new home-brew transverter on the air, schematic available from Ken. Traffic: W4BS 632, W4OGG 272, W4FX 138, W4DIY 121, WA4YEM 76, W4SQE 62, W4RUW 56, WA4YDT 48, W4WBK 43, K4PUZ 42, W4PQP 38, WA4YHO 30, WA4-ZBC 27, WA4CGK 24, K4MQI 22, W4PFP 22, K4UMW 21, W4TYV 15, W4TZJ 14, W4SP 10, WA4AJB 9, WB4-FCE 6, WB4EKI 5, WA4EWW 5, K4TAX 5, K4OUK 3, WB4BGU 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: W4OYI. Endorsements: W4BEJ and K4HOE as ECs; K4KIS as PAM; W4MWX as ORS; W4YYI as OPS. Appointments: W4BEW as EC; K4TRT as PAM; WA4TWB as ORS; WA4WSW as OPS.

Net	*Freq.*	*Days*	*GMT*	*QNI*	*QTC*	*Mgr.*
KRN	3960	M-F	1130	325	26	K4KIS
MKPN	3960	Daily	1330	290	37	K4TRT
KTN	3960	Daily	0000	790	537	WA4AGH
KYN	3600	Daily	0000/0300	459	425	W4BAZ

Congratulations to W4WZI and his committee on a job well done on the 1967 ARRL Kentucky Kenvention. The FCATN on 50.7 Mc. reports 12 sessions, 80 QNI and 24 QTC. School has cut traffic activity for WB4AIN, WA4-UAZ, WA4WWT, WA4UIH and WB4AGO. W4KKG reports a regular sked with W6CGP on 21,370. W4YOK/4 now is on 2-meter f.m. WB4BKG attended a class on Disaster Services with K4YZU as one of the speakers. W4ISF is county hunting and working AF MARS. WB4-AFH is chasing WAS on 6. WB4ACQ sent a very nice photo of his shack. K4FPW still is working on RTTY equipment. The Central Ky. Amateur Radio Club's officers are WA4SCB, pres.; WA4ZXH, vice-pres.; WB4-BBC, secy.-treas. W4OYI has moved to a new Owensboro location. Traffic: WA4DYL 250, WB4AIN 224, WA4UAZ 213, WA4UIH 177, WA4VUE 136, WA4WWT 118, W4BAZ 115, WA4AGH 99, WA4KFO 87, W4NBZ 70, K4MAN 51, W4KKG 33, WB4AFH 31, W4ISF 28, WA4VEC 27, WB4-AGO 17, WA4GHQ 17, W4KJP 15, W4YOK/4 13, WA4-UHR 12, W4CDA 10, WB4FOT 10, W4MWX 10, W4BTA 9, W4OYI 9, K4VDO 9, WB4BTM 7, K4FPW 7, WB4-BKG 6, K4HOE 5, W4JUI 4, K4KZH 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8FWQ, W8RTN, WA8OGR, K8KMQ. PAMs: W8IWF, K8JED, V.H.F. PAMs: W8CVQ, W8-YAN. Appointments: W8IWFQ, W8IWF, W8JTQ, K8-KMQ, W8RTN, W8SH as ORSs; WA8AXF, WA8CUL, K8PVC as ECs; W8CNL, W8QGE as OBSs; WA8EFK, K8WXO as OVSs; WA8LRC as OPS. Net reports:

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Sess.*	*Mgr.*
QMN	3663	2215	Dy.	521	458	30	W8RTN
WSSB	3935	2300	Dy.	788	91	30	W8IWF
UPEN	3920	2230	Dy.	275	8	30	K8ZSM
PON-DAY	3935	1500	M-Sat.	325	251	26	WA8OGR
PON-CW	3645	2400	M-Sat.	169	64	26	3C3DPO
MTN	3605	0145	Dy	59	86	29	WA8QAF
MICH 6	50.7	2400	M-Sat.	293	39	26	WA8LRC
LENAWEE 2	144.36	0100	Dy	274	61	26	WA8AAQ
BR	3930	2130	M-F	695	70	21	K8JED
MEN	3930	1300	Sun.	216	7	4	K8JED
SW MICH 2	145.26	2400	Mon.	42	1	4	W8CQV

Silent Keys: WA8QMU and K8RUL. New officers: Catalpa ARS—WA8RSL, pres.; W8DT, vice-pres.; K8-EHD, rec. secy.; W8ZKL, corr. secy.; WA8BUB, treas.; WA8FNY, W8JXU, W8CJT, W8VVD, W8KPL, WA8-RUJ, board. S.E. Mich. ARA—WA8NYK, pres.; WA8-EMJ, vice-pres.; WA8RQI, secy.; WA8BHW, treas. WA8OKQ, WA8SIQ, W8KAZ, board. The Fordson Elect. Comm. Club is looking for satellite tracking information via WN8WHG. The Cent. Mich. ARC gang is working on the Lansing Convention for next April 26, 27. Radio families: WA8FYM, WA8FYN, WA8FYO and W8AXA; WA8MOM and WA8YUH. W8WA is now K4WA down in Florida. The DARA and SEMARA visited the Enrico Fermi Atomic Plant. K8IRC and his YF are attending M.S.U., but will leave for Washington, D.C., soon. K8-JJC got married. K8HLR is trying to get a kw. into his VW. W8IV, WA8MCQ and WA8MAM made the BPL. W8NOH is out of the Navy and now in the reserve. WA8VHG has a half-kw. on 2. Traffic: (Sept.) K8KMQ 311, WA8MCQ 250, WØGXQ/8 223, WA8MAM 214, W8IV 176, WA8OGR 150, W8IWF 125, WA8IAQ 119, W8QQK 113, W8IUC 90, W8EU 84, WA8ORC 80, W8BEZ 79, W8-JTQ 66, W8FX 63, K8GOU 63, K8ETU 62, W8NOH 61, WA8QAF 59, K8MXC 58, K8ZJU 58, WA8LKI 56, WA8-FQC 54, WA8LRC 46, W8TDA 43, W8CQB 36, WA8AAQ 32, K3KRX/8 30, K8JED 30, W8YAN 30, WA8PZT 27, W8ICH 21, W8TBP 21, W8FWQ 15, WA8IML 14, W8-UFS 13, K8VDA 12, WA8GTM 11, WA8LXY 10, W8AUD 4, WN8WHG 3, W8AAM 2, WA8VHG 2, W8WVL 1. (Aug.) K8HLR 210, WA8IAQ 81, W8ICH 39, WA8UYJ 15, K8ZZV 14, W8SCW 5, WA8VGA 4.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8OUU. RM: WA8CFJ. PAMs: W8VZ and K8UBK.

Net	*QNI*	*QTC*	*Sess.*	*Percen*
BN	671	480	60	
OSSN	1672	1041	58	10

K8HDO reports the results of the 1967 Ohio Intrastate QSO Party were WA8FKD 10,679 points, WA8HTR 7884, W8PKU 5928, WA8RAF 2268 and WA8PKE 1904; W8BSR received a Worked All Ohio Counties award and K8-HDO received her Master's degree from Kent State University. Lancaster & Fairfield County ARC's *The Rag Chewer* informs that WA8RTH is home after an illness. W8THV and K8DMU are in the hospital and WA8CVC has a new Swan 500. From Mt. Vernon ARC's *K8EEN Newsletter* we learn the club held its annual picnic and WA8TKI is in the hospital following surgery. K8UBK drove W8NAL and your SCM to the Findlay Hamfest, where about 750 registered with between 1800 and 2000 attending. Van Wert ARC has two nets on 50.640 Mc., one on Sun. at 12:30 P.M. and one on at 7:30 P.M. and both nets operated from the county fair handling better than 200 messages. The writer has been notified by the manager of the W8/K8/WA8 QSL Bureau that if you send your foreign QSLs to WA8CXY by registered mail he will forward them to foreign QSL Bureaus at the rate of 4 cents per card, 30 cards for a dollar or for six dollars yearly any amount. W8FY has a new SB-101. We hear that W8BAH, editor of "Ham Antenna" in the *Cleveland Plain Dealer*, is in the hospital. WA8-YFN reports that WA8TKW received his General Class license at the age of 11 and WA8VFN received his Technician Class license. W8BU toured Norway and visited with LA7VD and others. WA8WJC received his Technician Class license. Tusco RC held its annual picnic. Springfield RC's *Q-Fire* says that WN8WXE, WN8-WYS, WN8WYT, WN8YGE and WN8YGF are new Novices. W8BLN and WA8HVK vacationed in Colo. Massillon ARC saw a movie entitled "Steel and America." Toledo's *Ham Shack Gossip* tells us K8DMU is in the hospital suffering from burns. W8FGD had a TR4

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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

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stolen Ser. #19664 and power supply Ser. #20335, W8WHA was in the hospital, Toledo Mobile RA held a transmitter hunt. Appointments made in Sept.: W8GVX, WA8VNU and K2SSX/8 as ORSs and WA8COA as OVS. From the "Ham Call," edited by WA8COS for the *Cincinnati Enquirer*, we hear that W8MGP received the Journalist Merit Award given by the Amateur Radio Editors Association, WA8GRR received his General Class license, W8JDV presented a research paper on the history of WLW before the Antique Wireless Assn. at the Henry Ford Museum, K8EUZ returned home after a tour of duty in Viet Nam and W8CHT and WA8CFJ attended the annual meeting of the Michigan traffic networks. W8WCW visited DJ9EJ and DL1RK while in Germany. Greater Cincinnati ARA's stag hamfest had 1958 registered with 21 states represented, W9MIO won the code-copying contest with 45 w.p.m. and also won the code sending contest (straight hand key) at 28 w.p.m. W8FY/8 and W8NAL made the BPL in Sept. Portsmouth RC's AREC provided crash-boat communications for the Labor Day Boat Races. WA8IPKN built a five-element 10-meter beam. Traffic: WA8CFJ 479, W8UPH 397, W8NAL 288, W8FY/8 217, W8IMI 215, WA8PMN 205, WA8NTA 202, WA8UPI 185, WA8AUZ 182, W8QXQ 155, W8QZK 150, WA8LVT 146, WA8VNU 146, K2SSX/8 140, W8SZU 139, W8GVX 132, K8ONA 114, W8DAE 107, K8UBK 96, WA8SHP 84, WA8OCG 78, W8QCU 78, WA8PPK 76, WA8SED 64, WA8PQL 63, W8ERD 62, WA8LAM 55, W8OE 53, W8TV 51, W8OUU 49, K8DDG 44, W8FGD 43, WA8COA 40, WA8MHO 37, K8MZT 37, WA8UDG 33, W8GOE 30, W8GAZ 28, K8BYR 24, W8TNE 22, WA8LDU 18, WA8QFK 18, W8ILC 16, K8VCW 10, WA8NPK 9, WA8KPN 8, W8LAG 8, W8WEG 6, W8DVM/3 4.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Appointments: WA2VYT as OPS. Endorsements: W2WXP as EC, WA2OJD as OO, WB2RBG as OVS and WA2VYT as ORS. The RPI Club, W2SZ, held an activities fair in Sept. under the leadership of WAØDEV. The club shack has been recently modernized. At the Albany Club program plans were discussed, while at the Schenectady Club the new regulations were discussed by W2ODC. For winning *CQ*'s Worldwide DX Contest for two successive years, WA2SFP was awarded a special plaque. The Schenectady Club's Broughton Award for meritorious service was given to W2AZH. In New Rochelle the CCNR started its ninth year as a club with a review of summer activities. The Westchester Club featured K2JKX, who spoke on antennas. WB2UEQ is operating portable from Wesleyan University. A new member of Navy MARS is reported by WB2WBA. WB2VUK, soon to be on 432 Mc., has been handling Metropolitan N.Y. traffic on the Md. Two-Meter Termite Net as well as the Hudson AREC Net. WB2VVS, WB2VVT and WB2VUK were recent visitors at Expo 67. WB2YRM reports a new 2-meter converter ahead of his SB-300 receiver. WA2PZB was active during the Sept. FMT. An exclusive shack in his former garage is enjoyed by WB2WAG. Among the new stations on 220 Mc. are W2JKI and K2DNR. W3FGQ was a recent visitor at W2EAF. Traffic: WB2UHZ 275, WA2VYS 86, W2EAF 82, K2SJN 39, W2ANV 34, W2URP 31, WA2VYT 30, WB2VVS 28, WB2QYZ 26, WA2WGS 23, WB2FOA 16, WB2VUK 7, WB2UEQ/1 5, K2HNW 4, WB2YQU 3.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. PAM: W2EW. Traffic nets:

NLI*	3630 kc.	1915 Nightly	WA2UWA-RM
NLI VHF*	145.8 Mc.	1900 Nightly	WB2RQF-PAM
NLI Phone*	3932 kc.	1600 Daily	WB2SLH-PAM
NLS Slow*	3715 kc.	1845 Nightly	WB2UQP-RM
Clear Hse	3925 kc.	1100 MTWTF	WA2GPT-Mgr.
Mic Farad	3925 kc.	1300 Ex Sun.	K2UBG-Mgr.
All Svc.	3925 kc.	1300 Sun.	K2AAS-Mgr.
NYSPTEN	3925 kc.	1800 Daily	WB2QAP-Mgr.

*Section Nets. All times shown above are local. WB2QIL, who is over at Post College, is looking for his commercial ticket so he can engineer at WCWP in his spare time. WB2ZEL reports that the W2JTZ, of Chaminade HSRC, is being pumped up to 1 kw. s.s.b. with a rotary and dipoles at about 80 feet up. W2GKZ had a Suffolk County RC Extra Class cramming like the dickens for Nov. 22. Bet they made it 'cause he's a lovable old onery cuss! WB2UQP, who also is AL2UQP Army MARS, became a semi-finalist for a National Merit Scholarship and helped W2CAE start a radio club at Great Neck North Senior. WB2JJU trudged off to William and Mary but his dad, WB2JJW, allows that he'll have to get his W4 call soon in order to chop the prodigious landline tab! WA2LJS relates that the Mid-Island RC did a fine job making communications for the Freeport 75th Anniversary Parade. WA2UWJ has announced that the Queens 6-Meter AREC Net opens up each Mon. night on 50.52 Mc. at 8 o'clock with planned drills in emergency traffic; and the 6 meter RACES Net follows at 8:30 on the same frequency. WB2DXM toiled all summer on the basement studio and when it was finally ready to light off it was zapped with senior-type homework! The forward motion of the family buggy is rarely impeded with WB2RBA at the helm but, alas, the machine has an affinity for immovable objects when in reverse. While passing through Vermont this summer, WB2AEK stopped at the Burlington Hamfest and you know that rascal won the mobile r.f. output contest! W2PF remarked that the Amateur Radio Luncheon Club meets the last Thurs. of each month at the Engineers' Club, 32 W. 40th St., at 12:15 P.M. Mr. Alfred Ritter, FCC Engineer-in-Charge, New York Office, spoke at the Sept. meeting. WB2TWN is wondering where WB2NZL, WB2OJX and the Opposums have gone. WB2MBU says he finally got the full v.h.f. RTTY setup with tape, keyboards, multiple page printer, the works. WB2SCF tells of DJ8WL's visit with the Cardinal Hayes HSRC guys at WA2THR and how pleased DJ8WL was with the club station from which he worked back into the homeland. Old WA2PJL writes that he spent the summer upstate at R.P.I. taking a few interesting courses of which one turned out to be a WB2EMU name of Linda! Hey, Merry Christmas and Best Wishes to All! Traffic: WA2UWA 485, WB2QIL 167, K2UBG 144, WB2ZEL 115, W2GKZ 80, WA2FTS 68, WB2UQP 63, WB2PTS 62, WB2RQF 43, WB2JJW 30, W2EW 27, WA2LJS 27, WA2UWJ 24, WB2DXM 12, K2IDB 11, WB2MZE 11, WB2AEK 10, W2EC 10, WB2NGZ 9, W2PF 8, WB2UIV 8, W2DBQ 7, WB2TWN 4, WB2EUH 2, WB2MBU 2.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2LQP—Asst. SCM: Edward F. Erickson, W2CVW. SEC: K2ZFI.

ARPSC Section Net Schedules

NJN	3965 kc.	Daily	7:00 P.M.	W2BVE-RM
NJ Phone	3930 kc.	Ex. Sun.	6:00 P.M.	W2PEV-PAM
NJ Phone	3930 kc.	Sun.	9:00 A.M.	W2ZI-PAM
NJ PON	3930 kc.	Sun.	6:00 P.M.	WA2TEK-PAM
NNJ AREC	50,300 kc.	M thru F	8:00 P.M.	WA2KZF-PAM
ECTN	146,700 kc.	Ex. Fri.	9:00 P.M.	WB2IYO-PAM
PVETN	145,710 kc.	Daily	7:30 P.M.	K2KDQ-Mgr.

All time shown is local. Please note the change in frequency for all 75-meter phone nets. The ECTN time also changed. New appointments: W2BVE as OBS, WB2ZCI as OPS, WA2KZF as PAM for the North Jersey AREC Net. WA2KZF is looking for stations all over the section and invites all to join. If you are on 6 meters, join in. Endorsements: K2KDQ as OBS and OVS. The Knight Raiders V.H.F. Club will again hold code and theory classes. Contact K2KDQ if interested. Net reports: NNJ AREC, 199 QNIs with 36 traffic; ECTN, 265 QNIs and 140 traffic. OO reports: W2TPJ 30, K2VAC 24. New club officers at the TCRA are WA2ASM, pres.; W2HDT, vice-pres.; W2OPE, secy.; WB2UEK, treas. Congratulations to the TCRA on making the highest score in the recent ARRL FD. WB2RKK claims over 71,000 points in the recent W/VE Test. WA2ASM reports he is over last year's score. WB2YMH passed the General Class exam and is on with a DSB-100 and an SC-140. WN2CWP is a new ham in Englewood. WB2UFV has his 500 counties confirmed. The new net mgr. for the Naversink Net is WB2BXK. WB2KTO reports 2 "S" gain with his new four-element beam on 20 meters over the Tri-Bander. His DXCC total is now 217/198. W2EWZ recently completed QSO No. 20,000 and has had 200 with W8DAE. W2APL is on s.s.b. WA2CCF applied for DXCC 140, WAS S.S.B. and WPX S.S.B. WB2RUM is trying a Mechanical Mark-Hold circuit using a Mercury relay in his RTTY station. W2BVE, W2CVW and WA2ASM became life members of the ARRL. K2IEF is up to 97 for DX-CC. The Windblowers Annual Big-Blow was a big success with over 100 stations working all four locations. WB2RIG and WB2JWB are active at W2BSC. WB2QMP reports working VE1-Land and N.H. on 2. The Annual SET will be held in January. Contact your SEC, EC or AEC or the SCM. We will be glad to give you the details. We learned of the passing of W2JT, RACES Officer for Passaic County. We will all miss him. Traffic: (Sept.) WA2IGQ 534, WB2RKK 366, WB2SSZ 319, WB2UFV 291, WA2TBS 136, WB2SEZ 81, WB2IYO 66, K2KDQ 61, WB2JWB 59, WA2ACJ 54, WB2DDQ 53, WB2NZU 47, W2LQP 45, K2DEL 34, W2PEV 34, WB2QMP 22, WB2ZCJ 20, WA2ASM 17, K2EQP 16, WB2CGI 14, WB2PXO 14, W2DRV 13, K2JTU 13, K2ZFI 12, WA2KZF 11, WA2WGR 11, WB2BXK 8, WB2KTO 8, WA2TNA 7, WB2WFO 7, W2EWZ 5, WB2SJH 4, WA2CCF 2,

WB2RUM 2, WB2NJB 1. (Aug.) WB2RKK 143, WB2-OHK 45, WB2QMP 41, WA2ASM 22, W2BVE 14, WB2-ZCI 12, WB2KTO 5, W2ABL 2. (July) WB2OHK 30.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, WØBDZ—Asst. SCM: Bertha V. Willits, WØLGG. SEC: KØBRE. PAM: WØNGS. RMs: WØTIU, WØSCA. WAØPUJ now has a new TH-6 beam with a Ham-M rotor. WAØMUB and KØLVB have taken down a heavy duty 75-ft. tower from atop a Marshalltown building. Looks like one of them is DX-minded. WØASU also has a new 50-ft. tower and a TH-6 beam. KØBND received 51 DX cards in September from the QSL Mgr., many of them UAs and UBs. EC WAØOCD is now off to school. WØJAQ operated some portable and mobile on his vacation through the Southwest. WØBDZ and his XYL vacationed in the East for ten days in Sept. WØEIT now has 3-400Zs in his final, also a kw. on 2 meters. The Tri-State ARC now has classes for prospective Novices. WØJAQ sends Official Bulletins Mon., Wed. and Fri. at 1725Z on 3975 kc.

Ia. 75-Meter Phone Net	26 sessions	1198	QNI	151	QTC
Ia. 160-Meter Net	30 sessions	570	QNI	6	QTC
Tall Corn Net	35 sessions	134	QNI	38	QTC

Traffic: WØLGG 1080, WØLCX 512, WØVAU 146, WØ-CZ 65, WAØSDC 44, WAØMIT 42, WAØJUT 19, KØ-BRE 18, KØKAQ 15, KØTDO 15, WØJPJ 10, WØNGS 9, WAØPUJ 8, WAØAIW 7, WAØIYH 5.

KANSAS—SCM, Roobert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RM: WAØMLE. V.H.F. PAMs: WAØCCW, WØHAJ, WAØKSK, WAØLSH. The Kansas PI Net is about to go into a two- or three-night operation. All V.h.f.ers check 145.350 Mc. more regularly at 9 P.M. CST. WA4OZY, pres. of the Forsyth Radio Club, 1600 Princeton St., Winston-Salem, N. C. 27103, would like to exchange Bulletins with several clubs in the Midwest. Contact him if interested. Members of the Tee-Ni-Chat Club, Wichita, visited a Titan Missile site Sept. 17 for a very interesting program. WØUYK lost some Collins gear when lightning struck his QTH recently. WAØJII now is in college in Manhattan. KØMZZ was elected pres. of the recently-formed Mo Kan Amateur Repeater Club—6 meter operation is planned, 52.525 out, 52.88 in. Other officers are KØKEK, vice-pres.; WAØ-LHK, secy.; WAØKSK, treas. Zone 7 AREC Net 75 meters reports QNI 23, 4 sessions; Zone 9 AREC Net 10 meters, QNI 26, QTC 2; Zone 13 AREC Net 75 meters, QNI 50; Zone 14 AREC Net 75 meters QNI 47, 4 sessions; Zone 15 AREC Net 75 meters, QNI 21, QTC 1; Newton V.H.F. 2-Meter Net, QNI 16; Zone 7 AREC Net, QNI 58, NCK V.H.F. 2-Meter Net, QNI 46, QTC 6.

KWN	30 sess.	744	QNI	20	QTC
Kans PO Net	31 "	359	"	25	"
HBN	21 "	637	"	152	"
KSBN	22 "			96	"
KPN	18 "			42	"
PI Net	12 "	132	"	4	"
QKS	55 "	299	"	93	"
KEC Net	4 "	43	"	4	"

Traffic: WAØMLE 140, KØHGI 105, WØCGZ 95, WAØ-LLC 90, WAØKDQ 87, KØBXF 79, WAØCCW 53, WØ-FII 44, KØEMB 38, KØJDD 30, WAØJOG 20, WAØ-KDJ 18, KØLPE 15, WØAVX 14, KØGZP 9, WAØLSH 9, WØILB 7, WAØHMZ 5.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. WØAKM renewed appointment as EC for Audrain Co. WAØFLL is the new EC for Clay Co. WAØPFU, WAØIKI and WAØFLL are new OPSs; WAØFLL is OBS. WNØSKR is a new Nov. Cl. at Houston. KØYBD has a permanent TCC EAN assignment. WAØJBY (Ritenour Sr. HS ARC, Overland) now has a DX-60 and an NC-173 for Novice and Swan 350 and TA-36 beam for Gen. Cl. WAØOXS, trustee, reports 11 students in the fall code class. KØDJG is the new pres. of UMR RC (WØEEE). WAØFKD was reappointed traffic manager for WØZLN (UMC RC). WAØ-KUH reports that the PHD Net on 6 meters has regular check-ins from St. Joseph, Richmond, Holt, Martin City, Grandview, and from Kansas stations in Lawrence, Overland Park, Chanute, and Uniontown in addition to K.C. KØWYP, WAØABO, WAØLHN, KØ-CEV, KØCGF, KØVTS and KØIQS received PHD Net certificates. WAØELM has the rig and antennas repaired after lightning damage. WAØITU finished conversion of commercial rigs to 6-meter f.m., and has conversion data if anyone needs it. KØLGZ/WØJBK got married Sept. 10. Please note that some net times change with the return to Standard Time. Net reports for Sept.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2330Z	M-W-F	13	165	5	WØBUL
MON	3585	0100Z	Daily	30	135	23	WØTDR
MNN	7063	1900Z	M-Sat.	25	105	78	WØOUD
MoSSB	3963	2400Z	M-Sat.	19	537	134	WØKTO
MoSSB	(Aug.)			29	696	103	
MTTN	3940	2300Z	M-F	20	191	84	WAØELM
MoPON	3810	2100Z	M-F	20	263	170	WØHVJ
QMO	3585	2200Z	Sun.	4	10	1	WAØFKD
PHD	50.4	0130Z	Tue(GMT)	3	67	9	WAØKUH

Traffic: KØONK 1768, KØYBD 390, KØAEM 140, WØ-EEE 131, WØOUD 124, WØZLN 116, WAØJII 74, WØ-HVJ 73, KØJPS 67, WAØFKD 58, KØREV 57, KØYGR 50, KØORB 38, WAØPFU 26, WAØFMD 22, WAØFLL 16, WØBUL 15, WØGBJ 10, KØGOB 6, WAØIHV 6, WAØKUH 6, WAØQBF 4.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØOAL. Net reports for the month of Sept.: Nebr. C.W. Net (NEB), WAØGHZ, 1st session QNI 141, QTC 98; 2nd session QNI 70, QTC 78, Nebr. Morn. Phone Net, WAØJUF, QNI 928, QTC 45. Nebr. AREC C.W. Net, NACN, WAØEEI, QNI 12. Nebr. Emergency Phone Net, WAØGHZ, QNI 1260, QTC 46. Nebr. Storm Net, WAØKGD, 1st session QNI 951, QTC 145; 2nd session QNI 833, QTC 70. Dead End Net, WAØMCX, QNI 159, QTC 5. West Nebr. Net, WØNIK, QNI 655, QTC 37. WAØKXJ/Ø was the high scoring Nebraska station in the 1967 New York State QSO Party. WAØKGD is award custodian for the Cornhusker County Award sponsored by the Lincoln Amateur Radio Club. *Neb-brasken* is the newsletter of the Nebr. C.W. Net members, published by KØAKK, who is also a new OBS. With winter here SEC KØOAL reminds amateurs to check their rigs, antenna systems and auxiliary power supplies for possible emergency work. Traffic: WAØGHZ 234, WAØDOU 211, KØAKK 156, WØLOD 145, KØJTW 62, KØIXY 58, KØQIX 48, WAØOCU 33, KØKJP 28, WAØPOC 25, WAØFIQ 18, WAØBOK 16, WØGGP 16, WAØGVJ 16, WAØQMZ 16, KØDGW 15, KØFRU 13, WØGEQ 13, WØHTA 12, WAØLOY 10, WAØJUF 9, WØAGK 8, KØODF 7, KØVTD 6, WØVEA 5, WAØ-EEI 4, WØHOP 4, WØPQP 4, WAØRPB 4, WØYFR 4, WAØIKG 3, WAØJFN 2, WØLJO 2.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John J. McNassor, W1GVT—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. Net reports for Sept.:

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845			
CPN	3880	M-S	1800	30	157	488

High QNI: CPN—WA1EEJ and W1GVT 26, W1YU 25, WA1FVH 24, K1EIC 23, W1YBH 22, K1SRF 21 and K1UWO 20. PAM W1YBH notes the CPN Net Directory listing is incomplete—please add Sun. Net 10 A.M. 3880 kc. on your copy. SEC W1PRT suggests we all decide in favor of some *public service* work as part of our hobby and active support of the RACES program will make a fine start. Highlight of the month was the Tri-City Hamfest in New London. Of the 25 attending who took the FCC exams 19 passed, including 5 Extra Class and 9 Generals. League Officials are eligible to participate in the LO Party the first Sat. of each month—see *QST ARRL Activities Calendar*. W1BDI, W1EOB and W1-TX/1 reenacted the original Hartford-Springfield Hiram Percy Maxim relay on 3.5 c.w. during Founders Week! V.h.f. is the ideal way to move Connecticut traffic. Join the Nutmeg V.H.F. Traffic Nets on 50.6 and 145.35 at 9 P.M. Congratulations to WA1FVH on Sept. BPL and phone first place in the CD and Teen-age QSO Parties; to WA1FGN on c.w. first place in the Teen-age QSO Party; to K1KLO on the Directors Plaque award and to W1CSM on his Extra Class ticket. The N.E. Teen-age Net meets at 7 P.M. on 3885 kc. All are welcome. The winter months are an ideal time for completing home-brew projects; also a good time to work and study for a higher class ticket. A Very Merry Christmas and a Happy New Year to all! Traffic: (Sept.) WA1HSN 277, WA1FVH 257, W1AW 179, WA1FNJ 131, W1WCG 126, K1RQO 106. W1EEN 98, WA1CYV 85, W1KAM 83, W1-NJM 69, WA1FGN 52, K1UWO 50, W1BDI 47, WA1GGN 40, K1SXF 32, W1EJL 31, W1QV 26, W1YU 26, WA1DUV 24, WA1DEM 20, K1SRF 20, W1YBH 19, K1LMS 16, W1GVT 14, K1PJQ 12, W1ZL 10, WA1GFJ 8, WA1GOI 7, W1BNB 6, K1BOP 6, K1YGS 5, WA9QVU/1 4, W1CTI 3. (Aug.) K1RQO 65.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from WIs YYI, RPF, JVZ, K1HHN. WA1DXI, W1-UDY/AUC and W1VMU are Silent Keys. W1FWS has

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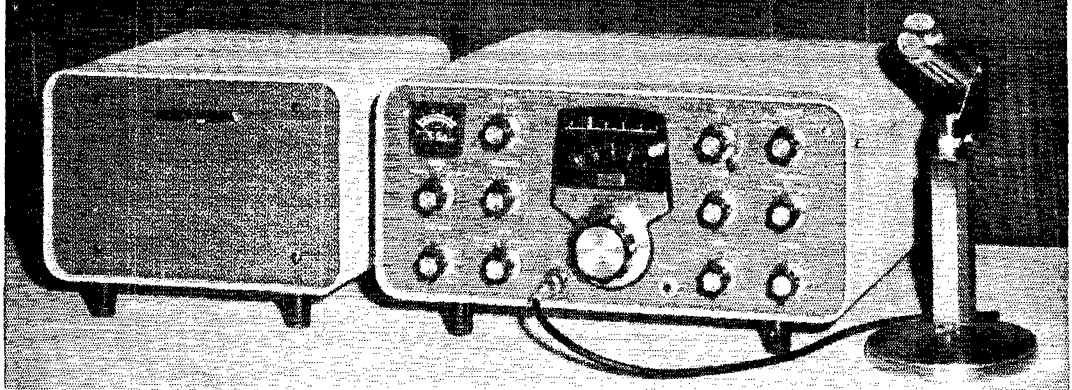

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HDP-21A, SSB "Ham" Microphone, 4 lbs.....$29.40

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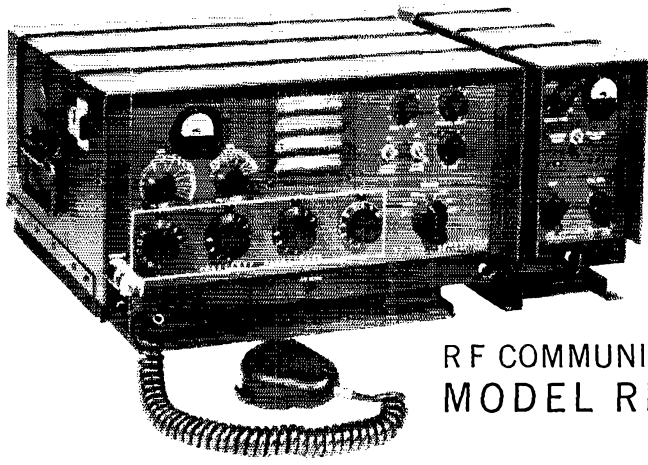

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GENERAL. The RF-301A [AN/GRC-165] was designed by R F Communications specifically for Army Tactical Communications applications. It is a rugged and very reliable modern Single Sideband Transceiver that can withstand the rough usage normally expected in the field army. The RF-301A includes in a single unit features usually found in transceivers costing two or three times as much.

This transceiver is compatible with all military type HF, SSB and AM equipment currently operational, and is now in full production.

PROVEN BY OPERATIONAL USE. The RF-301A [AN/GRC-165] is a revised Army version of the widely used RF-301 (AN, URC-58) SSB Transceiver. This unit has been sold to military users in the United States and in 14 other countries. It has been used extensively in the field under tactical conditions and has proven to be a highly reliable and dependable radio set.

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 10^6 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 Mc frequency range of the transceiver is provided.

This is the only transceiver available with both synthesizer and continuous tuning in both receive and transmit.

FULL COMPATIBILITY. The RF-301A transceiver is an extremely flexible unit, fully compatible with all high frequency SSB and AM equipment used by U. S. Defense agencies and by commercial organizations throughout the world. Operating modes include SSB (upper and lower sideband), AM, CW and FSK (with external adapter).

HIGH RF POWER OUTPUT. 100 watts PEP and average r.f. power output. The RF-301A transceiver can operate continuous duty, keydown, at 100 watts output at a temperature of +50°C.

UNIVERSAL POWER INPUT. Operates from 110/230 volt, 50/60 cycle power. In addition, a small module can be added within the RF-301A cabinet which makes it possible to use the transceiver on DC power as well as AC. Modules are available for either 12 or 24 volt DC operation.

TRANSISTORIZED. Fully transistorized except for P.A. and receiver R.F. input stage.

• For further information, please request a copy of our brochure on the RF-301A and its accessories.

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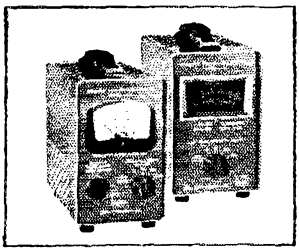

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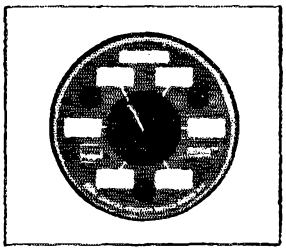

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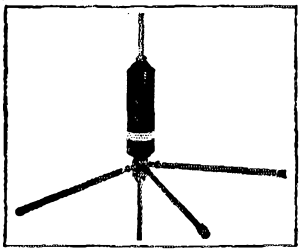

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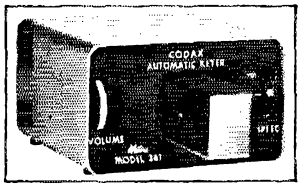

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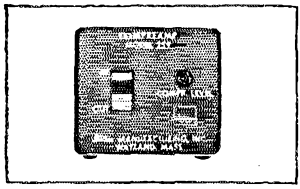

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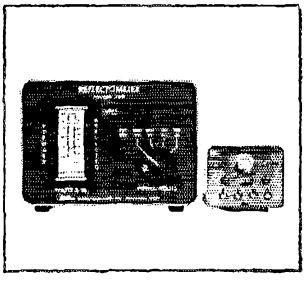

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PMR-7 Receiver 49
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VX-1 VOX 9
Galaxy V Mk II 289
DC-35 DC supply 75
RV-1 Remote VFO 49
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DAC-35 Dlx. Cons. 69
UM-1 Modulator 25
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Comm I 6m $ 89
Comm IIB 6m 109
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Comm IV 6m 149
11/4, 2, 6m VFO 34
6m Linear II 75
6m Linear III 89
G-28 Transceiver 149
G-50 Transceiver 189
910A 6m Xcvr 199
911A AC supply 39
913A 6m Linear 175
G-63 Receiver 89
G-76 Transceiver 125
G-76 DC supply 39
G-77 Transmitter 49
G-77A Transmitter 69
GSB-100 Xmtr 169
GSB-101 Linear 169
GSB-201 Linear 199

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SX-115 Receiver 325
SX-117 Receiver 199
S-120 Receiver 39
SX-140 Receiver 69
R-46 Speaker 9
R-48 Speaker 9
HT-32A Xmtr 249
HT-32B Xmtr 299
HT-33B Linear 375
HT-40 Transmitter 49
HT-41 Linear 199
SR-160 Xcvr 175

PS-150-120 Sup. 75
PS-150-12 Supply 49
MR-150 Rack 15
SR-500 Xcvr 199
P-500AC Supply 75
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HQ-110C Rec. 129
HQ-110A Rec. 159
HQ-110AC/VHF 199
HQ-140X Rec. 99
HQ-145AC Rec. 199
HQ-160 Receiver 189
HQ-170C Rec. 169
HQ-170AC Rec. 225
HQ-180 Receiver 239
SP-600JX (rack) 299
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HR-20 Receiver 89
SBA-300-3 6m conv. 15
SBA-400-4 2m conv. 15
QF-1 Q-multiplier 4
MT-1 Transmitter 39
TX-1 Transmitter 109
HA-10 Linear 175
HX-20 Transmitter 149
HW-12 75m Xcvr 89
HW-12A 75m Xcvr 99
HW-22 40m Xcvr 89
HW-22A 40m Xcvr 99
HW-32 20m Xcvr 89
SB-100 Xcvr 325
SB-101 Xcvr 350
HP-24 AC supply 49
VF-1 VFO 19
HG-10 VFO 29
HW-10 6m Xcvr 149
HW-29 (Six'er) 34
GP-11 DC supply 5
VHF-1 (Seneca) 125

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Valiant I 139
Valiant II 189
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KW Amplifier/desk 595
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Pacemaker 139
Invader 200 275
Courier Linear 139
6N2 VHF Xmtr 89
6N2 VFO 34
6N2 Conv.(14-18) 34
Mob. Xmtr (as-is) 15
Mob. VFO (as-is) 10
Signal Sentry 14

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HA-90 VFO 29

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NC-300-C2 Conv. 29
NC-300-C6 Conv. 29
VFO-62 29
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NCXA AC Supply 75
NCXD DC Supply 75
VX-501 VFO 175
200 Transceiver 275
AC-200 AC Supply 59
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SW-240 (late) 189
117AC AC Supply 59
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420 VFO 75
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Presidential Console for S-line	$495.00	$250.00
ELMAC	Reg.	NOW*
AF-68 Transmitter	$205.00	$107.50
GONSET	Reg.	NOW*
G-76 Transceiver	$451.32	$175.00
Communicator IV 6m Xcvr	307.00	207.00
913A 500w 6m Linear	256.00	196.00
G-150 Airport Comm. (122.8)		125.00
HALLICRAFTERS	Reg.	NOW*
SR-46 6m Transceiver	$189.95	$125.00
MR-40 Mobile kit for above	11.50	6.00
HA-26 6&2m VFO	59.95	42.00
SX-146 Receiver	249.95	175.00
HAMMARLUND	Reg.	NOW*
HQ-145XC Receiver	$299.00	$199.00
JOHNSON	Reg.	NOW*
6N2 Converter (14-18Mc) KIT	$ 59.95	$ 39.98
6N2 Converter (14-18Mc) wired	89.95	59.98
6N2 Converter (26-30Mc) wired	89.95	59.98
6N2 Converter (26-30Mc) KIT	59.95	39.98
6N2 Conv. (30.5-34.5Mc) KIT	59.95	39.98
Invader 200 SSB Transmitter	619.50	309.75
6N2 Transmitter (wired)	194.50	160.00
6N2 VFO (wired)	54.95	45.00
Ranger II (wired)	359.50	259.50
Ranger II (kit)	249.50	195.00
P&H	Reg.	NOW*
6-150 6m Transmitting Conv.	$299.95	$149.98
LA-500M "Spitfire" Linear	189.95	94.98
POLYTRONICS	Reg.	NOW*
PC-2 2m Transceiver	$349.50	$225.00
REGENCY	Reg.	NOW*
AR-132 Aircraft Receiver	$ 59.95	$ 29.98
SBE	Reg.	NOW*
SB3-DCP Mobile Inverter (1 KW)	$249.50	$124.75
W-72 Control Cable (SB3-DCP)	7.50	3.75
SB1-VOX VOX Unit	39.50	19.25
SINGER	Reg.	NOW*
PR-1 Panadaptor	$144.50	$ 72.25
SQUIRES-SANDERS (CLEGG)	Reg.	NOW*
SS-1R Receiver Ser.	$995.00	$495.00
SS-1S-RS Silencer/Speaker	170.00	85.00
99'er 6m Transceiver	179.95	119.98
Thor 6 6m Transceiver	249.95	175.00
418 DC Supply for Thor 6	159.95	79.98
Allbander Tuner	129.95	64.98
Video Bandscanner	445.00	245.00
Zeus 2-6m Transmitter	745.00	450.00
372 6m Low-pass Filter	14.95	7.48
SWAN	Reg.	NOW*
SW-117B AC Supply for 400	$ 85.00	$ 65.00
TRANSCOM	Reg.	NOW*
SBT-3 80-40-20m SSB Xcvr	$299.50	$198.00
SHA-3 AC Supply	99.50	49.75

moved to Florida. WA1DEK, K1NFW and W1MGP are on 75. W1AAU says the Swan 500 is getting out fine. W6JUT was here on a visit. W1PKV has a new tower and beam. The T9 Radio Club met at Doc Savage's QTH. W1KGH is secy. W1OFK is getting settled in Plymouth. W1s AOG, SKN, AQV and WA1DXI stood by during a bad fire in Medford as AREC members. W1HXK has a new '68 Ford. WA1GTB is on 6. W1DFR is on 2. W1JDP retired from Raytheon Co., and WØEQD, Kansas, has been at his QTH. WA1DGG is going to M.I.T. WA1HVK was NC for the Danvers C.D. Net in Oct. W1HIL has a 5/8-wave ground plane for 10. WA1EEJ says the N.E. Teen Net is on at 7 P.M. on 3885 kc. The 6-Meter Cross Band Net had 20 sessions, 123 QNIs, 2 traffic. The following nets have moved to 3945 kc.: CNEN, GSPN and New Eng. Emerg Phone Net on Sun. at 1230 GMT. The first meeting of the New Eng. Chapter of the OOTC Club was held and the temporary committee is K1FF, W1DFS, W1HIL, W1AOG, W1AMO and W1KI. WA1DRO is the new PAM for 2. Give him your support and be active in our 2-Meter Net on 145.8 Mc. K1ICJ has been endorsed as EC for Sharon; WA1DPX as OVS. W1ZSJ, secy. of the Central New Eng. Net, has a new Swan 500. WA1FKQ is NCS for EMN on Wed. K3QDD is getting things in order at W1MX. WA1HXF is on the air with an SB-301 and an SB-401. WA1FAD is handling traffic for servicemen in Vietnam. WA1DJC says the club at school in Gloucester is going well. WA1DEC-DED are in the Bahamas for a vacation. K1HHN worked KC4AAD on 40 s.s.b., KC4USV and KC4U8M on 20 s.s.b. using a 4-band doublet. K1FFE will be moving to Florida soon. K1OWM has a Knight Kittr-108 for 2. WA1DPX has a TX-62 and a Drake 2B and finally worked W1PMC on 2. W1TUG will be on the Marshall Islands for two years and hopes to use the call KX6BU. New officers of the Framingham RC are WA1EIN, pres.; W1SON, vice-pres.; W1LFM, secy.; WA1AZW, treas. Wellesley ARS held its first meeting. W2AZO/1 is a new OO. WA2ZEW/1, Cambridge, has an SB-101. K1ZGH says that the Mass. Chapter NAHC has taken over the "Worked All Prefixes U.S." award. Capeway RC met at W1EYU's QTH. WA3BQX, ex-K1BUR, was back for a visit. Danvers ARA held a meeting with a banquet and a "Gavel Award" from ARRL. The Yankee RC had a "Ham and Hobby" auction by W1AAT. W1TWJ moved to Middleton. The EM2MN had 23 sessions, 117 QNIs, 106 traffic. K1OJQ is out of the Army; he worked VE1AFB on 2 c.w., then VE1CZ on f.m. and K4QIF in Va. W1FJI now is an A-1 Operator and is in the North East Traffic Net. Traffic: (Sept.) WA1EYY 364, W1OJM 302, WA1FKQ 97, W1DOM 79, W1DAL 56, K1CLM 51, WA1FSI 37, W1CTR 35, W6JCF/1 28, W1PEX 26, WA1EOT 12, W1MX 12, WA1HXF 10, WA1FAD 8, K1WVW 6, WA1DJC 5, K1YUB 5, W1FJI 4, K1OKE 4, WA1DED 2. (Aug.) W1OJM 270, WA1FSI 25, K1ZGH 14, W6JCF/1 10, K1ESG 9, K1HHN 6.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1DYG. PAM: WA1FCM. RM: W1BJG. Traffic nets: Sea Gull Net on 3940 kc. at 1700 Mon. through Sat. Pine Tree Net daily on 3596-kc. c.w. at 1900. Because of school work WA1FCM is giving up the PAM job. He did a very nice job and we hope he can at least check into the nets and still be with us. Bill is going to the U. of M. at Orono and will operate W1YA. W1EOP and his flying club have a new plane and sure are enjoying it. W1GKJ operated portable in the W/VE Contest RTTY, c.w. and s.s.b. from P.E.I. and made 505 contacts. Also he sends Bulletins on RTTY on 6 and 2 meters. The word from W1BJG down on PTN is it's still the same small group keeping us in the running with traffic picking up. Maine Army MARS met at Chelsea for a lunch and a meeting with a nice group attending. K1ZVN has been in the hospital and would sure like cards from all his friends. Traffic W1BJG 119, W1GU 92.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: K1QES. PAM: K1APQ. RM: Open. Welcome to new hams: WN1IHA, WA1IHL, WN1IIH, WN1IIJ, WN1ILL, WA1IIO, WN1IJN, WA1IJO, WN1IJS. Endorsement: K1WKP as OVS, K1UZG reports 76 check-ins and 31 traffic for VTNHN. K1OLV, W1FSR and K1NXV vacationed in New Brunswick. K1DWK reports 148 check-ins and 11 traffic for the MVAREC. Don't forget that the Granite State Phone Net, New Hampshire Emergency Phone Net and Central New England Net have moved to 3945 kc. This was one of the first moves to take place in order to avoid conflict when the new rules become effective. Happy Holidays to all. Traffic: K1IBCS 163, W1MHX 36, K1BGI 28, K1PQV 21, K1QUES 10, W1BYS 1.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LII. PAM: W1TXL. RM: W1BTV. V.H.F. PAM: K1TPK. Endorsement: W1POP as EC for North Scituate. RISPN report: 30 sessions, 350 QNI, 46 traffic. The Newport County RC reports that WN1IOI is a new Novice in the club. The Fidelity RC, K1NQG, resumed its meetings for the coming year. The club meets every Wed. at 7 P.M. at 31 Marcy St., Cranston. At a recent meeting the following officers were elected: WN1HTH, pres.; WN1HUM, vice-pres.; WA1GND, secy.; WA1GNB, treas. Courses in radio theory and Morse code are planned by the club. The W1AQ Club of Rumford elected WN1ICR and WN1HXP into membership at a recent meeting. WN1ICO, of the club, has worked 45 states and has 36 confirmed for WAS. The club meets at 54 Kelley St. In Rumford every Fri. at 8 P.M. Classes will begin soon in code and theory for Novice licenses. Recently a 6-meter rig was added to the station. The SCM would like all clubs to send notices of their activities to him so that they may be inserted in this column. Traffic: (Sept.) WA1EEJ 291, W1TXL 222, W1YKQ 67, K1YEV 57, W1BTV 43, K1VYC 24, K1TPK 8. (July) W1BTV 49.

VERMONT—SCM, E. Reginald Murray, K1MPN—

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*NCS*
Gr. Mt.	3855	2230Z	M-S	573	28	W1VMC
Vt. Fone	3855	1400Z	Sun.	83	0	W1UCL
VTNH	3685	2330Z	M-F	76	31	K1UZG
VTCD	3990½	1500Z	Sun.	30	1	W1AD
VTSB	3909	2230Z	M-S	528	54	W1CBW
		1330Z	Sun.			

Vt. Intercom Net (W1KOO) on 146.94-Mc. f.m., is operational 24 hours a day and they have quite a group participating. W1JKG says his GD meter picks up the Mt. Mansfield repeater. The BARC is busy fixing up its new club house. W1MEP, W1JMG and W1UXK are doing well on 6 meters working into Westminster, Mass., consistently. Where are your traffic reports? We don't expect everyone to make the BPL, so how about? Season's Greetings. Traffic: (Sept.) K1BQB 250, K1UZG 43, K1MPN 19, WA1GKS 9, W1EJG 1. (Aug.) WA1GUV 1.

WESTERN MASSACHUSETTS—SCM, Norman P. Forest, W1STR—SEC: Open. RM W1DWA reports another record month over last year with a traffic total of 157 for WMN 3560 kc. (c.w.) daily at 2300Z. K1IJV has announced a training net for WMN which will meet Mon., Wed. and Fri. on 3744 kc. at 2330Z. Those interested should call in or write Jean for the opportunity to receive training in net procedure in a controlled net. Your SCM may be contacted for information. Congratulations to W1DVW on receiving both a Public Service award and Man of the Year award at the Annual WMN Picnic held Sept. 24 at W1DWA's QTH in Hinsdale. The Central Mass. Amateur Radio Assn., Inc. is now affiliated with the League. W1IUB reports good results on 2 meters with disappointing results on 6 because of the lack of a good opening during the Sept. V.H.F. QSO Party Sept. 9. A dozen stations participated from the top of Blueberry Hill in West Granville. They also operated on 220 Mc. with the call W1BZM/1 being used. K1TKS, at Worcester Tech, reports that the top academic student for each class is a member of the W.P.I. Radio Club: Sr. Cl. K1PXT, Jr. Cl. K1PHT, Soph. Cl. K1VZA. Traffic: W1DVW 132, W1DWA 128, K1IJV 78, W1UKR 54, K1AEC 48, W1STR 42, W1EOB 32, W1WZY 28, W1ZPB 25, W1BVR 19, W1MNG 15, W1YK 12, WA1ABW 11, WA1HEC 9, WA1GWV 8, WN1HHA 4.

NORTHWESTERN DIVISION

ALASKA—Acting SCM, Albert F. Weber, KL7AEQ—Asst. SCM: John P. Trent, KL7DG. OBS: KL7CAH. From Shemya K8RWO reports that he, K2YJU and WA1FIB are the only Generals among service folks on the rock. They have ham classes going and are planning RTTY before the end of the year. The big push around Fairbanks this winter is a 2-meter repeater aimed at that super passive repeater, Mt. McKinley. Fairbanks Club's new officials are KL7EKX, pres.; KL7ERJ, vice-pres.; KL7GBG, secy. KL7EKZ reports from Sitka that the club is starting a license upgrading course in the near future. KL7BLZ lost his new four-element quad and 55-ft. tower and KL7BCS peeled some elements from his beam in a recent windstorm. KL7FRW reports he is in the land of the horizontal icicles, POW 3 that is. We still want to appoint a real gung-ho SEC and a bunch of ECs. KL7BJD has been appointed EC. Does anyone have 16 mm. color or black and white movie footage of ham activities we could get a print from to make up a film of "Hams in Action, Alaska Style"? Tests run recently by KL7ENZ indicate that the Healy area is not the impossible v.h.f. situation that was once thought. Other new appointments are KL7GEF as OPS and W8KNC/KL7 as OVS. Traffic: KL7CAH 82, KL7EKZ 6.

IDAHO—SCM, Donald A. Crisp, W7ZNN—SEC: K7THX. The FARM Net meets Tue. through Sat. at 0100 GMT on 3935 kc. The new Idaho State (traffic) Net (ISN) meets on 3593 kc. at 0200 GMT Tue. through Sat. Net Control is WA7BDD. All amateurs are invited to

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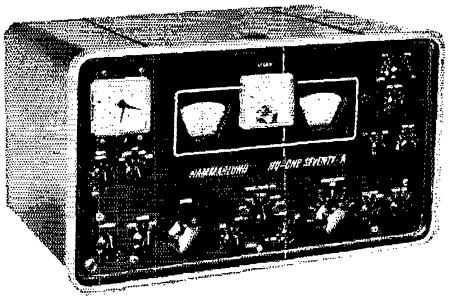

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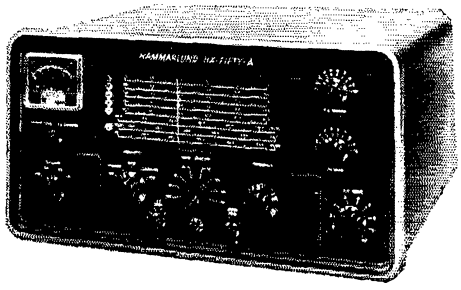

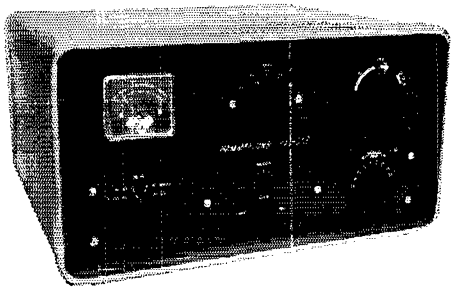

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check in. W7DMZ plans to build a new linear. The Lewiston-Clarkston Club has 40 students in the Novice code and theory course and 15 students in the Advanced Class course. WA7ETO, WA7EWV, and W7ZNN are instructors. The club set up an amateur radio booth at the Nez Perce County Fair complete with RTTY. W7IUO is operating QRP and has earned his WAS award. WA7-BDD has been appointed ORS. Your SCM spoke at a meeting sponsored by the Spokane Dial Twisters Club and attended the N.W. ARRL Officers meeting at Walla Walla. FARM Net report for Sept.: 20 sessions, 497 check-ins, 37 traffic handled. Traffic: WA7BDD 122, WA7ETO 33, W7FBL 18, K7OQZ 18, W7ZNN 10, W7-GGV 8, WA7EWV 6, K7OAB 6, W7IY 2.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM/SEC: Harry Roylance, W7RZY.

Montana Traffic Net	3910 kc.	1800 MDST M-F
Montana RACES	3996.5 kc.	0900 MDST 1-3 Sun.
Montana PON Net	3885 kc.	0900 MDST Sun.
Great Falls AREC Net	3900 kc.	0930 MDST Sun.
Missoula Area Emerg. Net	3990 kc.	0900 MDST Sun.

Endorsements: K7DCH, K7MRZ, K7OZU, WA7AEX, K7EGJ, K7UPH as ECs; W7FIS as OO; K7UPH as OPS. The Annual Division Meeting of the Northwest was called by Director Thurston in Walla Walla, Wash., Sept. 30. SEC W7RZY gave a report on the ARPSC and AREC 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 NTS people remarked that Montana is now very well represented on the RN7 by WA7DMA at Missoula. We still need more c.w. stations in this net. If interested, please drop your SCM a card. K7DCH has been very active in Navy MARS. W7OIO, of Butte, is in the General Hospital at Butte. W7FLB presented a paper at the MIME meeting in Denver. K7ABV, W7QB and W7EOI did very well in the ARRL DX Contest. We are in need of some OPSs in Montana. Traffic: WA7DMA 235, K7DCH 44, W7FL 21, W7TYN 13.

OREGON—SCM, Dale T. Justice, K7WWR—RM: W7ZFH. PAM: K7RQZ. Section net reports: WA7AHW reports for the AREC Net for Aug., sessions 31, check-ins 707, maximum number of counties 17, traffic 16, contacts 68. For Sept. sessions were 30, check-ins 735, maximum number of counties 18, traffic 31, contacts 57. W7ZFH reports for OSN for Aug., check-ins 87, traffic 64, sessions 22. For Sept. sessions were 22, traffic 28, check-ins 78. K7IFG reports for BSN for Aug., sessions 62, traffic 160, contacts 192, check-ins 1094. For Sept. sessions were 60, traffic 136, contacts 170, check-ins 889. K7NTS has been keeping busy telephone relaying for the USCG cutter *Northwind*. WA7CPI has his u.f.o. detector operating and has it on 24 hours per day. WA7-DWI and WA7DWK are now on 10-15-20 meters with a beam on a homemade 50-ft. tower. W7FHX is finding more time to operate since his retirement from the post office. K7EWW and W7MLJ have been hunting together (deer—not DX). WA7CIP cleaned house by trading all his gear for a TR-3. Traffic: (Sept.) K7RQZ 359, W7ZB 182, WA7BYP 90, K7IFG 84, K7OUF 58, K7NTS 55, W7ZFH 48, WA7CIP 44, WA7DWK 34, K7KPT 25, K7-WWR 20, WA7DPK 14, WA7DOX 10, W7MLJ 5, WA7-GLP 2. (Aug.) K7RQZ 319, WA7BYP 194, WA7CIP 173, W7ZB 120, K7IFG 105, K7NTS 103, WA7DOX 40, K7-WWR 31, W7ZFH 31, W7DEM 18, K7KPT 16, WA7EES 8, W7MLJ 7, WA7CPI 1.

WASHINGTON—SCM, William R. Watson, K7JHA—SEC: W7UWT. RM: K7CTP. PAM: W7BUN.

WSN Net	3575 kc.	0200Z Daily	QNI 286	QTC 403	Sess. 30
NTN Net	3970 kc.	1830Z Daily	QNI 907	QTC 423	Sess. 30
WARTS	3970 kc.	0100Z Daily	QNI 1256	QTC 155	Sess. 24
NSN Net	3700 kc.	0300Z Daily	QNI 414	QTC 99	Sess. 30

The latest addition to the list of affiliated clubs is the Dial Twisters of Spokane. Note the recent change of WSN to 3575 kc. from 3535. The new AREC Wash. State frequency has been listed for 3930 kc. and will function under SEC W7UWT. This will augment the state c.d. frequency under AREC and the various traffic nets. New appointment: W7HJW as OBS. NW Tech. Net activity is up. K7JHA joined the SCMs of Oregon, Idaho and Montana at a meeting in Walla Walla called by W7PGY, Northwestern Division Director. Three SECs also were present. A step-up of AREC activity was recommended and endorsed by all. The BEARS Net now is going on 3940 kc. each Sun. at 12:30 P.M. K7JXQ is the new recorder for the WARTS. If you miss any bulletins get a copy of the Tacoma Club's bulletin, *Logger's Bark*, which publishes them all. SCM K7JHA met with the Pacific Area Staff of NTS at Los Angeles with TCC Direc-

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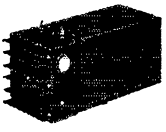

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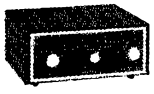

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for W7DZX for an FB meeting involving traffic procedures and policies. K7JHA also brought back an Invader. The NW S.S.B. Net was omitted as a co-sponsor of the Yakima Hamfest. Our apologies. WØJAN/7 now will be known as W7ETR. K7OOM is schooling in Elensburg. W7PUL reports two new 432-Mc. stations in Spokane. The Richland Club now is in the Red Cross Bldg. at Kennewick. K7PVF and W7COG are shuttling to Heil's Canyon Dam. K7PVM finished at Ft. Lewis. K7MGA used his other call, WA7ICH, from Packwood. W7PI is toying with some new gear for traffic nets. We regret the passing of W7EKT, of Spokane, to the list of Silent Keys. Traffic: (Sept.) W7BA 1415, WA7DXI 981, W7ZIW 705, W7DZX 392, W7KZ 284, W7PI 233, WA7-DZL 125, W7IEU 89, W7BTB 75, K7JHA 52, WA7BZY 50, K7CTP 50, WA7EDQ 48, K7MCA 44, W7APS 36, K7TCY 24, W7AMC 16, W7BUN 12, W7AIB 10, W7RXH 10, W7UU 10, W7AXT 7, W7OEB 7, WA7DMF 5. (Aug.) K7MGA 16.

PACIFIC DIVISION

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6GHZ. PAM: Vacant. V.H.F. PAM: KH6EEM. RM: KH6GGR.

Net	*Freq. (Mc.)*	*Time*	*Days*
League Appointees	7.290	0700Z	Wed.
Friendly Net	7.290	2030Z	M-F
Pacific Interisland	14.330	0830Z	All

KH6NS, KH6EEM, KH6DEM and KH6BZF hope to work some 2-meter stations during the fall opening to the coast, Japan and other Pacific Islands. May I take this opportunity to wish you and yours the best of holiday greetings. W2KG called me on the landline during his pass through Honolulu. W8DGF/8, ex-KH6DEM, did the same on his pass through to S.E. Asia. WB6-NMT/KH6 returned to his post at San Diego's N.E.L. KH6AFM has undertaken another license class. KH6-ARL has been working on our amateur radio portion of the Honolulu City Council new Comprehensive Zoning Laws. If you have a tower and want to keep it up you had better start working to keep that tower. Call Mike at 565-140 or 567-222 to see what you can do to help yourself. KH6IJ has been spearheading the move for the amateurs to write to their councilmen. If they place physical restrictions on us then we'll be out of business electrically. If you need a fact sheet on the "islands" write the Hawaii Visitors Bureau, Suite 801, Waikiki Business Plaza; Honolulu, Hawaii 96815. Ask for the publication *Hawaii USA*, Form HVB 360M-4/67. Congratulations to the gang at KH6SP on their fine work during Typhoon Sara which hit KW6-Land and to KH6s BB, CBQ, BZF, EEM and others on their excellent work on 10 meters. Traffic: KH6GHZ 423, KH6SP 214, KH6BZF 36.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEAU. W7TVF will schedule anyone stateside or DX needing Nevada. Las Vegas Radio Club members provided 2-meter f.m. communications between the Boy Scout camp and their homes. About fifty are on 2-meter f.m. in the Las Vegas area. The Reno area has fifteen on 2-meter f.m. using 146.94 Mc. Simplex. A group has formed another club in Reno, the Nevada Amateur Radio Society. W7CSB has been spending some time up near UAØ-Land. W7SNP and OM K7ICW have been vacationing in the Northwest visiting v.h.f.ers. W7PBV attended the Southwestern/Pacific Divisions Convention. W7HQS has rebuilt an army jeep into a communications vehicle and is now working on a tractor. K7ZOK showed powerline QRM movies at the last SNARC meeting. W7EBP and K7RKH have put the final touches on their speeches for "SAROC." W7JU/K7JU has cleaned out forty years of his c.w. ham collection and is now operating s.s.b. He will retire Dec. from Los Angeles D W & P. Traffic: WA7BEU 10, W7PBV 2.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—SEC: WB6BWB. ECs: WB6MXD, K6RHW, WB6RSY, W6SMU, WA6TQJ. RM: W6LNZ. New officers of the SACARDEP Radio Club are W6WLI, pres.; K6VOO, vice-pres.; WA6PMW, secy.; K6VXN, sgt. at arms. W6EOU and WA6JDT attended the Pacific/Southwestern Divisions Convention in Los Angeles at the Ambassador Hotel. W6LNZ made the BPL for the fourth time. WB6MXD has been representing the northern part of the section while QNI the Golden Bear Net from Crescent City. Don also is studying for the Extra Class ticket. WB6QZZ, in Anderson, has been off the air with rig troubles. WB6MAE has got back on the air portable from White Rock. Short report, isn't it? Want me to say more? OK then, send me some reports. I received very little news this last reporting period. Traffic: (Sept.) W6LNZ 206. WB6MXD 4, WB6MAE 2. (Aug.) WB6EAG 4, W6NKR 3. (July) WB6MAE 10.

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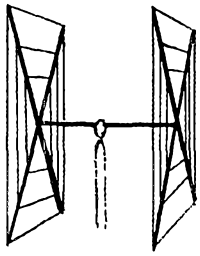

CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; 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!

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Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16′ square.

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10′ × 1¼″ 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′ × 1″ OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞″ OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

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Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are *much lower* than even the bamboo-type:

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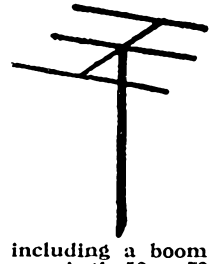
TEN METER CUBICAL QUAD	23.00

(all use single coax feedline)

BEAMS The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9ADQ, and 4U1ITU. THAT ANTENNA WORKS! WN4DYN



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2 El 20	$16	4 El 10	$18
3 El 20	22*	7 El 10	32*
4 El 20	32*	4 El 6	15
2 El 15	12	8 El 6	28*
3 El 15	16	12 El 2	25*
4 El 15	25*		
5 El 15	28*		

*20′ boom

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"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 AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODII, WA3DJT, WB2-FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1-MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2-KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1-LC, PY5ASN, FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15, 10, 6 meters $14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters $16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters . . . $18.95

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GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—New officers of the Marin Radio Club are W6FVK, pres.; WB6UJO, vice-pres.; WB6IMO, secy.; WB6PQE, treas. W6CWR is working lots of Navy MARS nets. WA6QCR is completing an all-band RTTY setup. WA6ZHT is constructing a linear to cover all bands. At the evening high school in Santa Rosa WB6AGP is teaching the rudiments of amateur radio. With the higher frequencies opening up, WB6PVA is finding a lot of new—and some exotic—DX on 10 and 15 meters. Up in Sonoma County, W6ARQ reports across country on 6 meters with some find band openings. W6HSA is pres. of the San Francisco Club and editor of the club paper. WB6GVI is on active duty with the Navy. WB6FDP received a citation from the Navy for providing communication from Viet Nam. W6GQA, top OO in continuous FMT activity prepares to enjoy his fourth sunspot cycle. While home between voyages WB6JQP handled 195 messages in a short layover. WB6POP is attending Cal Poly. W6CFE works c.w. exclusively. K6JHR is active on the NCN training net, while W6EAJ says his only activity is the Grandfather Net on 160 meters. W6WLV added an EICO 720 and a 20-meter dipole. WA6ALK, Estelle, still is hampered by a leg injury but signed up with Navy MARS. WA6NDZ has returned from Chicago. K6TWJ, a standby on the Golden Bear Net, was in Hawaii for a month. K6CWS and XYL W6HPS have a new tower and tri-bander for DX activity. WB6UJO and XYL WB6VBN 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 3917 kc. for mobile operations. The WA6AUD/W6PTS tower team has ceased its volunteer week-end labors for the winter K6ICE lost all his gear when his shack went up in smoke. W6ZC continues what appears to be a 24-hour watch for DX—all bands and all hours. WB6OGD is building up his country count. WA6BYZ made the BPL. Traffic: W6KVQ 367, WA6BYZ 206, WB6JQP 198, W6WLV 146, K6TWJ 35, WA6AUD 17, W6BWV 10, WB6PDP 5, W6CYO 4, WB6GVI 3.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—K6RBB is the new EC in the Stockton area. W6ASV retired and bought himself a Camper and a TR-3 and is going traveling. WB6LYH is on 40 s.s.b. W6IIK is operating from Big Creek, on 40 s.s.b. K6QPE is heard nightly. K6BJI is chasing DX on 15 meters. W6JUK is on 10 meters with a kw. WA6SCE is busy handling traffic. WB6ETQ is back from an extended vacation trip to Alaska. K6KOL is building a 30-element beam for 2 meters. The Turlock Amateur Radio Club meets the 2nd and 4th Tue. 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 W6PIX, pres.; W6WZM, secy.-treas.; and WA6EDQ, editor. W6PIX has a Swan 500. W6JMP is really thinking about s.s.b. W6SVM has a new V.W. and is mobiling on 40 s.s.b. The Tuolumne County Amateur Radio Society is now affiliated with the League; WB6RZI is secy. The Delta Amateur Radio Club also has affiliated with the League. W6WZM, WA6TQL and WA6ONZ attended the ARRL Convention in Los Angeles. W6EYO is vacationing in Canada, and is on 14,260 kc. for skeds. K6IXA is handling traffic from Vietnam. W6TFD is having transceiver problems. To everyone, a Very Merry Christmas and a Happy New Year. Traffic: (Sept.) WB6HVA 304, W6ADB 169, K6KOL 123, WA6SCE 18. (Aug.) W6ADB 363.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Ed. Turner, W6NVO. SEC: W6VZE. RM: W6QMO. SEC W6VZE is now running a code practice net seven nights per week on 145.49 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. K6DYX was busy making plans for an around-the-world cruise. W6PLS reports that conditions on 10 meters are the best ever. WA6LFA works NCN and liaisons to RN6. W6AUC reports that the QCWA held its Annual Picnic at the Sonoma Golf and Country Club with 113 members present. W6ACW also is active as NCN liaison. W6OH reports activity in traffic work as well as the Mission Trail and MARS. WB6IZF and K6LFZ, EC for King City and Hollister, respectively, provided 2-meter communications for a large control burn in San Benito County. Ed reports that he is active on WCARS. W6BPT is back on MTN after several years and is running a pair of 125As. K6YKG is NCS of the NCN Sat. evenings. W6VZT is active on 20-meter DX. The West Valley Radio Club meetings featured operation of club station W6PIY. W6RSY made the BPL. The Santa Cruz Radio Club held an antenna demonstration. The club welcomes members from the Santa Cruz/Watsonville area. W6YBV is QRL with NTS operations. W6DEF is originating traffic on the 2-meter

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***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 28.5 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, MARS, 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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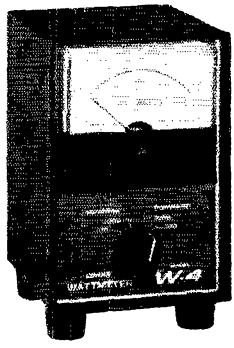
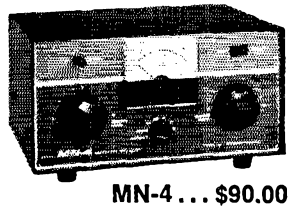


WATTMETER W-4 $49.50

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 3¾" W x 4" D.



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200 watts

MN-2000 . . . $160.00
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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.

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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.

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c.d. net as well as work on NCN. W6MVL is busy working DX. WA6YMX now sports a new quad. WA6HVN is busy getting a pair of 425As on the air. W6MMG reports that KP4JE is now active from the Redwood City area on 10, 15 and 20 c.w. Traffic: W6RSY 1586, W6YBV 201, W6DEF 97, K6DYX 86, W6PLS 47, W6VZE 20, WA6LFA 14, W6AUC 13, W6ZRJ 13, W6OII 12, WB6IZF 5.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4-BNU—Asst. SCM: James O. Pullman, WA4FJM. SEC: WA4LWE. RM: K4CWZ. PAM: W4AJT. V.H.F. PAM: W4HJZ. WB4EQW is the proud owner of a brand-new General Class license. W4IJP has a new SB-101 on the air and has received his CP-15 certificate. WA4ZLK reports that W4RIZ has constructed and installed a 2-meter repeater for the Wilson area. K4GHR is now on 2 meters. WA4FJM says the Triangle ARC is having a ball designing and building solid-state, two-watt input, hand-held 6-meter transceivers as a club project. W4BNU is now working some RTTY on 80 and 20 meters. W4NAP reports the Rockingham County AREC gang had a good turn-out for its picnic.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
THEN	3865 kc.	0030Z	Daily	185	WA4GMC
NCNE	3573 kc.	2330Z	Daily	115	W4IRE
NCNL	3573 kc.	0300Z	Daily	73	WA4CFN
Late (Aug.) reports:					
NCNE	3573 kc.	2330Z	Daily	146	W4IRE
SSBN	3938 kc.	0030Z	Daily	58	WA4LWE

Traffic: (Sept.) WB4BGL 169, W4LWZ 118, WA4CFN 100, W4RWL 88, WA4VNV 81, WA4ZLK 40, W4ZZC 36, K4EO 34, W4AJT 18, K4CWZ 18, K4PJE 18, WA4GMB 12, W4FDV 11, WA4FJM 11, W4NAP 10, K4GHR 7, W4-BNU 5, K4TTN 5, WB4CVM 4, WA4KWC 4, W4ACY 2. (Aug.) W4RWL 105, WA4VNV 44, W4YMI 18.

SOUTH CAROLINA—SCM, Clark M. Hubbard, K4-LNJ—SEC: WA4ECJ. Asst. SEC: W4WQM. RM: K4-LND. PAM: WA4EFP. 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 net meeting the night before at the Holiday Inn with 35 attending the supper. WA4ICF will be on 2 meters soon. WB4AQF, WB4CUT, WA4VKB all have new towers. K4LNU now is on RTTY. The Anderson Radio Club toured the FAA Omi-TACAN station recently. W4KNI is back with the SCN. K4VVE is the proud father of a junior operator. K4GVE is on RTTY now. W4JA had to give up OOing. We hope Gil can soon get back to it. Net traffic: SSBN, 102, SCN 9. Traffic: WB4DXX 189, WA4APD 89, WA4-NWI 79, WB4BZA 40, W4NTO 37, W4UMV 36, K4LNJ 32, W4FFH 26, W4JA 21, W4FVV 18, K4OCU 11, WA4-HFA 9, K4LND 6, W4PED 6, K4VVE 5.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: WA4EUL, K4MLC. WB4AAU and WA4-EUL are new ECs. K4MJL was appointed OO and K4MJZ OPS. WA4UMX is off the air while away at college. The VSBN and VFN, plus several local nets, were active during Hurricane Doria's threat to the coast. W4ZAU, WA4WQG, WA4PUI and WB4DOY are all clergymen who frequent our section nets. WA4FIJ, former PAM and active netter from West Florida, is now portable in Norfolk. New officers of the PVRC are W4ZM, pres.; W3TMZ, vice-pres.; K3EST, secy.; W3-JPT, treas. WB4BQF reports earning the WAS, and K4TSJ is very near the DXCC. All sections members are encouraged to sign up for AREC membership and to participate in the January Simulated Emergency Test. Contact K4LMB for the address of your EC. Virginia section-wide net frequencies:

3935	2300 & 0300 GMT	Daily
3680	2330—0030 GMT	Daily
3825	2400 GMT	Daily

Traffic: (Sept.) W4ZM 265, W4NLC 183, W4RHA 147, WA4EUL 137, W4DVT 101, K4KNP 100, WB4DRB 59, K4TSJ 58, WA4OUS 56, WA4FCS 50,W4SZT 46, K4FSS 43, K4MLC 43, W4OKN 37, W4TE 37, W4MUJ 35, WB4-GTS 31, WA4PBG 28, K4MJZ 25, WA4JJF 18, W4SHJ 17, W4BZE 15, K4LMB 14, K4VCY 13, WB4DOY 12, W4-ZAU 10, K4GR 9, WA4WFQ 9, W4MK 6, W4KFC 5, WA4WQG 5, WB4BQF 3, WA4FIJ 3, W4JUJ 2, W4LK 2, W4KX 1, K4YEE 1. (Aug.) K4MJZ 30, WA4WFQ 18.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8IRN. RMs: W8HZA, K8TPF. PAMs: K8CHW, W8IYD. W8WVM, WA8NDY, WA8WCK, WN8YHI, WN8YHJ and WN8YHL operated in the Sept. V.H.F. Party from Upshur County. W8BKK has been forced

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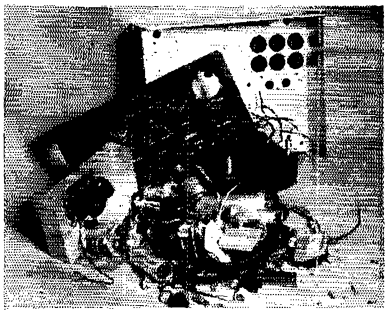

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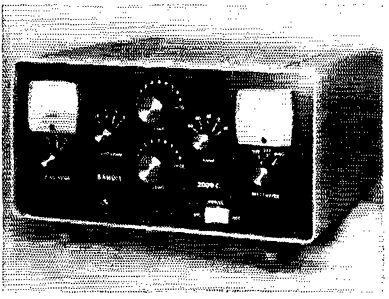

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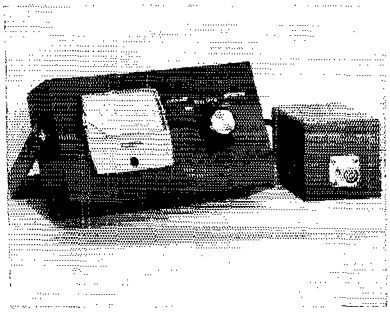

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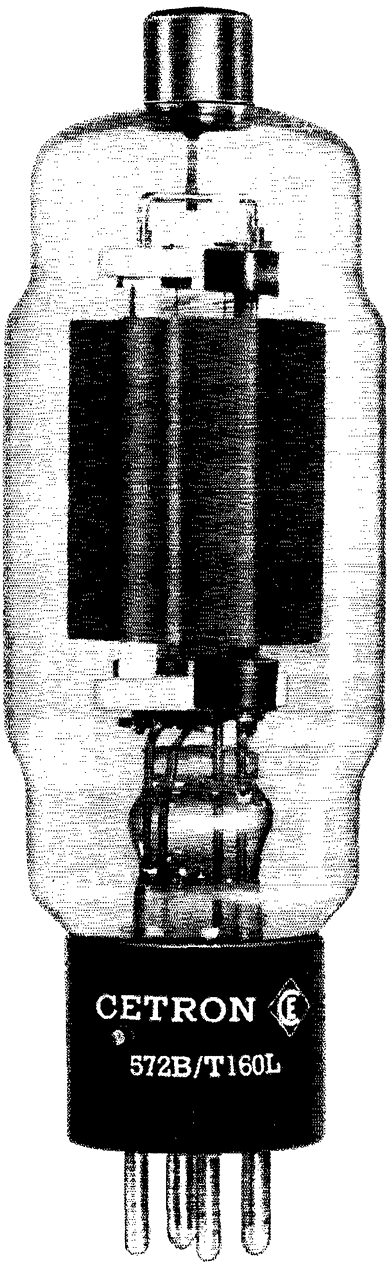

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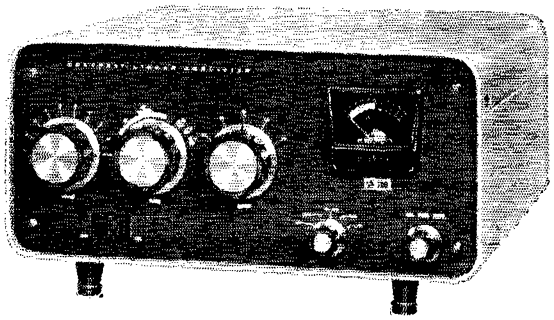

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January 6-8, 1968

sponsored by
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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 cities 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, countries 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. Va. 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 14240/14340 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 29009.

to resign as OO because of moving to Nashville. WN8-YCD likes traffic work. WA8YSB, instructor at W.V.U., is quite active; he also holds W1FKP and W4KDD. W8CUL has a new SB-101 and is active on 80 through 2 meters. W8TGF is active on 144 Mc. from Randolph Co.

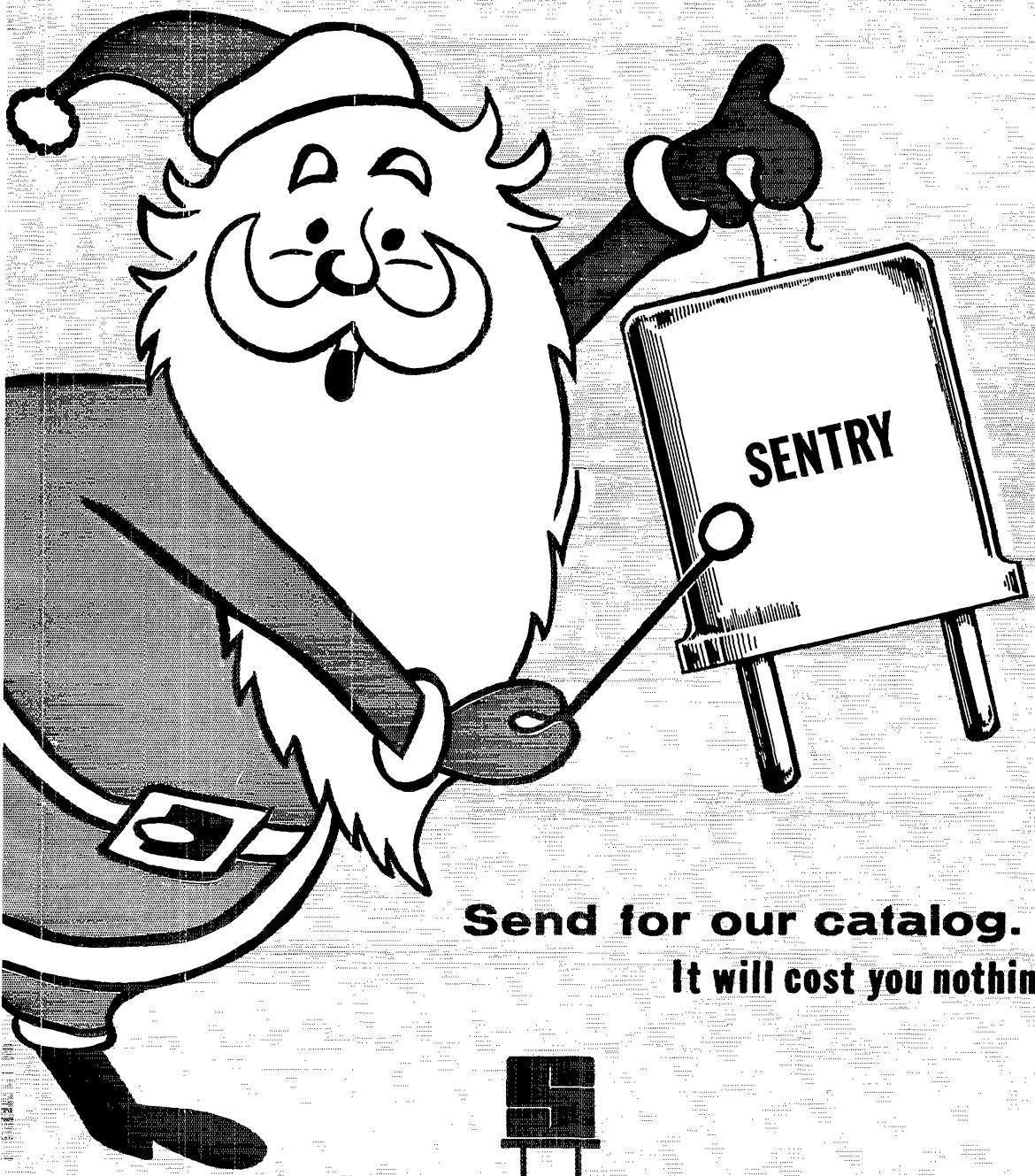
WVN C.W. Net, 30 sessions with 90 messages (July)
WVN C.W. Net, 31 sessions with 154 messages (Aug.)
WVN Phone Net, 21 sessions with 69 messages (Aug.)

It is with regret I report the passing of W8BTU, of Princeton, and W8PRO, of Williamson. W8HZA is building an SB-101 transceiver. W8JM is building an HW-12A and mobile power supply. Director Vic Clark was guest speaker at the QCWA Dinner in Charleston. K8UHC and K8CAY are active on 6 t.m. from Huntington. Planning for the 1968 ARRL State Convention will begin with a meeting in Charleston in Dec. and an election of officers. Are you ready for the SET, to be held in Jan.? OBS and OO appointments are available. Traffic: W8SQO 141, WA8POS 127, K8MYU 89, W8CKX 60, WA8RQB 52, W8IMX 32, WA8NDY 16, K8BIT 14, K8MQB 12, W8JM 10, W8IYD 9, W8GUL 4, W3FKB/8 2, WA8LAL 2, WA8QZO 2, WA8YSD 2, K8CHW 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Richard Hoppe, KØFDH—Congrats to WØIES on earning another BPL for his fine work with our Colorado Weather Net. The Hewlitt-Packard Loveland ARC, WAØSKH/Ø, had a very successful outing during the Sept. V.H.F. Contest. Equipment was available for 50 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 AP/6 for which the antenna was a 1-gallon oil can with a quarter-wave stub. The Colorado High Noon Net reported the highest activity for Sept. with a QTC of 79 and a QNI of 455 in 26 sessions. Traffic: WØIES 760, KØZSQ 336, WAØMNL 168, WØKAU 123, WØFEO 58, KØDCW 48, KØSPR 21, KØECR 16.

Merry Crystals from...



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NEW MEXICO—SCM, Kenneth D. Mills, W5WZK—Asst. SCM: Marty Petsonk, WA5MCX. SEC: K5KTQ. PAM: W5DMG. OVS: K5TQP. Congratulations to WA5MCX 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 messages for many points including Europe. Many of these were passed on 20 meters, the operating band at the fair. Everyone seems to have settled into the new school year. WA5MIY is all set to go somewhere else and send some traffic back home just to have some. K5TQP and WA5MFZ attended the V.H.F. Conference at Waggoner, Okla. Fred reports he has a new pair of 20-ft. vertically-stacked yagis up 70 ft. Traffic: K5HTS 18, W5NON 16, W5DMG 13, WA5JNC 10, WA5RBU 9, W5BWV 5, WA5MCX 4, W5NUI 3, WA5BLI 2, WA5-MIY 2.

UTAH—SCM, Gerald F. Warner, W7VSS—SEC: W7WKF. RM: W7OCX. Traffic nets:

BUN	Daily	7272 kc.	1830Z
UARN	Sat.-Sun.	3987.5 kc.	1400Z
URN	M-F	146.2-146.8 Mc.	0030Z

Utah stations heard participating in the Sept. V.H.F. QSO Party were WA7LAW, WA7ENF, K7SUJ, WA7-BYX, now on Guam, would like to renew Utah acquaintances. Ray is on 15-meter s.s.b. V.h.f. meteor and Aurora fans please note: K6VLC/7, at Dugway, is on the air with high-power 2-meter s.s.b. gear. Please plan to attend the Utah Hamvention at Provo on Feb. 17, 1968. Many long hours of planning have gone into this affair. It should be a good one. K7JLF has the details. BUN still rolls along in high gear, reports W7-OCX, despite many members leaving for school. Traffic: W7OCX 143, W7LQE 129, WA7BME 14, W7VTJ 4.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: WA7CLF. PAMs: W7TZK, K7SLM. OBSs: W7TZK, K7SLM, K7NQX. Nets: Pony Express, Sun. at 0830 on 3920; YO, daily at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 7255; Wx Net, 0630 Mon. through Sat. on 3920. W7UFB has moved to Jacksonville, Fla., and is teaching in a junior college. W7-VDZ and WA7CLF have new towers up and ready for the winter winds. K7ITH has moved to Moorcroft for the winter. The Carbon County Radio Club at Rawlins has a code and theory class going. We need more hams in that part of the state. Please send me your nominations for the 1967 PICON award. Ask WN7HOK, of Casper, about Murphy's Law; he has had more than his share. Traffic: K7NQX 414, WA7CLF 121, K7KSA 55, W7TZK 52, W7NKR 33, WA7DNZ 28, WA7BPO 26, K7VWA 17, W7HLA 16, W7YWW 14, K7HHW 10, WA7-HAB 6, W7CQP 4, K6UVJ/7 2, W7AEC 2, K7YPT 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4WHW—SEC: W4FPI. PAM: WA4EEC. RM: WA4EXA. Thanks to the leadership of the North Alabama DX Club for the increased participation in DX activity and the fine showing made by Alabama operators in the DX Contest (Oct. *QST*). The AENM still is setting the pace with a large check-in and good traffic activity, followed by AENT and AENH. W4FVY 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. W5GVE/4, in Dothan, is a new Alabama OVS, running 500 watts on 2 and 6. WB4DQW, in Montgomery, is doing a fine job on 6 s.s.b. ECs: Start making your plans for the SET to be held in January. A special invitation is extended to all operators to check with your EC and get in on the fun and reap the benefits of participation in the SET. W4MKU is proud of his 30-w.p.m. copy certificate. WA4FYO is the leader in reported traffic again this month. Traffic: (Sept.) WA4FYO 339, K4AOZ 161, W4FVY 148, WA4-EXA 76, WA4EEC 64, WA4VEK 58, K4NUW 55, K4WHW 55, K4BSK 50, W4YPC 46, WA4YYV 43, WB4-CYU 42, WB4DIN 41, WA4PIZ 41, WB4EKK 31, W4MKU 31, WA4LQN 27, WA4UXC 24, WB4EKJ 21, WB4BLX 18, WA4VUG 14, K4WOP 10, WA4GGD 8, K4GXS 7, WA4-JSM 7, K4KJD 7, W4FPI 6, K4UUC 5, W4DGH 4, WA4ZFA 4, K4NJY 2, WA4ROP 2, WA4WLD 2. (Aug.) K4HJX 46, W4MKU 14, WA4ZFA 5.

CANAL ZONE—Acting SCM, Russell E. Oberholtzer, KZ5OB—SEC: KZ5MV. RM: KZ5FX. Be on the lookout for Canal Zone QSO Party rules. The Party is planned for Jan. 27 through Jan. 29, 1968. KZ5SF is holding code and theory classes for potential hams. KZ5CT and KZ5SA moved to Margarita. KZ5AA is holding a week-day traffic net on 21.3 at 1600Z. KZ5TS

CQ . . . CQ . . . CQ . . .

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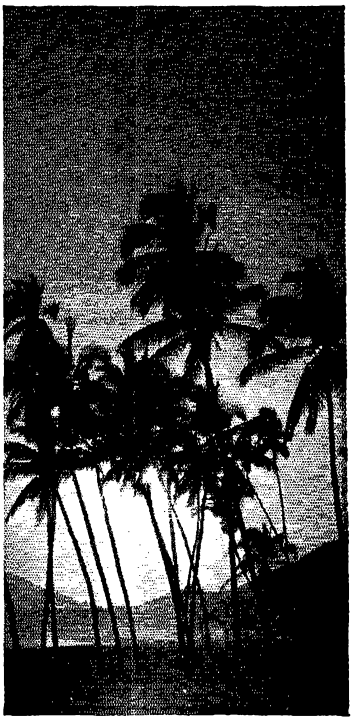

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reported working CX9AJ on 6 meters. KZ5WR and KZ5MW report new harmonics at their QTHs. The CARC toured the ITT transmitter sight. Welcome to new KZs ZN and CK. Traffic: KZ5SF 168, KZ5TS 139, KZ5AD 43, KZ5AJ 43, KZ5MV 14, KZ5OA 9, KZ5OB 9, KZ5WR 9, KZ5FG 6, KZ5GN 6.

EASTERN FLORIDA—SCM, Jesse H. Morris, W4-MVB—SEC: W4IYT. Asst. SEC: W4FP. RM C.W.: W4ILE. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAM 40M; W4SDR. PAM 75M: W4TUB. V.H.F. PAM: WA4BMC. I had two nice visits with clubs recently. On Sept. 21 I met with the Polk County Civil Defense 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. 28 I visited with the Lake Amateur Radio Association. President K4AOB and his club have their own club house 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 lesson to others who would like to do the same. W4KRC and the BEBA gang made p.e.p. during the week end they operated from AAA Headquarters in Orlando. Many of the traffic gang has returned to school. WB2WWH is now WB4HKP in Miami, W8BZY is operating from Patrick AFB and WB4HNU is operating from the Naval Hospital in Jacksonville. And then there is WA4STJ, who is building a home-brew *steam-powered car!* Traffic: (Sept.) K4KRG 597, WA4BMC 508, WA4SCK 289, WA4NEV 278, WB4HKP 226, W4FPC 222, WB4AIW 206, W4VDC 90, WA4FGH 89, WB4DSP 83, W4NGR 79, K4DAX 78, K4COO 75, W4SDR 71, W4SMK 71, W4FP 64, W4AKB 63, WA4HDH 56, WA4NBE 52, W4YPX 52, W4MVB 51, WA4OHO 50, W4SME 48, WA4TWD 42, W4PBK 38, WA4CIQ 35, W4EHW 30, K4DSN 29, W4IAD 28, W4TRS 28, W4KHY 27, W4OGX 27, K4QCG 25, W4IE 21, W4-VPQ 21, K4SCL 20, WA4WOW 20, W4GDK 19, WA4EYU 17, K4LPS 16, WA4FJA 15, W4KRC 15, W4CWI 14, K4IEX 12, K4ENW 11, WA4VZF 11, W4GM 10, WN4-FSF 8, W4IYT 8, WA4WZZ 8, K4BLM 7, K4EBE 6, W4TJM 6, W4BKC 4, WA4PWF 4, WB4ADN 2, WA4STJ 2. (Aug.) WA4NBT 40, K4ENW 21, WA4DEL 15, W4BKC 14.

GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4-DDY. RM: W4CZN. PAM: K4PKK. K4HQI reports continued good openings both on 6 and 2. W4YNL is NCS for the Ga. Tradewinds Net which meets Thurs. at 2000 EDT on 50.25. WB4GDQ now is a General and well along for WAS with 80 watts to a dipole. K4TXK is returning to college. W4LRR reports work on RTTY and the one-eyed monster keeps him busy. WB4AJR is a new ORS and active as 4RN representative. K4TQU now is on 2 meters. W4BGK has a new v.h.f. antenna system. K4BEF has a Galaxy V for the low bands. WA4WQC is located in Texas now. K4PZS is building a new 2-meter rig. WB4EMF has an SR-150 for home and mobile. GSN reports all 60 sessions are covered with 472 stations reporting 168 pieces of traffic. WA4JSU, Sun. night net control for the Ga. S.S.B. Net, had 258 stations and 20 messages. W4RZL has new towers at 50- and 60-ft. level with a lazy quad for the low bands and plans a tri-band quad for 60-ft. level. Traffic: W4-FOE 410, W4CZN 157, WB4EPI 134, WA4RAV 98, W4FDN 81, W4PIM 58, WB4AJR 56, W4DDY 52, WA4-LLI 33, K4BAI 28, WA4JES 17, K4AJF 12, K4JFY 6, WB4EMF 5, W4YE 5, W4RZL 3.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB. PAM: WA4ZGI. RM: W4BVE. Section Nets:

Net	*Freq.*	*Time*	*Days*
WFPN	3957 kc.	2300Z	Daily
QFN	3651 kc.	2330/0300Z	"

Pensacola: Ten-meter net activity on 29.56 Mon. nights is increasing. Both a.m. and s.s.b. stations are welcome. W4AXP has his receiver back from the factory and is looking for old friends. W4UUF sold all the h.f. gear and has two new v.h.f. s.s.b. rigs—a Swan 250 and a Sidewinder with linear. Milton: K4HOX is putting a Model 19 on RTTY. Fort Walton: WB4GYX joined AF MARS and is getting an ARC-1 on 2 meters. WN4GMG made the trip to Mobile and passed the General Class test. His dad, W4UNV, is building a 10-meter rig. WA7-AIW is operating /AM from C-121 out of Eglin AFB. The EARS Club, W4SRX, now has a w.b.f.m. rig on 146.94 Mc. Defuniak Springs: K4KHV is the new EC for Walton County. Chipley: WB4FLK's daughter received her Novice ticket with the call WN4HMD. Madison: WA4GHE is constructing a windmill tower to hold 75-, 40- and 6-meter antennas. Hams and CBers joined to

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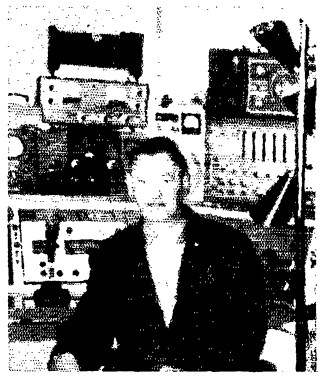

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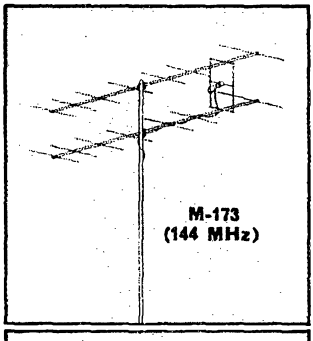
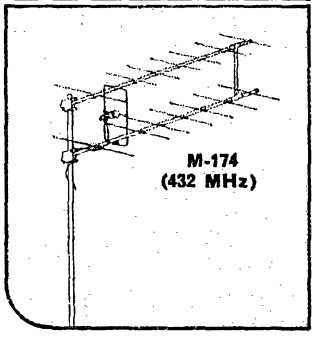


M-173
(144 MHz)



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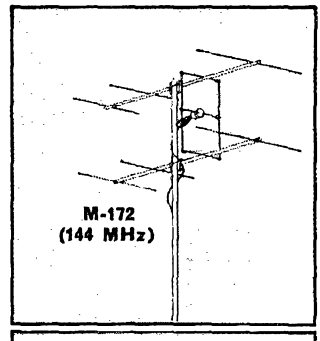
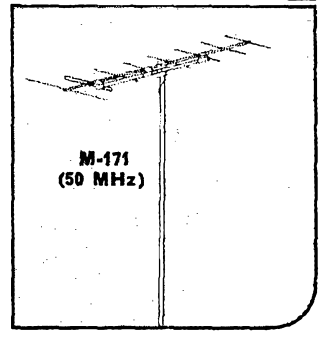


M-172
(144 MHz)



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form a county-wide emergency communications group. Cross City: W5AYS/4, Dixie County EC, has been transferred, leaving W4SIU the only ham in these parts. Traffic: (Sept.) K4VFY 387, WA4JIM 172, W4BVE 61, W7BNR/4 34, WB4GYX 28, WA4EOQ 15, WA4GHE 4, WB4FLK 2. (Aug.) WA4IMC 193.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—PAM: W7CAF. RM: K7NHL. Endorsement: K7VOR as OBS. It is with deep regret that we record the passing of WA7CXP. K7JQJ is training director for the educational classes sponsored by the Old Pueblo Radio Club of Tucson. K7NHL has a new Heathkit SB-401. OBS WA7GOG is QRV 24 hours a day with Official Bulletins and general interest ham news. K7PVD has added a Heath SB-101 transceiver and a kw. Kompact linear amplifier to his station. K7MJD is the proud new owner of an SB-200 linear. The officers of the new Arizona Repeater Association, Inc., are K7YFR, pres.; WA7-EHL, vice-pres.; WA7ERH, secy.; WA7GPX, treas., K7ZZK, club trustee. The club meetings are held the 4th Mon. of each month at the First Federal Savings and Loan Building at 20th St. and 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: K7NHL 290, K7MTZ 33, W7DQS 15, W7FKK 8.

LOS ANGELES—SCM, Donald R. Etheredge, K6-UMV—SEC: K6QPH. Congratulations are in order to W6GYH, WB6BBO, and WB6GGL on earning BPL for Sept. traffic. WA6UIX is now in W1-Land studying at M.I.T. Best wishes to W6PUZ, who has moved to Seattle. Don did an excellent job as both an OO and OVS and will be missed. WB6GHB is looking for groups that are space-communications oriented. WB6UEL is a new member of the Palisades ARC. WA6SNK now has an XYL. WB6HMW is building an ATV station. SG-VRC's secretary, WB6MTA, is moving to W1-Land while LERC ARC's WB6BGF has a new Arizona QTH. Unfortunately two active v.h.f.ers, K6GBQ and WA6-UKM, are now Silent Keys. Summertime found OO W6PCP vacationing at Yellowstone Park. WB6BBO was a speaker at the Antique Wireless Assn. Conference in Michigan. WB6GGL respectfully requests a 36-hour day for his traffic-handling duties. K6ASK is doing some 432-Mc. antenna rearranging. WB6TQS is cutting his teeth on traffic-handling and DX with 75 watts. W6-YRA now has a new keyer. WB6KVA is the proud holder of a 35-w.p.m. Code Proficiency certificate. Congratulations, Greg! W6IBD reports a new five-element 10-meter beam is up and working great. SEC K6QPH reports the following active Emergency Coordinators (ECs) for our section: W6OI, W6LVQ, W6MLZ, WA6-WJT and WB6QMF. A standing invitation to join the AREC and/or traffic nets is extended. Club bulletins are solicited as well as news from individuals and should be sent to K6UMV, c/o address on page 6. Season's Greetings to all. Traffic: (Sept.) W6GYH 1320, WB6BBO 600, WB6GGL 501, W6QAE 339, K6CDW 254, WA6KZI 224, WB6SCK 127, K6ASK 63, W6BHG 61, K6QPH 58, K6BPC 54, W6OEO 52, WB6QMF 44, W6PCP 25, WB6-KGK 19, K6EA 18, W6DQX 17, WB6AEL 13, K6UMV 12, W6DGH 9, W6HUJ 8, W6TN 7, WB6TQS 7, WB6SLG 6, WB6OUD 4, W6YRA 3, W6RCV 1. (Aug.) W6MLZ 36.

ORANGE—SCM, Roy R. Maxson, W6DEY—EC WA6TAG is back in the desert after a short vacation up North. OPS K6GMA's XYL had an operation and is doing FB now. OBS WB6TIF has changed his OBS sked to 3725 on Mon. and 7165 on Wed. at 5:30 P.M. and Sun. on 3790 at 9:30 A.M. local time. SEC W6WRJ visited with WA6YWS in Independence but missed EC WA6-GQJ, in Olancha, as John was having a check-up at the hospital in L.A. WA6OQM hopes to be back on the c.w. nets soon. RM WA6RQF has an s.s.b. generator for the B&W 5100B. ORS WB6UTC has a TCC sked on a trial basis to show the OTs in NTS. WB6TMO is opening up on SCN. K8PWE, of K6MICA, advises they have a TV-1-C Rtty converter and a Clegg 22er with an Ameco TX62 with a Hy-Gain fifteen-element beam for local 2-meter operation in the evenings. EC WB6QAK and Asst. EC WB6RVM and the AREC group are handling communications for the Tustin Tiller Days Parade. W6DEY/W6PJU have a new Swan 350. Traffic: (Sept.) WB6TYZ 350, WB6JFO 192, WA6ROF 152, K6IBI 140, WB6UTC 82, WB6TIF 70, K6MICA 62, K6IME 23, W6-BNX 18, W6WRJ 18, WA6RQK 16, WA6QZA 14, WA6OQM 8, WB6MWL 7, WA6PTU 5. (Aug.) WA6IDN 18.

SAN DIEGO—SCM, Don Stansifer, W6LRU/WA6-VUI—Seven members of the San Diego County ARPSC Two-Meter Net handled communications for the Julian

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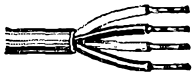

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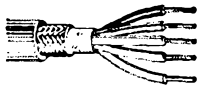

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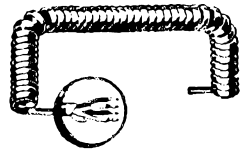

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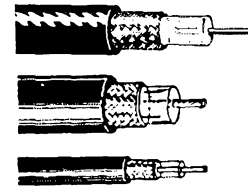

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Apple Days Parade. They were W6BTP, WA6LAG, K6QXN, W6VON, WA6IJO, WA6TJK and K6GAO. The Oct. meeting of the San Diego V.H.F. Club featured films from the Air Force. The Six-Meter ARPSC Nets meet Sun. at 1100, Mon. and Thurs. at 1930, local times, on 50.250 Mc. The Palomar Club meets the last Tue. of each month at 8 P.M. at the South Oceanside School. Visitors are welcome. W6BZE vacationed to Reno and the Mammoth Lakes High Sierra area. WA6SBO showed his European and African slides at the Sept. San Diego DX Club meeting. WB6MSE has returned to college at Cal Poly in Pomona. Congratulations to ex-Director W6QJW, who made the BPL. Seasons Greetings to all from your SCM for the past 14 years and 168 columns in *QST*. Support your new SCM, 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. Call W6LRU for details. Traffic: K6BPI 9352, W6EOT 501, W6VNQ 419, W6BGF 336, W6QJW 217, W6LRU 26, WB6SQZ 19, WB6UMT 8, WB6SLG/6 6, K6CAG 3, WA6ARZ 1.

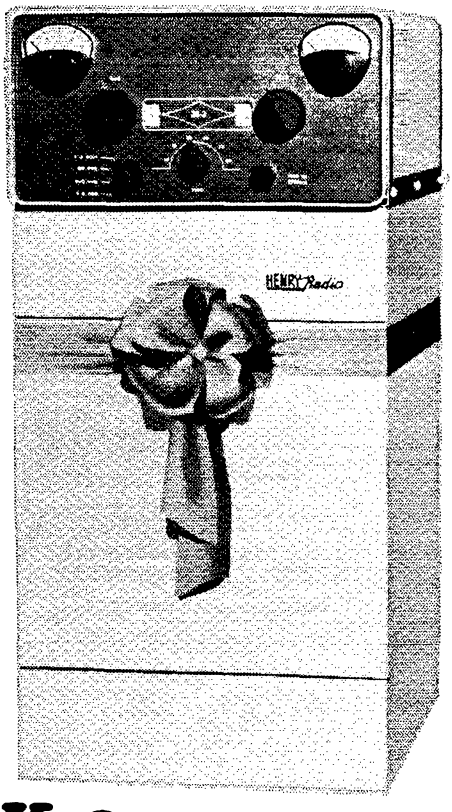
SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—SEC: K6GV. The Estero Radio Club members handled all the communications and public address systems for the Rockarama Parade during the Labor Day week end celebration at Morro Bay. W6JTA was in charge of these activities and this is the fourth year that the Estero ARC has provided its services. As a result of code and theory classes held by the Estero ARC, there are four new Novices in the area with the following calls: WN6YWF, WN6VRZ, WN6WKU and WN6-VKN. The *Key Klix* printed a rumor that W6KZO was through with ham radio. However, he has been checking in again on 3895. WB6DBD is busy with his teletype equipment on MARS frequencies and also is sport'n a new Hi-Gain beam. Our SEC sends along a report and news that the EC for Santa Barbara is W5DTM/6. Sept. at the Ventura County ARC was a special month when the always-successful auction was held. WA6VJP has just passed 5 Novice trainees from the Ventura Co. ARC. Traffic: (Sept.) W6OED 7. (Aug.) WB6DPV 3.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LR. I have tried for many years to remember to wish you a Merry Christmas at this time but for some reason I have failed to do it at the right time. Thanks to W5DYW for reminding me that it is only a short time 'til he must remind 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 Ice Cream Supper recently. K5BIQ presented two films, "The Big Bounce-Project Echo" and "Talking of Tomorrow Communications in the Year 2000," both very interesting films from the library of the Tel. Co. WN5TKG is a new Novice (my boss) as a result of the efforts of the KC Club of Ft. Worth. W5NAJ 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, as I have to get my report in by the 7th. The Arlington ARC reports great success from a rummage sale netting them about $144 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: W5BNH 912, WA5AGH 106, WA5EVS 35, W5PBN 29, W5JSM 11, W5MSG 4, W8GUI/5 3.

OKLAHOMA—SCM, Daniel B. Prater, K5CAY—Asst. SCM: Sam Whitley, W5WAX. SEC: K5ZCJ. RM: W5QMJ. PAM-75: W5PML. I am glad to announce that the new EC for Kay County, WA5OHX, has been elected Kay County Radio Club pres. with W5ZCJ, vice-pres.; and WN5RRJ, secy.-treas. Ron is working with civil defense and county officials to get a RACES and AREC group organized. WA5KZA, Pawnee County EC, is busy organizing an AREC net for the county. WN5SZK is a new Novice in Pawnee. W5DZA is undergoing treatment in Oklahoma City Hospital. K5MBK is back in Lawton after a tour in Vietnam. WA5GVH passed the General Class exam and has a new TR-4 ready to go. WA5JGU also has a new TR-4. W5YJ, Oklahoma State U. amateur radio station, is operating on 2-meter f.m. now. WA5MSD and WA5SDU of Cherokee, have units working Wichita, Kans. and Enid stations on 146.94 Mc. New officers of the Enid Amateur Radio Club are K5CAY, pres.; WA5OUB, vice-pres.; and K5FPU, secy.-treas. Tex 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



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12 students participating. WA5OUJ, at Fort Supply, is on 2 meters with an ARC-3. Sooner Traffic Net: QNI 615, QTC 175. Traffic: K5TEY 1904, WA5IMO 74, WA5KNR 32, WA5NTI 19, W5MFX 17, W5OLB 14, WA5KZA 13, WA5DZP 12, WA5OHX 12, WA5BTQ 9, W5UYQ 9, WA5MDN 7, K5WPP 3.

SOUTHERN TEXAS—SCM, G.D. Jerry Sears, W5-AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. 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 up to 15 inches of rainfall. Many amateurs operated until their antennas went down or their homes were flooded. The list of amateurs participating in this disaster operations still is being compiled. Hurricane Fern caused alarm when she suddenly formed and headed north toward the Galveston/Houston area. The already stricken areas were much 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 W5ABQ reports that K1ERI/5 took the big leap into matrimony in Nov. and says not to expect him on the air for a while. K5MZH has been transfered from c.d. work to the San Antonio Police Intelligence squad. EC W5TFW has a new SW-350 on the air. K5HGB reports for W5AC and requests that you look for them on 160 meters this season. A new OBS is W5ABQ in San Antonio. W5VCE is the new U.H.F. PAM for the Harris County area. The QSL Bureau asks that you please include your *call* and some stamps with your envelope. Traffic: WA5MBC 411, W5BGE 201, K5HZR 169, WA5KQE 165, W5AC 138, W5EZY 99, W5ABQ 93, K2EIU/5 77, W5OP 60, WA5MXY 38, W5AIR 22, K5-HMF 18, W5AQN 15, W5TFW 11, K5WYN 8.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM APSN: VE6ADS. ECs: VE6SA, VE6SS, VE6XC, VE6PL, VE6AFQ. ORSs: VE6BR, VE6ATH, VE6ATG. OPSs: VE6HM, VE6SS, VE6ADS. OOs: VE6HM, VE6TY. OBSs: VE6HM, VE6AIF. It is with regret that we record the following Silent Keys: VE6AA, Frank R. Duval, Lethbridge; VE6OE, James A. Nielson, Medicine Hat; and VE6YZ, Frank Isenor, Calgary. These boys will be missed by many. Our SEC reports now that the holidays are over fall and winter activities will pick up, and plans for some AREC activities are shaping up. Yours truly had a very nice visit from VE2OJ, Quebec SCM, whom I had not seen for twenty-seven years. Some forgot their traffic counts this month. Traffic: VE6HM 43, VE6FK 17, VE6SS 7, VE6FS 6, VE6AOO 4, VE6TY 4, VE6WN 2.

BRITISH COLUMBIA—SCM, H.E. Savage, VE7FB —VE7XW has purchased MV Hemlock and will be renamed appropriately. VE7ARZ has opened a Chicken House in Victoria. VE7BFL visited the U. of S., VE5US, and met many of the gang he talked to whilst at U.B.C. and operated VE7ACS who, by the way, is now VE7UBC. VE7BUV's SB-100 and long wire accounts for that signal. Our RM, VE7BLS, reports that things really are moving on 3650 kc. at 0300Z. VE7AC had to lay off picking apples as W6EY and his XYL, also W6JVA and his XYL, dropped in for a nice visit. VE7BDM has wired the SB-301 and dusted off the DX-20 installed multiband dipole. VE7TT is now active at 100 Mile House. The Vancouver Club's new officers are VE7FB, pres.; VE7APU, secy.; VE7QK, vice-pres. The East Kootenay ARC is preparing its repeater for 2 meters. VE7BXD is our newest blind operator. To the many who have heard *Swap and Shop* read on 3755 kc. by VE7BGJ we report that he is a blind operator. VE7BLO is confined to a wheel chair and is very handicapped. VE7AMW has moved to a new QTH and is building an FB shack. VE7BK has been doing much travelling. Traffic: VE7BHH 150, VE7BFL 104, VE7BLS 44, VE7BQA 21, VE7BUV 19.

MANITOBA—SCM, John Thomas Stacey, VE4JT—The Mid-Continent Hamfest in Winnipeg was sponsored by the gang from VE4UM. Nearly two hundred were in attendance including Canadian Division Director VE3CJ. VE4LG and VE4YJ announced their engagement with wedding bells set for Dec. The building committee at VE4UM consists of VE4HI, VE4CS, VE4EI and Dave Trueman. The UMARS has the RTTY going again and has started code classes. VE4YJ is secy.; VE4XW, operations mgr. and VE4EI, technical mgr. VE4EX reports liaison between the phone net and the Northwestern Ontario Net and reports 22 active on MEPN. The closing date for reports is the fifth of the month and your activity reports would be greatly appreciated. VE4EI took a few days off to visit with

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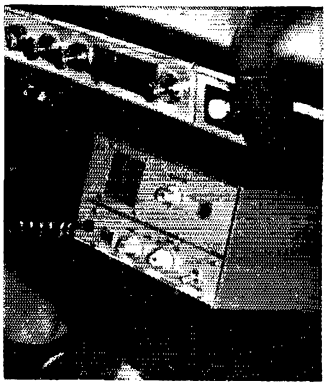

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some of the TEN gang in the Dakotas and Minnesota. Net reports: Phone net sessions 30, QNI 399, QTC 3; c.w. sessions 28, QNI 107, QTC 62. Traffic: (Sept.) VE4JT 53, VE4EI 52, VE4LG 41, VE4NE 23, VE4AP 9, VE4EF 4, VE4FO 4, VE4GN 3, VE4NW 3, VE4DV 2, VE4UM 2, VE4XN 2, VE4YC 2, VE4DQ 1, VE4RV 1. (Aug.) VE4XN 10.

MARITIME—SCM, J. Harley Grimmer, VE1MX—Asst. SCM: R. P. Thorne, VO1EI. SEC: VE1HJ. The 1967-68 executives of the NBARA are VE1YU, pres.; VE1PL, vice-pres.; VE1ASL, secy.; VE1AGE, treas. VE1FN, past-pres. The 1967-68 executives of the NSARA are VE1AAC, pres.; VE1MQ, 1st vice-pres.; VE1LV, 2nd vice-pres.; VE1AKO, secy.-treas.; and registrar for call letter plates, VE1UB. One of the youngest amateurs in this area is VE1AKA, who is 15 years old. He is active on 20 and 40 with a T-150, HRO and all-band vertical. Ex-VE1AOO is now signing VE3DBR from Don Mills, ex-VE1ADH is signing VE3-GFN from Toronto and ex-VE1PV is signing VP1PV. VE1AFB now has fourteen elements on 2 meters and VE1TG has a seven-element 10-meter beam and a five-element 20-meter beam in operation for the big DX contests this winter. VE1AMR was high section scorer in the N. Y. State QSO Party. Memorial University ARAC, VO1GN, again is active following the summer lay-off. VO1DN is back on the air, having dried his gear off after it was soaked when his basement flooded. The 1967-68 ARCON executives are VO1GE, pres.; VO1GI, 1st vice-pres.; VO1IQ, 2nd vice-pres.; VO1BN, secy.: VO1IT, treas. (Thanks SONRA News). APN Sess. 30, QNI 261, QTC 24. Traffic: VE1AMR 21, VE1-ARB 18, VE1AAX 6.

ONTARIO—Acting SCM, Rees Powell, VE3DJK—We have compiled an up-to-date list of provincial clubs and correct addresses of secretaries and bulletin exchange addresses which is available to anyone who asks for it. A questionnaire was sent to all members of the Ontario Phone Net asking for advice and assistance regarding the net. Response was terrific and a great help in making some plans for improvement. Anyone who belongs to a traffic net in Ontario and has any good ideas regarding the correlating of our traffic nets into, inside and out of Ontario, please drop me a line outlining your ideas to improve Ontario traffic-handling procedures. VE3BBQ is on 80-meter s.s.b. VE3BDX reports that VE3SH is back on 2 meters along with VE3CRA and VE3FUH. Ottawa's f.m. repeater VE2-CRA, 146.46 in 146.94 out, is very active. VE3CUA worked K7WIA and double E July 14 for 43 states on 6. VE3BBQ has produced a solid state product detector to plug into the 6H6 socket of a second detector. The S.S.B. Dinner in Toronto was a huge success and VE3GH needs a tilt of the beam for bringing so many active hams together under such nice conditions. VE3-FRB used his mobile to help save a life in calling for Provincial Police at an accident scene on the way home. VE3GI is set up on the Ottawa repeater and VE3BUR has a new long-wire antenna and HT-46. VE3AFA says he is there but listening. VE3BUX, VE3-BSY, VE3FPJ and VE3DU are running for SCM. Traffic: VE3DBG 116, VE3DVE 111, VE3BBQ 103, VE3ATI 76, VE3GCE 73, VE3EBH 62, VE3GI 49, VE3AWE 37, VE3-BUR 14, VE3AUU 10, VE3DH 7. (July) VE3BBQ 17, VE3DH 4, VE3VD 2.

QUEBEC—SCM, J.W. Ibey, VE2OJ—SEC: VE2-ALE. RM: VE2DR. PAMs: VE2BWL and VE2AGQ. VE2ADE reports that the repeater VE2RM atop Mount Rigaud is now ready to accept any kind of emergency traffic. EC VE2AJD, Trois Rivieres, sent an excellent traffic report. VE2BJG and VE2DAE are very good traffic prospects in the Trois Rivieres area and from the Nicolet area Pere Robert reports that they now have daily stand-by on 144, 146 and 3.750 Mc. VE2BVV planned the VE2MO meeting in Trois Rivieres when the RAQI directors were guests for their regional meeting. VE2BBY, Lennoxville, reports that the Sherbrooke Amateur Radio Club is well away for the new season and has VE2BLY as pres. and VE2DFI as secy.-treas. The MARC got itself away to a new season in Sept. with a very informative talk by Canadian Vice-Director VE2BK and a report on Field Day by VE2AGQ. During a Sept. vacation which took us coast to coast we had the pleasure of making many new amateur friends and renewing many very old-time acquaintances. The Simulated Emergency Test will be held Jan. 27-28, 1968. There is an appointment in the ARRL field group to suit every taste. Let us know your interest and you will receive an application pronto. VE2DCW made the BPL during the summer months. Traffic: VE2BRD 63, VE2DR 54, VE2PJ 54, VE2BVY 44, VE2UN 42, VE2OJ 36, VE2BWL 35, VE2AJD 34, VE2ALE 19, VE2EC 18, VE2BGJ 15, VE2CP 13, VE2WM 12, VE2XPO 11, VE2-BBY 10, VE2ADE 8, VE2DCW 8, VE2BYS 4.

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- W2AU Super Vinyl jacketed 2 element 10-15-20 meter quad. Complete quad **$64.95**
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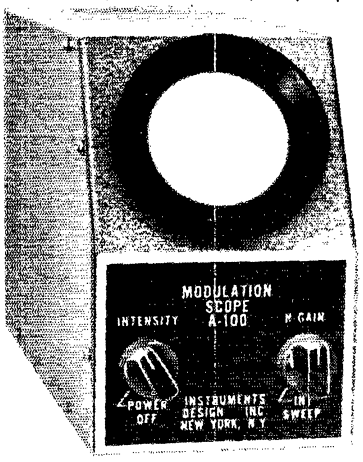

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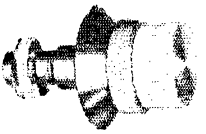

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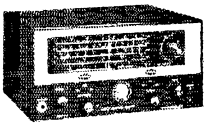

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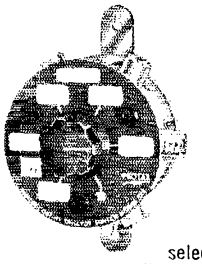
Covers .54 MHz through 54 MHz in 5 continuous bands. Includes standard broadcast, all foreign broadcast, all amateur bands through 6 meters, all 27 MHz CB channels, all 2-way radio frequencies from 30 to 50 MHz including police and fire departments. Fully transistorized • AC and portable (optional) • Noise limiter • Band spread • Includes BFO.

$64.95 kit, $79.95 wired



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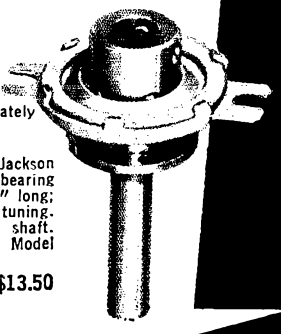

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WEFAX Satellite

(*Continued from page 94*)

into the antenna line for the desired frequency.

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Complete the WEFAX Monthly Evaluation Report.

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All amateur stations having APT reception capabilities may participate in the experiments. Further information may be obtained by writing:

WEFAX Coordinator
Code 733
NASA, Goddard Space Flight Center
Greenbelt, Maryland 20771

An Unusual Story

(*Continued from page 68*)

"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 relighted 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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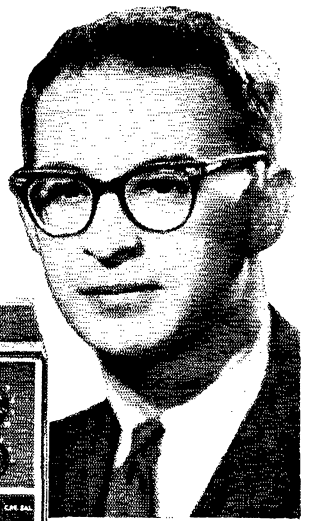
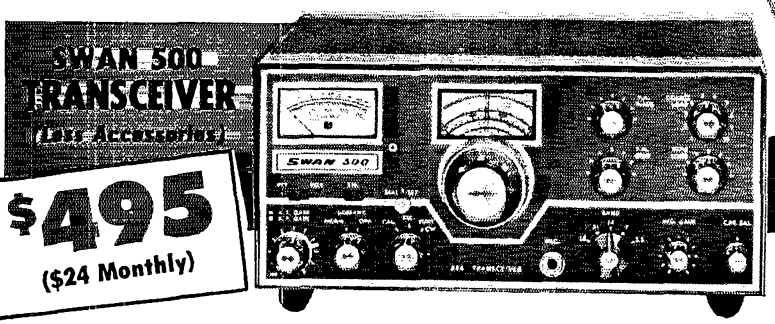


Larry Meyerson
WØWOX



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- Rated at 480 watts SSB, 360 watts CW, 125 watts AM.
- Selectible SB • ANL
- Calibrator

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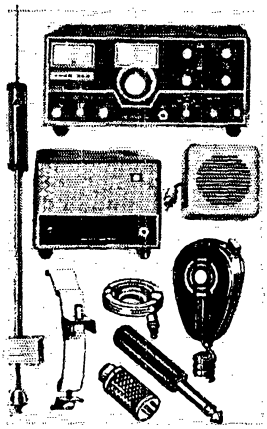

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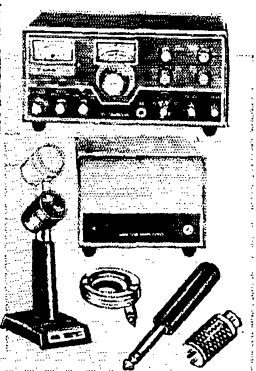

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A.R.P.S.C.

(Continued from page 71)

1RN. He knows that W1EEN will show up to take any traffic for ARRL. His New Haven outlet is W1KUO, his Bridgeport outlet W1RFJ, his New London outlet W1OBR; 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 M minute and time for the net to begin. WA1HSN gives with the net call-up, and stations start reporting in; but only those with traffic, and the "irregulars." Not W1EFW, W1EEN, W1KUO, W1RFJ or W1OBR. 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 and complying with 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 what 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 knowing it, could contritely 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," "yo!" 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. — *W1NJM.*

September Reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
EAN	30	1571	1.266	52.4	99.4
CAN	30	1222	.964	40.7	100
PAN	30	1177	.871	39.2	99.7
1RN	60	406	.327	6.8	91.9
2RN	57	430	.626	7.1	91.6
3RN	60	578	.457	9.6	99.2
4RN	53	399	.332	7.5	82.8
RN5	60	643	.344	10.7	90.9
RN6	60	1256	.750	27.8	100

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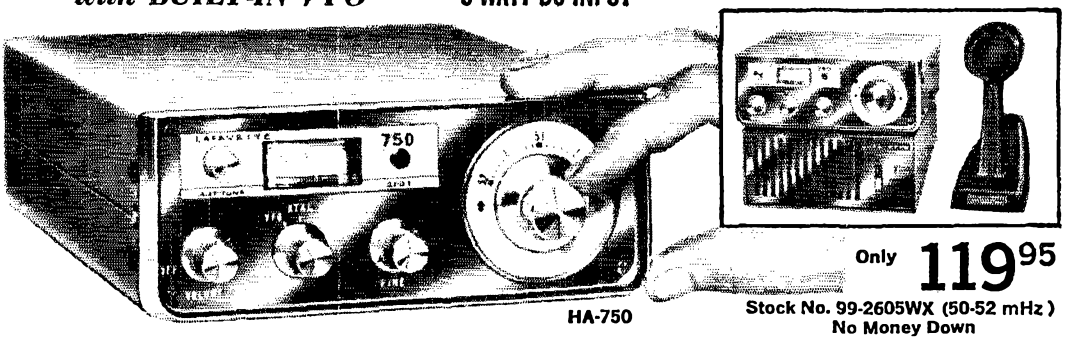

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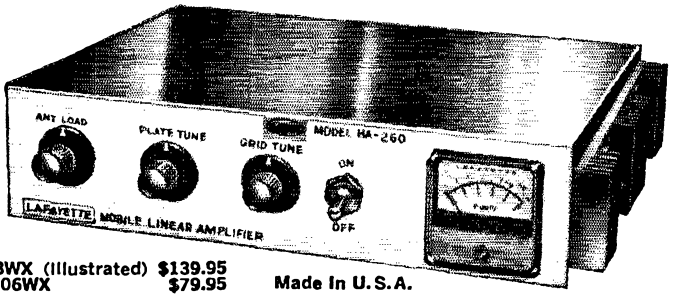

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9RN	60	457	.442	7.6	93.3
TEN	60	661	.490	11.0	76.2
ECN	29	100	.216	3.5	64.5[1]
TWN	26	190	.312	7.3	56.0[1]
Sections[2]	2148	15587		5.7	
TCC Eastern	130[3]	719			
TCC Central	90[3]	486			
TCC Pacific	120[3]	755			
Summary	2866	27,764	EAN	14.2	78.8
Record	2655	25,042	1.231	15.4	—

[1] Region net representation based on one session per day.

[2] Section and Local nets reporting (71): AENB, D, H, M, O, P, R, S, T (Ala.); ARSN, OZK (Ark.); NCN SCN (Cal.); HNN (Colo.); CPN (Conn.); FMTN, GN, QFN (Fla.); GSN (Ga.); QIN (Ind.); ILN (Ill.); Iowa 75; FCATN, KRN, KTN (Ky.); LAN (La.); PTN (Me.); MDD, MDDS, MEPN, Termite (Md.-Del.); WMN (Mass.); M6MTN (Mich.); MJN, MSN, MSPN (Minn.); MNN, MTTN, PHD (Mo.); NLI, NLIVHF, NLS, NYS (N.Y.); NCN, NCSB, THEN (N.C.); OSSB (Ohio); OPEN, STN (Okla.); EPA, EPEN, PFN, PTTN, VHFTN, WPA (Pa.); RISPN (R.I.); SCN (S.C.); NTTN (Tex.); BUN (Utah); VTNH (Vt.-N.H.); VN, VSBN, VSN (Va.); WSN (Wash.); WVN, WVPN (W.Va.); BEN, WSBN (Wis.); APSN (Alta.); BCEN (B.C.); RPQ (Ont.-Que.).

[3] TCC functions performed not counted as sessions.

K2KIR reports a lot of traffic at the beginning of the month because of the Ohio and New York State fairs. W9DYG sez a good month for CAN, considering all that happened; within ten days, three NCS positions had to be filled and W9DYG QNGed seven times but all spots are now filled. K7JHA notes the second session representation is very low and he is considering movement of the 0415Z session to a time prior to the Section net sessions. W8CHT comments that 8RN has the best roster ever lined up and he can even afford to be choosey. W9QLW wants to know why stations QNI 9RN QRU and then report into CAN with QTC 7. The liaison between the Local and Section nets has improved greatly. WØLGG is very pleased to have WAØDOU on the NCS roster because of his fine capabilities and potent signal.

Transcontinental Corps: W3EML sez that for the first time since he has been TCC Director, there is a Canadian station (VE2UN) working in the Eastern TCC; the excellent RTTY facilities at VE2UN might develop into a PAN/CAN RTTY function.

September TCC reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	130	80.0	1995	719
Central	90	81.2	1065	486
Pacific	120	87.6	1547	755
Summary	340	82.9	4607	1960

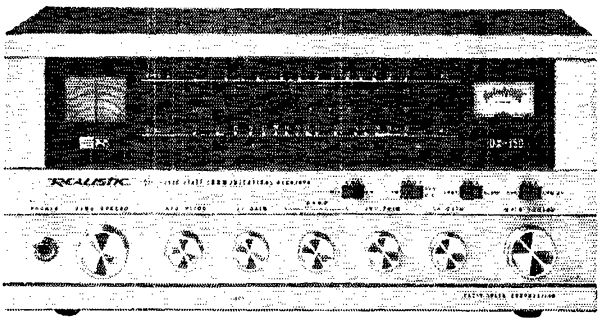
Sep. TCC roster: Eastern Area (W3EML, Dir.) *W1s* BJG EFW NJM, *W2s* GKZ SEI, *K2s* KIR KTK RYH SSX/8, *WA2s* BLV UPC UWA, *WB2s* RKK UHZ, *W3s* EML NEM, K3MVO, *W4s* DVT NLC ZM, *W8s* CHT ICH, K8KMQ, *WA8s* CFJ OCG, VE2UN. Central Area (W9JUK, Dir.) W4OGG, K4BSS/4, WA4WWT, WB4AIN/4, W5KRX, *W9s* CXY DYG JUK QLW VAY YT, WA9NPB, WØLCX. *KØs* AEM YBD, *WAØs* FKD LAW MLE SOC. Pacific Area (W7DZX, Dir.) *W6s* BGF EOI EOT HC IDY IPW TYM VNQ, *K6s* IBI LRN, *WA6s* BRG ROF, WB6HVA, *W7s* AAF DZX HMA ZIW.

—•••—

Other Net Reports

Net	*Sessions*	*Check-ins*	*Traffic*
Clearing House	21	233	167
Mike Farad	52	370	257
New England Teenage	30	369	94
Hit and Bounce	30	396	716
North American	26	516	683
7290	56	2316	1529
75 Interstate	30	1176	617
20 Interstate	20	312	3130
QTC	21	357	314
Eastern Area Traffic	30	422	303

QST



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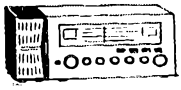

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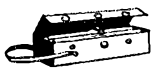

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DXCC Listing

(*Continued from page 104*)

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VE6PL	KR6DB	ZL2BAH	W1WX	JA1TIH	WA2WV-	WA4EII
VE7ACS	LA4VG	ZS6XP	W2GWT	JA7KW	V/KL7	WA4FFW
VP9EU	MP4TBO	5Z4IR	W2JLX	JA8JL	LU1AD	WA4JTI
WA1EJN	OH1VL	9M2JJ	W2PHT	K1AFC	LU3DSI	WA4LDC
W2GTF	OH2LO		WA2BHO	K1CBV	OE1SQ	WA4SRS
WA2BVU	OK1AFN		WA2OIL	K1EUS	OE3HOW	WA4SSM
WB2MWU	OK1IJ		WA2RED	K1FNU	OE3SBW	WA4TJM
WB2RIR	OK1JD	**101**	WA2TIF	K1IIK	OE8RT	WA4UOE
WB2RKH	OK3JV	CP5AQ	WB2MTM	K1IJV	OK1AJM	WB4BUQ
W3BWZ	PAØMIB	DJ2OEC	WB2NZH	K1JMH	OK2KZC	W5IRG
W4DJT	SM5CON	DJ4BE	WB2VCC	K1NIJ	OK3CAU	WA5AET
W4MOJ	SM7CPL	DJ4PX	W3CAU	K1OGA	OZ4CF	WA5BFB
WA4TTY	SM7DQC	DJ6OM	WA3BHB	K1SGU	PAØPAH	WA5EAM
W6KGP	SP9RB	DJ6TR	WA3FGS	K1SWG	SM4CPW	WA5LMG
WA6GCP	UA4KNA	DJ6TU	W4ROC	K9CVO/1	SM5BPZ	WA5OCN
WA6SII	UA4ZA	DJ8SI	WA4MCV	K2BKU	SP5YL	W6QFU
WA7EDB	UA9MR	DM2ADC	WA4QPV	K2BYX	TF2WBZ	WA6SZW
W8MRS	UD6GF	DM3YPE	WA4SGF	K2MYR	UA1TL	WA6THG
WA8GYX	VO1AQ	DM4WPL	W6KHS	K2PKH	UA3BK	WB6KIL
WA8MVR	W1BUB	F5CH	WA6HAE	K2PZF	UA3BS	WB6QWJ
W9FNX	W1DAY	F9CZ	WB6GFJ	K2YEK	UW3BX	W7AST
W9OYZ	W1DYT	G3FLS	WB6MLG	K3AOH	UW3CS	W7KOI
WA9DJO	WA1ANR	G3OZP	WB6OXR	K3FQR	UA4LN	W7SFF
WA9NKN	W7UXP/1	HB9ZE	W8GKX	K3KMO	UA4NE	W8AFN
WA9OTH	W2KJR	JA6PN	W8WVE	K3MUB	UAØEK	W8FDC
	W2QIS	JAØAZE	WA8FKY	K3SMN	UP2UK	W8FMG
	WA2CCF	K1NEI	WA8GDR	K3SWU	UT5CJ	W8HNP
102	WA2JMW	K1PMJ	WA8HXR	K3WNL	VE2BGJ	W8KVF
CR4BB	WB2BOM	K2HWF	WA9AZL	K3ZVM	VE3CCB	W8LAU
DJ2RT	WB2JOX	K3NWD	WA9DBS	K4ADK	VE3FXR	W8OUU
DJ4GA	WB2MRA	K3OIO	WA9GXL	K4BP	VQ9BC	W8PYN
DJ5YQ	WB2SQN	K3ZMH	WA9HJM	K4ILW	VS9AMD	WA8FIO
DJ6MH	WB2NDS	K4ARO	WØBVV	K4KSB	W1AGP	WA8NQC
DL1TI	W3BZN	K5IXH	WØEXS	K4RBZ	W1CT	WA8QXC
DL3JR	W3DBT	K6YUI	WAØHMP	K4UTI	W1DMD	WA8RXU
DL3WC	W3ZNH	K7AHO	YO5KAU	K4VZI	W1EZM	W9CRW
DL4LG	W4PED	K7ZKH	YO8KGA	K5WIM	W1HTE	W9HDR
DL6CT	W4RJL	K8UZX	YU1PCF	K6AAW	W1KVI	W9HTF
DL9EZ	W4TMR	K8VYY	3A2BT	K6BAG	W1YCH	W9JCV
DM2AMM	W4WWG	K9GCE		K6CAA	WA1CYT	W9MG
DM2BYN	WA4ECY	K9IHG		K6MVJ	W2KFB	W9OGY
G3RDE	WB4BKV	KR6UD	**100**	K6OZV	W2YWO	W9SCD
G3RFN	W5JTB	LA3HI	AP2AR	K7IIU/6	WA2ARM	WA9BGK
G3SVH	WA5CXT	LA9EG	CT1OI	K7AGJ	WA2IOG	WA9GYZ
G8LC	W6MTJ	OE1KRW	CT1UT	K7ANY	WA2WLN	WA9IAT
HA1SB	WB6EUZ	OE6SWG	DJ6KA	K7HRW	WA2YYJ	WA9JOQ
HA1VA	WB6PGK	OK2KGV	DJ6SL	K7INQ	WB2BYF	WA9LMY
HA7PG	W7GGG	OZ1IF	DJ9NI	K8ABD	WB2NZU	WA9MMT
HB9AGO	W7HO	PE2EVO	DL5FL	K8EJN	WB2PMP	WØCRY
HB9AHF	WA7ARU	PY1BQO	DL6VP	K8LSK	WB2QGB	WØDCP
HM2BD	W8IWF	PY1BYK	DM2ANN	K8NG	WB2QJI	WØIEM
JA1NLX	W8TJQ	SP6SO	EL2D	K8POJ	WB2SBN	WØPJB
JA7FC	W8VQM	UA1UD	F2ZE	K8TBR	W3JXS	WØRRS
JA8SW	WA8ECE	UW3EH	F7DQ	K8VRF	W3KHW	WØYI
K1QWK	W9CGC	UA6KAE	G3EFC	K8WUT	W3NNL	WAØBGU
K1SOP	W9HVP	UW9CE	G3LNO	K9GCM	W3WXO	WAØBSZ
K2HCU	W9MFW	UB5IU	G3MWP	K9IIV	W4AMP	WAØGFW
K2SIG	W9RMQ	UR2IP	G3OLN	K9JKO	W4DMT	WAØMLD
K3AFO	W9VCQ	VE3BII	G3RWF	K9WMM	W4KA	YO3UA
K4BE	W9YXX	VE3ETB	GM5AFF	K9YHB	W4LXA	YO8DD
K4CGK	WA9LGC	VE6AKV	HA3MJ	KØGML	W4OHP	YU3JS
K4DGL	W9SEA	W1ALT	HAØHH	KØIIR	W4WRH	YU3NP
K4KZZ	WØSEA	W1AYR	HB9ADM	KG6IG	WA4BNI	YV5BZH/6
K9AGT	WAØIBJ	W1MBX	HB9PQ	KG6AIU	WA4CJV	6O6BW

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328	**321**	**316**	YV5AB	W8PUD	**302**	W5TIZ
G5VT	K6LAS	W9ILW	ZS6UR		K8ONV	W7ADS
W3KT	W3MAC			**307**	W7CMO	W8NGO
	W3NKM	**315**	**310**	K6EVR	YV5AFF	W9LNM
327	W4SKO	K9ECE	K1IXG	W2CKY	YV5BPJ	W9JYJ
VE7ZM	W5KBU	W8DMD	K9KYF	WA2RAU		W9UZC
	W9RNX		W1CLX	W6REH	**301**	ZS6LW
326		**313**	W2WZ		DJ2BW	
W2OKM	**320**	W1MMV	W4OM	**306**	W1JYH	**299**
W8QJR	HB9J	ZS6Q	W6ZJY	OZ7FG	W1ZW	I1UA
	W2RGV		W9NZM		W6NJU	K6CYG
325	W2PTE		ZL1KG	**305**	W9BMQ	UA2AO
W4ANE	W8JIN	**312**		CR6BX	YV5AIP	VK2JZ
	W8UAS	K2MGE	**309**	W6HYG		W1HX
323		GI3IVJ	K6LGF		**300**	W2FGD
W2BQM	**319**	W2EXH	ON4DH	**304**	G3HDA	W2GQN
W9YSX	W2FXN		PAØFX	W4RLS	K4HYL	WB2FSW
		311	WA2IZS		K6HZP	W3DJZ
322	**318**	G6TA	W4PAA	**303**	W2BOK	W4FPS
G3DO	DL7BA	K4HEF	W5IYU	EA7ID	W2MES	W4SSU
PAØHBO	VE3QA	PY4CB		G3FXB	W2ODO	**298**
W2GLF	W5PQA	SM3BIZ	**308**	W2WMG	W2PTM	K5JEA
ZL1HY	ZP5CF	W4EEE	K9LUI	W6MBD	W4AZD	W1UOP
		W5AFX	W4NJF		W5LZW	W2ZTV

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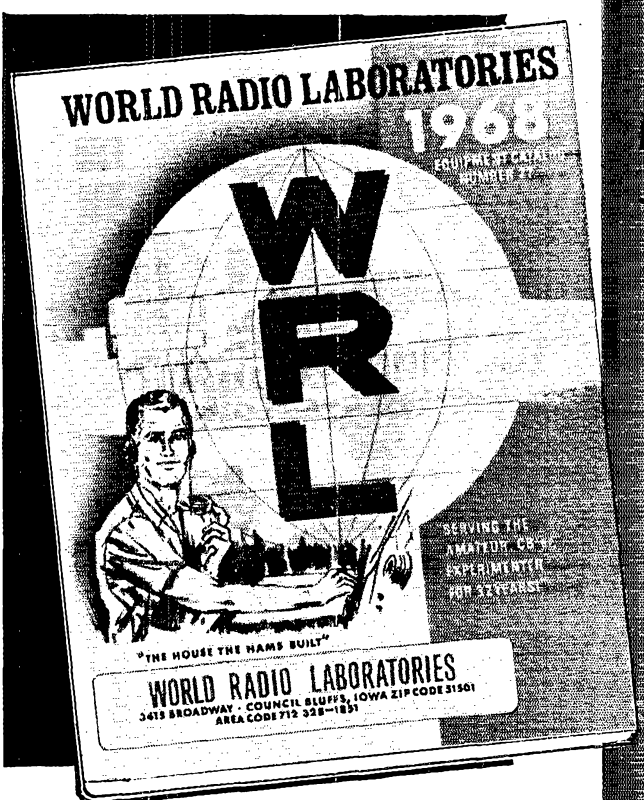

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297
DL1KB K2BZT K8VUR KP4CL WIFZ WA6EYP WA8AJI

296
WA5EFL

295
DJ7ZG

294
WA2SFP

291
K1SHN W9SFR

290
F2MO GI3JIM W2TQR W6WX

289
K6EXO TG9AD W4HA

288
W1YDO W7QPK

287
KØUKN

286
EA2CQ

285
I1CQD W1BIH W2CGX W6BSY WA6SBO W9HB

284
KH6OR WA2EOQ W4MS W6QOG ZP5ET

283
CT1PK I1CTE K8LSG WB2EPG W5ABY W6VUW W8BQH ZS6BBP

282
K4AJ K6ERV VE2WY WA2ELS W3CGS W4UWC W6KTE W7DLR

281
EA1GH K6VVA W1ORV W2GNQ

280
DL3RK DL7AA F3DJ I1KDB K1JMV K4TWF K6ENX K7GCM LA7Y

W1DGJ W1GKK W2CZF W2NUT W4CWV W4HUE W5NMA W6YMV W8BGU

279
PY4KL W2FXE W2IOT W4VMS W6CHV W6LDA W8IJZ WØLIL XE1CE ZS6YQ

278
I1PP PY2PC W1BHP WB2HXD W3VSU W4SHP W8CUT W9GMY

277
K2YLM OA4PD W1WQC W2GKZ W4PJG W5IPH WØQUU

276
W9JT

274
W9TKD

273
K5AWR W8JBI

272
W4EEU W5JWM

271
I1RIF W3YZI W4AXE YV5BBU

270
LA5YE W5KC W7GUV WØPGI

269
VE3ACD W4HKJ W6EUF W6KUT

268
DL7HU JA1DM

267
K8IKB

266
OE1FF VE2NV W8WT

265
DL1JW K1IMP W8ARH

264
DL7EN W3GRS WØNVZ

263
K4ASU

262
I1AA

IT1TAI W2CYX

261
K6CCY PAØSNG SM5CZY VE3WT W8ONA YV5BFT

260
I1BAF PY7YS VE4OX W2LEC W3AYD W3BSC W3BVL W8CUO ZL3NS

259
EA4GZ EP3AM K5GOT OA4KY SM5RK

258
W1CJK W2JLH K3YBR KØOYQ ZL3OY

257
K9PPX KØMAS WA2HOK W4DLG

256
I1ZJG K4CAH SM5WJ

255
W1BPY

254
OZ3Y

253
K1DPI SM6CAS

252
K6OHJ K9LKA

251
K4BVQ VE2ANK W8SZS

250
9M2DQ

249
K8OHG W3NIG

248
W7BTH

247
K6YRA W8NVP W8QNW

246
DJ5LA JA3UI W4AVY W6NWZ

245
EA2CA OY7ML WA4WAO

244
K2JFV VE3ES W5ENE WØQLX

243
K6EC

K8VDV VE6TP W2GRY W2LKW W4QBK WA6KNE

242
DJ3CP HK3LX PY2CYK SM5HK VE1AFY W2GBC W2JSX W4BYU W8GMF

241
PAØGMU K1IDW K3HHY W1HJB W3AEV WA4GCS WØQGI

240
G3WW K1UDP K2KER K8AXG KØOYQ LU9DAH OE2EGL OK1MP SMØATN W2GHK WA2WVL W4EFX W4NI WA4JOS W9HP

239
G2BOZ G3AAE HB9NU I1ZPB K8AJK PY3AHJ W1FAB W1SXQ W2CES W2FXA W3BBL W4EEO WA6FPB W9DNE

238
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237
F8SK K1EJO

236
HK3AFB W2UTH

235
G3HSR WA3ATP W9EGQ

234
K6SOK W2SUC

233
GM3CIX W6ABA W9CPD

232
G4JZ WØBFB

231
VE3EUU

W8HDB ZS5PG

230
K2OEA K4ET W2JAE WB6GOV

229
K4FTZ WA6ZIQ

228
W4GRP

227
I1SCA OZ3SK WA5DAJ WA9NUQ

226
DL7FT VE6SF W1RO WAØKDI

225
W4FRO W8NXF W9CPM WØHX

224
DL3AA W5ERY

223
IT1GAI VE1WL W7DQM W8WC

222
DJ5VQ K4YYL SM5BPJ W2YTH W3OBD W4BXG WA8OJI W9RKJ

221
DJ1ZG I1RCD SM5RY WA2OJD W4TUC W5HTY

220
DJ5AA F8CW FG7XL G3BID HK4EB JA6AD VE2BCT W2SNI W5OPL WA5IEV WA5KBK W6EPZ W6GPB W6USG W8ACT WØNCG ZL3MN

219
JA1ADN K2ISP VE3RE WØIJM

218
HB9AHA K3UZY W3PN WØSFU

217
K1HVV WA2VOH

WA6MWG

216
W7WLL W9QQN YV2CJ

215
K1OLT K9JJR OX3JV PAØEEM

213
K1ZSI K4WMB

212
W6TGB

211
K2JMY ON5PD VE5LM W4JVU WA6QWN

210
K9WTS W7MKI XE1SN W8GUZ ZL4BO

209
JA2JW K3MVP W6TXL W8JFD

208
I1EVK K5DFZ W1JWX W2RBK W4ASW W9GXH

207
CX3BH K4IEP OH1TM ON4BX W2MVR W3DRD W9JUV

206
DJ2YL DJ4TZ VE6ABP W4NML W9ZTD

205
DJ8CB K3HQJ W7MSC

204
JA2ADH K7CHT W1KID W2MM W5DNL WØLBB XE2YP

203
G4JW K1BDP SM6VR SM7ACB VE3AAZ WB2MFX W5RDA W9HPS W9KXK

202
CX2CN DL6PC HB9FE I1ANE I1TRA K2IEG K4GXO K4PQV K4ZJF W4PLL

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199
KØBUR PY2QT W2MOF WB2NIC W4ELB W4JDR W4NBV W4TRG W5AJY

198
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197
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196
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VK2ADE W1SEB W7AUS

194
WA8HFN

193
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191
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189
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188
G6RH WB2HZG W6CLS W7OEV

187
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OE1PC
W1FJJ
XE2WH

186
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W1OHJ

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VE2AFC
VE2JC
W9WYB

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W5WLD
4X4TP

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XE1NI

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VE3EVU
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WB2IEC
W3NM
WA3BYS
W4HOS
W4WR
W5LDH
WB6AJH
W7JWE
W8CFG
W8FOV
W9PUY
WA9PQE
ZL3RP

139
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KH6
KW6EJ
TG9GZ
VE3BLD
W1EJE
W2CNQ
W2EYB
W4BHG
W4ETO

XW8AX

138
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WA4IRR

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YV3CN

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XW8AZ
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6W8AE

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K4WJT
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OH3NY
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5A4TK

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WB4BDO
WA6WXP
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WA4ZLP
W5PTG
WB6EFA

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VE3DDX
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JA6BZI
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LU2CF
VE7JF
WA4GUZ
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W7AS
W8OAR
YV1LA
6Y5DM

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PY2DSC
SM5YV
UA9EU
YV6BR
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LA7WI
UA1IG
W1AA
WB2HIZ
WB2RHX
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WA4HTR
W6PGM
WB6AKZ
W9QKC

109	YV7AV	DJ3GY	W4LXL	W6EHV	W5NQR	SM5BPZ
EI4AN		DJ8BQ	W4WSF	W6KWU	WA6HAE	VE8AA
JA1ALX	**106**	DL8LH	WA4GDP	WB6URS	WA6RTA	VK3SM
K4GRD	DJ6NE	HK3SO	WA4LMD	W7HO	W8ZVL/-	WA1CXE
K5OLJ	DJ9QO	I1BBR	WA4MDA	W7RPH	6	W2PBZ
K8GQG	DL6ZT	I1PAI	WA4WLX	WA8GRO	W7LEB	WA2CCF
OE1WP	F2VX	I1PIE	W6ZGZ	W9UX	W8PQD	WA2LMW
OK3KAB	F8SA	IS1TDW	WB6ABL	YV1KZ	W9PVZ	WA2RUB
VK3KB	I1APV	K1QMV	WB6OYM		WA9MOB	WA2WFI
W2DY	K4UOQ	K1ZQL	W7REZ		ZD8JC	WB2ICS
WB2QKT	K5DZV	K4MKI	W8IBX	**101**		WB2OBO
WB6FCR	K9TXZ	K5TOK	WA8MQP	CR7FM		W4AVL
WB6LQR	KG6SB	OE1IU	W9GFF	CT1AMW	**100**	W4BCB
W7WS	VQ8AR	VE3LZ	WA9BVX	DJ6FN	CN8AQ	WA4BRW
YA5RG	WB2PPP	VP7DR	W9JWD	DJ9XA	CP5AD	WA4CQN
	W5LXX	W3ZPO	YV5CHO	DL3LS	CR4BC	WA4OQO
108	W6UQU	W4HVD	ZS6AUZ	F7CK	DJ6OK	WA4RQD
DJ1YL	WA6HKG	W6OMR	9K2AN	G3NXB	DJ6VH	WA4SWW
DJ8YQ	WB6JRL	WB6RMZ		G3PFE	DL2AH	WA4TLI
HA5AM	W8TWA	W8WAH		HB9VJ	DL3RE	WB4BKV
K1ZUP	WA8LYJ	W9HGA	**102**	HK3AUE	DL6XV	WA3APO
K5JCC	W0CQT	W0LHP	AP2MI	I1ERE	DL9DE	/4
K6SVQ	XE1XS	WA0IHQ	CT1NL	I1MY	DL9XR	W6MR-
K9PQG	ZE1BP	5R8AK	DJ4ZD	I1WL	F2QM	U/4
OZ5GT			DJ9MW	K3FNW	F5SJ	W5DRQ
UA3CT	**105**		HC6GM	K4BWZ	G3RHM	W5HUM
WA1BQS	DJ2MV	**103**	HM2BD	K4DJW	G3SVH	W5MIR
W2EYJ	HK5ACI	CE6EW	I1POB	K5AAD	G5ABA	WA5CST
WB2VEG	I1FBI	DJ8OT	JA8NU	K7UXS	HK3AJV	WA5NQJ
WA4ICB	I1TRV	DM2AEC	K1HBM	K8YRN	HK5DE	W6KOE
WA4UHK	K2MVW	F2EX	K2DJD	K9VLE	K2HLK	W6ORC
WB6ADY	K6YUI	F2RK	K3CBW	KØHUU	K2HWB	WB6POP
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	KR6DB	K2CHS	KH6FRO	KH6FQB	K2PZF	W7HLH
107	KZ5AG	K2HPZ	KP4COX	LA4VG	K3ZNS	W7UTL
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DJ9WA	UA4CZ	LU2FAO	SV0WG	VE3DVT	K4THA	W7ZPV
HR1KS	W1LEL	OE2UE	TI2KR	VE6AET	K5YBB	W8GHN
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JA4ZA	W4WHP	SM5ZO	VE6PL	VS9AWR	K7TCL	WA8PKG
JA7BSD	W6CUF	UA1CX	W1DHL	W1DAY	K7ZKH	WA8RSL
K2MPS	WB6CCV	UA1ZF	WA1BJY	W1MX	K8QYA	W9CCK
K3TRZ	WB6CGA	VE3FCR	W2ORA	K6HWC/-	K8TBQ	W9FPM
K3ZCA	K7IIU/6	VE6ABR	WA2YFB	1	K8ZNC	W9OFO
K9YWY	W7KOI	VP2AA	WB2QKG	W2QIS	K9AXS	WA9NKN
KX6DR	W8CEM	W1EED	W3ABT	W2UFT	K9FVR	WA9PZU
OK3DG	W8JSU	W1HQV	W3GVD	WB2FBN	W6IBU/	WA6HMP
PY2OY	W9MZP	W1MP	W4DFK	WB2KTO	KG6	XE1BC
W2SJM	WØRRW	W2ONK	W4MLF	WB2RKH	KR6MF	W2ZIA/-
WA5RQA	ZP5IT	W2ZGB	W4QBY	W3FWI	KX6BW	ZK1
W6OSU		WB2VZW	W4TZT	W4RMT	OA4EE	ZS6XP
WB6UJO	**104**	WA3BHY	W5YKF	W4ZDK	OA4PI	3C5FO
W8LXU	DJ1VY	W4FPQ	WA5KBJ	WA4EKF	PAØPOB	9M2JJ

Headquarters Visits

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:30, on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U. S. 5, the Wilbur Cross Highway. (For W1AW visiting hours, see the schedule on page 100).

Grounds

(Continued from page 26)

If the building is wired according the National Wiring Code one side of the a.c. line *and* the metal receptacle boxes are at ground potential. It is an easy matter to check the metal boxes by removing the receptacle cover and to see if there is a connection from the a.c. wiring.

If you have a volt meter, you can use it to determine whether the water pipes are at ground potential. Set the meter on the a.c. scale that will read 117 volts, connect one lead to the water pipe and touch the other lead to either of a.c. outlet holes. If one side reads 117 volts you can safely assume that the water system is grounded. The other side shouldn't read anything because, as we mentioned earlier, this is the neutral or ground side of the a.c. line.

(Continued on page 160)

(*Continued from page 158*)

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.

QST

I.A.R.U. News

(*Continued from page 77*)

Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands Antilles: VERONA, P.O. Box 383, Willemstad, Curacao
New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington
Nicaragua: C.R.E.N. QSL Bureau, Box 925, Managua
Nigeria: NARS QSL Bureau P.O. Box 2873 Lagos
Northern Ireland: via Great Britain
Northern Rhodesia: see Zambia
Norway: N.R.R.L., P.O. Box 898, Oslo Sentrum, Oslo 1
Nyasaland: see Malawi
Okinawa: O.A.R.C., APO, San Francisco, Calif. 96331
East Pakistan: Mohd, AP5CP, Tiger Amateur Radio Club Dacca Signals, Dacca 6
West Pakistan: Ahmed Ebrahim, AP2AD, P.O. Box 65, Lahore
Panama, Republic of: L.P.R.A., P.O. Box 9A-175 Panama 9-A
Papua: VK9 QSL Officer, P.O. Box 204, Port Moresby (or via Australia)
Paraguay: R.C.P., P.O. Box 512, Asuncion
Peru: R.C.P. Box 538, Lima
Philippine Islands: P.A.R.A. QSL Bureau, P.O. Box 4083, Manila

(*Continued on page 162*)

(Continued from page 160)

Poland: PZK QSL Bureau, P.O. Box 320, Warsaw 1
Portugal: R.E.P., Rua de D. Pedro V., 7-4°, Lisbon
Puerto Rico: KP4YT, P.O. Box 1061, San Juan, Puerto Rico 00902
Rhodesia: R.S.S.R., P.O. Box 2377, Salisbury
Roumania: Central Radio Club, P.O. Box 95, Bucharest
Rwanda: via Congo (9Q5) QSL Bureau
Samoa (American): Clark Browne, KS6AX, Comm. officer Government of American Samoa, Pago Pago 96920
Saudi Arabia: HZ1AB, 7244th ABRON-COMM., APO, New York, N. Y. 09616
Scotland: via Great Britain
Senegal: Ch. Tenot, 6W8BF, P.O. Box 871, Dakar
Sierra Leone: Radio Society of Sierra Leone, P.O. Box 907, Freetown
Singapore: QSL Manager, M.A.R.T.S., P.O. Box 777
South Africa: S.A.R.L., P.O. Box 3037, Cape Town
Spain: U.R.E., P.O. Box 220, Madrid
St. Vincent: QSL Bureau, P.O. Box 142, St. Vincent, West Indies
Surinam: QSL Manager (PZ1AR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo
Swan Island: Swan Island, West Indies via Tampa, Florida
Sweden: Sveriges Sandare Amatorer, FACK, Enskede 7
Switzerland: U.S.K.A., 6233 Buron/LU
Syria: P.O. Box 35, Damascus
Tanzania: RSEA, P.O. Box 2387, Dar es Salaam
Trinidad and Tobago: Les, A. Thomas, 9YALT, Los-Iros Road, Erin, South Trinidad
Uganda: R.S.E.A. QSL Bureau, P.O. Box 3433, Kampala
Uruguay: R.C.U., P.O. Box 37, Montevideo
U.S.S.R.: Central Radio Club, Box 88, Moscow
Vatican: HV1CN, Domenico Petti, Radio Station, Vatican City
Venezuela: R.C.V., P.O. Box 2285, Caracas
Virgin Islands: Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, V.I. 00820
Wake Island: Jack A. Chalk, KW6EJ, P.O. Box 415, Wake Island 91930
Wales: via Great Britain
West Pakistan; Lahore Amateur Radio Society, P.O. Box 65, Lahore
Yugoslavia: S.R.J., P.O. Box 48, Belgrade
Zambia: Radio Society of Zambia, P.O. Box 332, Kitwe

World Above 50 Mc.

(Continued from page 91)

W1OOP varactor tripler and a 32-element collinear. At Hiawatha, in eastern Iowa, KØEMO has a similar rig and a 48-element collinear. In northwestern Illinois, WA9NKT is active with an 8122 final and a 48-element collinear up 55 feet. He is also working toward 1296.

WØDRL, 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. WØDRL would also like to arrange other schedules.

1215 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 Vilardi, WA2VTR, are working with modified APT5s, using a 3C22, and expect this to be an inexpensive method of obtaining 30 watts output at 1296.

(Continued on page 164)

(Continued from page 162)

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 4½ 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.e. schedules. His address is Ray Naughton, Box 80, Birchip, Victoria 3485, Australia. QST

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. QST

Silent Keys

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

W1AOZ, Wilfred Walsh, Lexington, Mass.
W1AQX, William Nulsen, Durham, N. H.
W1JBE, Robert F. Gagnon, Lawrence, Mass.
W1VMU, Roy G. Johnson .Braintree, Mass.
W2BIN, Isadore Kurland, Pennsville, N. J.
WA2DPZ, Richard G. Dorr, Sr., East Patterson, N. J.
W2DXN, Mario E. J. Baggia, Brooklyn, N. Y.
W2JT, Earl F. Lucas, Wayne, N. J.
W2KUZ, Fred E. Bailey, Brooklyn, N. Y.
ex-W2MGE, Martin Block, Englewood, N. J.
W2OSQ, W. A. Alznauer, Shore Acres, N. J.
K2QPL, Leo Wallerius, Haledon, N. J.
WA2YST, Charles Kolstein, Merrick, L. I., N. Y.
ex-W3ECN, Thadieus Wielicki, Philadelphia, Penn.
W3LA, Fred Karklin, Phoenixville, Penn.
W3NDE, Henry J. Brock, St. Marys, Penn.
W3OT, Irving B. Smith, Jr., Ft. Washington, Penn.
W3VSU/K2ACW, Lyle J. Quinn, Upper Darby, Penn.
W4HJY, Daniel S. Richards, Charlotte, N. C.
WA4KUC, Richard C. Dunlap, Oak Hill, Fla.
W5CSI, C. A. Watts, Jackson, Miss.
K5IWS, Henry E. Parker, Jackson, Miss.
K5KBY, James B. Bowman, Oklahoma City, Okla.
W5KMJ, Bennie Rockett, Waxahachie, Texas
W5OLD, Oran Hollingsworth, Sulphur Springs, Texas
W6CY, C. Elmer Lundy, San Francisco, Calif.
WA6OMQ, Ross Vernon, Anaheim, Calif.
W6RBH, Stuart Johnson, Visalia, Calif.
W6RO, Dwight B. Williams, Long Beach, Calif.
W6V8F, Ralph Davenport, Colton, Calif.
W7BZI, Hugh Hetrick, Enumclaw, Wash.
W7FWA, Frank W. Gallier, Phoenix, Ariz.
W8AM, Elmer C. Immel, Detroit, Mich.
W8CTI, Andrew Summerville, Richmond Heights, Ohio
K8IVG, Donald Ferguson, Battle Creek, Mich.
WA8LNZ, H. Dale Isham, Hope, Mich.
WA8QMU, Donald Whiteside, Sr., Flint, Mich.
W8RUL, John G. McKay, Flint, Mich.
W8THV, Herb Pierce, Columbus, Ohio
K9DSO, Joe McGovern, Ober, Ind.
K9DTC, Donald F. Butler, Roselle, Ill.
W9HDZ, James Steffen, Fond du Lac, Wisc.
W9IBI, Cecil Furry, Mattoon, Ill.
W9IZL, V. L. Daniels, Racine, Wisc.
K9KOP, Walter H. Hall, Bedford, Ind.
W9MPL, Floyd Mitchell, Granite City, Ill.
K9QDJ, William H. Gordon, Moline, Ill.
K9WST, Charl H. Ryan, Indianapolis, Ind.
WAØBUC, Alton Hathaway, St. Louis, Mo.
CT1ZY, Manuel Lisboa, Coimbra, Portugal
VE3CGA, John Parkinson, Hamilton, Ont.
VE5CM, Art Driver, Regina, Saskatchewan
VE5GX, Joe Robson, Lac La Ronge, Saskatchewan
VE6AA, Frank Duval, Lethbridge, Alberta
VE6OE, James Nielson, Medicine Hat, Alberta
VE6YZ, Frank Isenor, Calgary, Alberta
ex-VE7BJ, Edward Brooks, Vancouver, B. C.
ZS1AB/ZS3AB, 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 ham affairs. QST

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- ☐ **VHF MANUAL** $2.00 — A new and thorough treatment of the amateur v.h.f. field
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- ☐ **HOW TO BECOME A RADIO AMATEUR** $1.00 — All about amateur radio and how to get started
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(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

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SBE 34	329	HT32A	279	HR10	79
SB2LA LINEAR	189	HQ145C	179	DX60A	77
SBE33 INVERTER	[illegible]	HQ170AC	279	10ER KIT	37
100V	399	HQ180AC	279	2ER WIRED	[illegible]
INTERCEPTOR B	329	NCX2000	599	2ER DC SUPPLY	17
DRAKE R4A	319	NC60	46	SB610 SCOPE	[illegible]
PGH LA400C	117	NC183D	199	SB630 CONSOLE	74
ZENITH S/WAVE	44	NC105	144	KNIGHT VFO	[illegible]
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(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for, except there is **no charge for zipcode, which is essential you furnish. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.**

(8) **No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.**

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

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

INVITATION: New York Radio Club cordially invites New York City area hams and SWLs to its regular monthly meetings. Second Monday of each month at George Washington Hotel, 23rd St. and Lexington Ave., at 8 P.M. All are welcome. W2ATT, New York Radio Club.

DAYTON Hamvention April 26, 1968: Wampler Arena Center, Dayton, Ohio. Sponsored by Dayton Amateur Radio Association. Informative sessions, exhibits, hidden transmitter hunt, and ladies program for the XYL. Watch the Ham Ads for information, or write Dayton Hamvention, Box 44, Dayton, Ohio 45401.

MOTOROLA used FM communication equipment bought and sold. W5BCO. Ralph Hicks, 813B No. Federal Hiway, Fort Lauderdale, Florida.

PRE-WORLD WAR I operators will find many of their old buddies are members of the Old Old Timers Club. Pictures and thumbnail sketches will also appear in the coming Bluebook. We welcome all applicants whose first wireless contact was more than 40 years ago but give special consideration to those pre-World War I Pioneers including Charter Membership. Write to W5VA, Secretary of the Old Old Timers Club, P.O. Box 840, Corpus Christi, Texas 78403.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. W4AA, Wayne Nelson, Concord, N.C. 28025.

TUBES, Diodes and Transistors wanted. Astral Electronics Corp., 150 Miller St., Elizabeth, N.J. 07207.

SELL, swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

TUBES Wanted. All types higher prices paid. Write or phone Ceco Communications, 120 West 18th St., N.Y. 11, N.Y. Tel: 242-7329.

DUMMY Loads, 1 KW, all-band, $7.95; wired, $12.95. Ham Kits, P.O. Box 175, Cranford, N.J. 07016.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

MANUALS for surplus electronics. List 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: Collins Parts. BC-610, GRC-2, Autodyne, Bethpage, L.I., N.Y. 11714.

HAM'S Spanish-English manual. Gabriel K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

BEST Offer paid for any piece of aircraft or ground radios, tubes or test equipment. In a hurry? Cash-in-advance arranged. Turn those unused units into money. Air Ground Electronics, 64 Grand Place, Kearny, N.J.

FOR Sale: SB-101 and SB-200. Wanted, kits to wire. Heath preferred. 12% of cost, some in stock. Professionally wired. Lan Richter, K3SUN, 131 Florence Drive, Harrisburg, Penna. 17112.

1916 QSTS needed for personal collection. Price secondary. Ted Dames, W2KUW, 308 Hickory Street, Arlington, New Jersey 07032.

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QSLS "Brownie" W3CJI. 3111 Lehigh, Allentown, Penna. Samples 10¢. Catalog 25¢.

QSLS stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

C. FRITZ—QSLs that you're proud to send, bring greater returns! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252 (formerly Joliet, Illinois).

QSLS-SMS. Samples 10¢. Malgo Press, Box 373, M.O., Toledo, Ohio 43601.

DELUXE QSLs Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

10¢ Brings free samples. Harry R. Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

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RUBBER Stamps $1.15 includes tax and postage. Clints' Radio W2UDO. 32 Cumberland Ave., Verona, N.J. 07044.

QSLS, finest YLRL's. OMs samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

QSLS, SWLS, XYL-OMS (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous, DX-attractive, protopal snazy, unparagoned cards (Wow!) Rogers KØAAB, 961 Arcade St., St. Paul, Minn. 55106.

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QSLs, SWLs, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P. O. Box 11184, Phoenix 17, Ariz. 85017.

QSLS 300 for $4.35, samples 10¢. W9SKR, George Veseley, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J.

QSLS-100 3-color glossy $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free sample to Dealers or Clubs. Tepaco, John K4NMT, Box 198T, Gallatin, Tenn. 37066.

QSL's: Quality with service. Samples free. R. A. Larson Press. Box 45, Fairport, N.Y. 14450.

QSL's. Free samples, attractive designs. Fast return. W7HZ Press, Box 2387, Eugene, Ore. 97402.

QSLS. Kromkote glossy 2 & 3 colors, attractive, distinctive, different. Choice of colors 100-$3.00 up. Samples 15¢. Agent for Call-D-Cals. K2VOB Press, 31 Argyle Terrace, Irvingston, New Jersey 07111.

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QSL, SWL, cards that are different. Quality Card stock. Samples 10¢. Home Print. 2416 Elmo Ave., Hamilton, Ohio.

FINE Embossed QSL's Samples. Ace Printing, 6801 Clark Ave., Cleveland, Ohio 44102.

QSLS Glossy coated, 100, $2.00. 3 and 4 colors. Samples, dime. Bob Garra, Lehighton, Penna. 18235.

RUBBER Stamps, 3-line address $1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLS by Jansen, K2HVN, samples 25¢. 860 Atlantic Street, Lindenhurst, N.Y. 11757.

PICTURE QSL Cards for your shack, etc. Made from your photograph. 1000 $14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 9140.

QSLS by K1FF, $2.00 for 100. Others at reasonable prices. Samples 25¢ deductible. Box 33, Melrose Highlands, Mass. 02177.

QSLS Second to none. Your personal combination from largest section, glossy reds, blacks, Calypso, Pinecraft, vellum and Crystallon. All ink colors. Many card styles. Fast service. Samples, 25¢. Includes your call in beautiful 4½ in. letters. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

QSLS. New catalog 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

HUNDRED QSLS, $1.25 postpaid. Samples, dime. Holland, R3, Box 649, Duluth, Minn. 55803.

QSLS, samples 20¢. Fred Leyden, 454 Proctor Ave., Revere, Mass. 02151.

QSLS. Free samples. WA8NYB Print, 645 Reynard Ave., Cincinnati, Ohio 45231.

QSLS. Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE/W3COP, 905 Fernald, Edgewater, Fla. 32032.

RUBBER Stamps. Under 2", $1.00 first line, 50¢ each additional line, postpaid by return mail. Fulton Rubber Stamps, Rte. 216, Fulton, Md. 20759.

CANADIANS: Best used gear list in Canada. Free Etco, c/o Marv, VE2ANN, Box 744, Montreal 3.

WANTED To buy: Tuning coils for National receiver SW-58 or 6 pin coil forms. The coils wanted are No. 60, 64, 65, 66, 67. If you have coils that tune lower than this I would be interested even in the above type set. Like to hear reply by mail any amateur in USA or Canada. Leonard V. Avey, Lombardy, Ont., Canada.

CANADIANS! Selling KWM-2, Serial No. 11800, with 516F2 power supply: $795.00. Geber, VE5BY, Benson, Sask.P., Canada.

CANADIANS: Sell Collins 75A-1, spkr, and 3.1 Kc adapter. Want: SSB adapter 51SB or SB-10, etc. VE3BNV, 555 Princess St., Woodstock, Ont. P., Canada.

CANADIANS: Eico 753 and 751 SSB transceiver and power supply. For sale: In perfect condx. Best offer. Al Miller, VE7KC, 89 Corry Place, Penticton, B.C., Canada.

WANTED: For personal collection: QST May 1916; Learning the Radiotelegraph Code, Edition 4; How to Become a Radio Amateur, Edition 9; The Radio Amateur's License Manual, Edition 2, 11, 12. W1CUT, 18 Mohawk Dr., Unionville, Conn. 06085.

WE'RE Trying to complete our collection of Callbooks at Headquarters. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington, Conn. 06111.

RTTY Gear for sale. List issued monthly, 88 or 44 mhy toroids, five for $1.50 postpaid. Elliott Buchanan, W6VVC, 1067 Mandana Blvd., Oakland, Calif. 94610.

WANTED: Tubes, all types, write or phone Bill Salerno, W2ONV, 243 Harrison Avenue, Garfield, N.J., Tel: GArfield Area code (201)-773-3320.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

TELEPRINTRONICS—Toroids. 6/$2.00 postpaid. List. Typetronics, Box 8873, Ft. Lauderdale, Fla. 33311.

WANTED: Model #28 Teletype equipment. R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101.

SELL: CQ, QST, Handbooks, old radio magazines, any quantity. Buy old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif.

NOVICE Crystals, all bands, $1.30 each. Free list. Nat Stinnette, Umatilla, Fla. 32784.

TOROIDS, 88 mh uncased, 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

FREE Catalog. Loads of electronic Bargains, R. W. Electronica, Inc., 2244 South Michigan Ave., Chicago, Illinois 60616.

ILLUSTRATED Certificate Guide: Radio Amateur's Vocabulary German/English. $1.00 each. Zangerl, OE9CZI Dornbirn 1, Nachbauerstrasse 28, Austria.

TQQQOBES: 6146B, $4.00; 6CW4, $1.40; 811A, $4.25; 4D32, $15.90. All new, boxed, guaranteed. Free catalog. Vanbar Distr., Box 444Z, Stirling, N.J. 07980.

WANTED: Tubes and all aircraft and ground radios. Units like 17L, 51X, 618T or S, R388, R390, GRC. Any 51 series Collins unit. Test equipment, everything. URM, ARM, GRM, etc. Best offer paid. 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

INTERESTING Sample copy free Write: "The Ham Trader," Sycamore, Illinois 60178.

HALLICRAFTERS HT-37, $250.00. SX-111 with speaker, $130.00. Heath Ham-Scan, $40.00. K2UWM, 1302-8th St., North, Bergen, N.J. 07047.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan 48104. Tel. NOrmandy 8-8262.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts. 617-598-2530 for the gear u want at the prices u want to pay.

REPAIR and install Amateur Radio Transmitters, receivers and accessories. Ted Dreil Electronics, Inc. 4103½ Dumaine St., New Orleans, Louisiana 70119.

WANTED: Lynmar, type TRS-1, TRS-2, T-R switch, or TRS-1T RF output transformer. K5RYV, Star Rte., Box 79, Clovis, N. M. 88101.

HT-32B, $325.00; SX-115, $325.00. Both like new. Gonset 2-meter Sidewinder, less supply, $150.00; SR-42 plus VFO, $150.00. W4MVC, 10 Carlen Avenue, Asheville, N.C. 28804.

FOR Sale: Heath SB-400 and SB-300, new condition, complete, $500.00. Heath Monitor 'scope HQ-10, new condition, $50.00. Ted Brix, 5573 No. Van Ness Blvd., Fresno, Calif. 93705.

COLLEGE Bound: HT44 plus P.S./150, SX-177 Clegg 99'er, In excint condx. Peter Williams, 615 Marview Terrace, Cincinnati, Ohio 45231.

SOLID State rectifiers. Replace those tubes and up operating efficiency. 5U4 5V4 and 5Y5 units, $4.00; 5R4 units, $9.00. Both units, $11.95 postpaid. Merely plug them in. RF Devices, Box #15, Ramsey, N.J. 07446.

4KV, 200 Ma. Varian, VA1302 power supply, General Electric 1250 volts at 500 Ma. Power supply catalog number 516E739G1, General Electric Regulator catalog number 516E734G1. Above mounted on 19 inch rack panels. Sorry, that's all the info I have. Two Eimac SK-400 sockets. Make offer for any or all. K3ZPN, Box 6001, Philadelphia, Penna. 19114.

SALE: Navigator, VFO and xtal 160-10M c.w. w/extra 6146As and coax relay, $60.00. W2NJS, Tom Donohoe, 39 Gramercy Park, NYC 10010. Tel: 212-673-3458.

TR-4, $480.00; AC-4, $83.00; DC-3, $123.00; R4-A, $330.00; T4-X, $330.00; MS-4, $17.50; RV4, $83.00; L-4, $580.00; factory-sealed boxes, fully guaranteed. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. 47404.

WANTED: KWM-2 needing repair. Please state price and condition. 4-100As swap. WB6SBR/KG6, 1132 R. T. APO 96334 S.F.

TA-33 Jr. beam, AR-22 rotator. Must sell. Kaye, 1361 E. 17th St., Brooklyn, N.Y. Tel: (212)- DE9-0349.

PRINTED Circuits. Build the modern way. 10¢ stamp for catalog. Harris Co., P.O. Box 985, Torrington, Conn. 06790.

NEW 4CX250B, $21 pr. pp, 4X150A, $7 pr. pp, 4-125A, $16 pr pp. Heath HX-20 SSB xmtr with AC supply, $95.00. C. M. Pruett, Star Rte C, Flamingo Bay, Ft. Myers, Fla. 33901.

RTTY Channel filters, octal mounted, 2125/2975, $5.95 pair. Special filters for TT/L-2, SASE for information. 88 mh toroids, uncased, 5 for $2.50. Herman Zachry, WA6JGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

HEATH Marauder, Drake 2B, any reasonable offer on each. Want transceiver. Prefer local deal; will answer letters after 12/15. WB2QAL, 147 Valley Run, Cherry Hill, N.J. 08034.

CHRISTMAS Bonus: Drake TR4, MS4, AC4, and 454X mike, $599.95; Swan 500, 117XC, $495.00; Swan 350 117X, $420.00; Galaxy VMK2, AC35 and 454 mike, $420.00. New Ham-M w/control, $89.00; Mosley TA33, $100.00; Hy-Gain TH3MK2, $95.00. Newtronic 4BTV vertical $27.00. Save every day at Evansville Amateur Radio, 1629 S. Kentucky Ave., Evansville, Ind. 47114. Phone 812-422-4551.

INTERESTED In Codamite automatic keyer. Lane Pattison, Star Rte., Box 79, Clovis, N.Mex. 88101.

WANTED: Manual for LR-3 freq. meter. W1CNY.

TRANSISTORS. Brand new, 100 of each. Jan 2N 1049A Silicon Transistor Corp. and Jan 2N1016BM Westinghouse. No reasonable cash offer refused. C. Grimes, 1197 Anderson Ave., Bronx, N.Y. 10452.

SELL: Facsimile transceivers, TT-1E/TXC-1, excellent condition with manual, $65.00. Timefax paper, 193⅜" wide x 350', $2/roll. WB2PLY, Box 207, Princeton Jct., New Jersey 08550.

MERRY Xmas and a Happy New Year from WOCVU. See you at ARRL National Convention in 1969 at Des Moines, Iowa.

WRL's used gear. Trial—terms—guaranteed. NC303, $199.95; 6251, $589.00; Thor VI/AC, $169.95; G76, $99.95; SR-150, $269.95; Eico 753, $119.95; SB2LA, $159.95; 2B, $189.95. HQ-170AC, $239.95. HQ110C, $130.95; HT37, $199.95; HW-12, $94.95; HQ180A, $299.95. Request free "Blue Book" list of hundreds more. WRL, Box 919, Council Bluffs, Iowa 51501.

CHRISTIAN Ham Fellowship is now organized for licensed amateurs. The organization sends free to anyone requesting the article "Twice Born Hams". Also any Christian hams can request free information on the organization. Write Christian Ham Fellowship, 5857 Lakeshore Dr., Holland, Michigan 49423.

HY-GAIN DB24 20/40 meter beam, fine shape. First $90.00 takes it. Galaxy 2000 plus linear, w/supply, new warranty, first check for $340.00; New-Tronic 75 meter Cliff Dweller, first check for $60.00. William Ogg, WA9RMO, 540 S. New York, Evansville, Indiana 47714.

SELL: 1948-1966 QST, Radio TV News. Best offer. W2KZ, 61 East Depew Ave., Buffalo, N.Y. 14214.

FOR Sale: QSTs, April 1946 to latest issue. Make offer. Edwin S. Crane, W2EF, 58 Patterson Avenue, Hempstead, L.I., N.Y. 11550.

FOR Sale: Collins 75A-4, serial #3116, SSB, c.w. filters, $400.00. Heath Marauder HX-10, $200. Johnson Viking II with VFO, $70.00. F.o.b. Alliance. Mrs. Robert L. Sell, 3620 Rambo, Alliance, Ohio 44601.

SX-111 Hallicrafters receiver. Original owner will ship. Original operating condition. All inquiries will be answered. First certified check $115.00 takes. Paul Baumgartner, W8FXF, 12 East Fourth Ave., Williamson, W. Va. 25661.

SELLING. Ideal for Novice or Extra, c.w. rig. Johnson Viking Adeventurer c.w. transmitter 50 watts, $30.00; Knight kit FM monitor receiver 152-174 mc, $35.00; stacked 2-meter halo with mast, $10.00; Heathkit visual-aural signal tracer, $19.00; Master Mobile #750 all-bander loading coil, $9.00. An 131A army mobile whip antenna 127 in. $3.00. Please call after 7 PM. Tel: ES 2-7927. Sy. WB2JMD, 2790-86th, Brooklyn, N.Y. 11223

NATIONAL NC-183-D receiver, in excint condx, $120.00. Write to Grant Mills, P.O. Box 274, Camavillo, Calif. 93010.

PICK Up and save: Apache and SB-10 combo, both excellent; manuals, cables. Package deal. Won't split or ship. W9KQL, 3135 So. 5th, Springfield, Ill. 62703. Phone A.C. 217-522-1428.

SACRIFICE From estate: the only professionally built antenna lowering and raising system for telephone poles up to 100 feet. Includes tracks, rollers, worm mechanism, electric motor complete with hardware electric prop-pitch motor, two selsyns, 20 ft. stainless steel mast, $300. F.o.b. or trade for transceiver or stereo console. Nick Winter, 10107 Lev Ave., Pacoima, Calif. 91331.

HRO-60, product detector, xtal calibr., spkr., A,B,C,D,E,F,H and 2J coils, $250.00. K2BQO, Paul W. Haczela, 8 Yale Place, Armonk, N.Y. Tel: 914-AR3-9067.

SWAP: Collins S/Line for KWM-2. S. P. Hess, 800 Old Kensico Road, Thornwood, N.Y. 10594. Tel: 914-RO-0511.

SX-101A, Mk III, like new condx, only 50 hrs. use: $185.00; G-50 new, 6146b, $225.00; Gonset (Cum IV), just aligned, $200 2MTS; Gonset GSB-100 SSB xmtr, clean and stable sig. $185.00. Heathkit compact linear with a.c. supply, $145.00. W3FXA, Bernard Wolk, 5358 Akron, Philadelphia, Penna. 19124.

JOHNSON Ranger and F/W, like new, $169.00. Also Instructograph code instructor, complete 4/all tapes, best offer. Floyd Scott, 66 W. North Ave., Northlake, Ill. 60164. Phone 312-562-0674 after 5 PM.

POWER Supply, adjustable 6-12 volt at 100 Ma., short-proof; regulation 0.1%, ripple 10 mv, 3x3 in. p.c. card; 6.3 VAC input. Assembled, $12.00; kit, $6.95. p.c. board and schematic, $3.00. Listening, Incorporated, 6 Garden Street, Arlington, Mass. 02174.

FOR Sale: Like new NCX-3 and Heath HP-23, $220.00. W2UPJ, 20 Ash Dr., Neptune, N.J. 07753.

QST Sale: 1955-1956, 1958-1963; $6.00 per year, or $40 for the lot. Gary Knight, 2023 Empress, South Pasadena, Calif. 91030.

TOWER, Windmill 94 ft. high. Used but in first-class condition. Best offer. Tad Matucha, WØHHP, Route 1, Tonganoxie, Kans. 66086.

SALE: Viking I and II with VFOs, $50.00 and $75.00; also SX-101 and S-140 ham rcvrs, $95.00 and $45.00. In A-1 condx. WA9FIW, 1129 No. Knight, Park Ridge, Ill. 60068.

APACHE and SB-10 for sale, $125.00 as pair, or will sell separately. Cain, 2415 West Main, Richmond, Ind. 47374.

FOR Sale: SR-42-A, and HA-26 VFO. Used less than one hour. Like new condx, in original cartons. Both for $150.00. A. H. Carmical, K4IZU, 521 Fleda Road, Memphis, Tenn. 38117.

WANTED: RRT and RST Tuners and instruction manual for Model R receiver. Purchase or trade. Ken Miller, 525 Chevy Chase, Mansfield, Ohio 44907.

SX-117, 10M crystals, HT-44, PS-150-120, transceive cables, $550.00; SB-200, only few months old, $190.00. All in mint condition and in working order. Ray Bunnell, K2CBG, Star Route, Branchville, N.J. 07826.

COLLINS 75S-3, very little use. Just like-new condx. Will ship with manual in factory carton upon receipt of first certified check for $395.00. K7BHI, 5005 S.W. 18th Place, Portland, Oregon 97201.

FOR Sale: HT-44 and PS-150 a.c. power supply w/cables, manual and spare set of tubes. In exclnt condx, mechanically and electrically. Will deliver in Ohio or W.Va. Asking $260.00. WA8RXU, L. Beebe, Box 387, Beverly, Ohio. Tel: 614-984-4159.

VHF Gear Sale: Clegg Zeus, $250; Interceptor with All-bander, $280; HX-30 with 10-D microphone, $175.00; Utica 650 with VFO, $110.00; Gonset Linear, $75.00, Waters compreamp, $15.00. F.o.b. Cleveland. Money orders only. Rydarcik, Box 741, Shaker Heights, Ohio 44122.

WANTED: Hallicrafters HT-44 and Collins 32S-1 transmitters w/AC power supplies. Must be in mint condx w/manuals. WA6JWK/4, 2304 N. Florida Street, Arlington, Virginia 22207.

$5.00 each: BC-645A, Heath Q-Multiplier, Millen R9-er (6, 10 m coils), 12v generator, dual channel audio amplifier 6V6s. Make offer (must see to appreciate): 6m G-E NBFM transmitter 6146 final, 2m final 4X150, 2m Tecraft converter. W2HCP, tel: (201)-356-7593.

84 Issues QST: 1934 through 1940; 8 issues Jan., Aug. 1941; 2 issues May and June 1942. Fine condition. Reasonable. H. Fullington, 44 So. 13th St., Pittsburgh, Penna. 15203.

FOR Sale: B&W 6100, like new, $289.00; HW-12, in gud operating condx, $79.50. You pay shipping. Robert F. Dukes, 834 Butler, Bolivar, Tenn. 38008.

BC-610. BC-614 spare tubes and transformers. Will deliver within 100 miles radius. W3HMR, Paul Moffitt, 222 Sherbrook Blvd., Upper Darby, Penna. 19082.

RCVR: SP600/R274, gud, 19 tubes. Price $85.00. J. M. Dickey, Goochland, Virginia 23063.

SELL: DX-40, $25.00; DX-100B, $75.00; HW-32, $75.00. Albert Long, P.O. Box 423B, RD #1, Utica, N.Y. 13502.

SELL Motorola FMTRU-80D converted to 146.94 Mhz with crystals, 12 VDC or 117 VAC with AC power supply and accessories. $85.00. KØCKX. Tel: 319-338-1814.

WANTED: Radio and wireless sets, equipment and literature prior to 1924. Also Hallicrafters Skyrider Diversity Model DD1 circa 1939. Russell Hanselman, 914 Columbian, Oak Park, Illinois 60302.

HEATHKITS, Marauder, $150.00; Mohawk with 6M conv., $100. All in exclnt condx with manuals. Smitherman, 109 Elliott, Oak Ridge, Tenn. 37830.

COLLINS 30L1 with 572B's in final: $350.00; 312B-5, $250.00; Ham-M rotor and control, $60.00; Viking 6N2 VFO, $15.00; Vibroplex Original Deluxe, $15.00; SB-300 with c.w. filter and SB-600, $225.00. All immaculate, f.o.b. Phoenix. W7CWQ, George Schade, 7026 N. 14 Street, Phoenix, Ariz. 85020.

SELL: Johnson Valiant, $190 or your best offer; 275 w. Matchbox, $20.00; Electro-Voice 611 microphone, $15.00; Heath MT-1 and MR-1 with AC and DC power supplies, $125.00; DX-20 with three crystals, $25.00; Drake 2B and 2BQ, $175.00. Write: Dale M. Johnson, K9VUJ, P.O. Box 151, Ettrick, Wisconsin 54627.

4-400As, wanted, reasonable, in gud condx. WB2AGR, Sturdevant, Callicoon, N.Y. 12723.

HAMMARLUND HQ-129X, $110.00; Eico 720 K transmitter, $60.00. $150.00 for both of them. A. Cusumano, 67 Fourth St., Brentwood, N.Y. 11717.

WANTED: Mosley TA-33 Senior, excellent condition only. WA2QDR, Gene, 63 Second St., New Rochelle, N.Y. 10801.

WANTED: Two 752-B tubes. Give price and condition. W7ED, 10304 Hipkins Rd, SW Tacoma, Washington 98498.

DRAKE 2B, 2AC, Heathkit SB-400, $495.00: mint condition. Robert Whitaker, WA5LJB, 2314 11th St., Lake Charles, La. 70601.

SELL: HE-45B 6-meter xcvr and matching VFO for $50.00. WB2ACE, 711 Carlisle Road, Jericho, N.Y. 11753. Call (516)-WE8-0767.

HAM TV—RCA 7038 Vidicon, $15.00. Sylvania closed circuit TV camera, $145.00. Wireless FM transmitter for telephone range 600 ft. on any FM receiver. $15.00. WB2GKF, Stan Nazimek, 506 Mt. Prospect Ave., Clifton, New Jersey 07012.

HALLICRAFTERS FPM-200 transistorized transceiver, AC supply, mobile mounting rack, speaker, key and lock. Very gud condition. Best offer takes it. WAØDAR/9, Marvin Gorden, 711 W. Capitol Dr., Milwaukee, Wis. 53206.

COMPLETE 6-Meter station: Utica 650 with matching VFO, 3-element Telrex beam in attic, CDR rotator, D-104 mike; Ameco Nuvistor preamp Model PCL-P tunable, Seco antenna tester and power meter Model 520. Whisper fan, all cables, brand new condx. $200.00. K2RBQ.

ESTATE Liquidation. SSAE brings list of quality equipment. Paradd Engineering, 284 Route 10, Dover, N.J. 07801.

CLEGG Thor 6, complete, $145.00; Hy-Gain trap beam with balun, new, $60.00. WB2GND, 196 So. Hewlett Ave., Merrick, N.Y. 11566.

WANTED: Military, Commercial, Surplus, Airborne, Ground, Transmitters, Receivers, Testsets, Accessories. Specially Collins. We pay cash and freight. Ritco Electronics, Box 156-12, Annandale, Virginia 22003. Tel: 703-560-5480 collect.

TRADE. Have new boxed Swan 500 with 117XC p/s. Even trade if you have any mint R-390A/URR, 51J-4, 618S-1, 618T, TS-510A/U, SG-2/GRM-4, MD-83A/ARN, SG-13/U. Bill Slep, W4FHY, Slep Electronics, Highway 301, Ellenton, Florida 33532.

WRITE, phone or visit us for the best deal on new or reconditioned Collins, Drake, Swan, National, Galaxy, Gonset, Hallicrafters, Hammarlund, Hy-Gain, Mosley, Waters, SBE, Henry Linear, towers, rotators, other equipment. We try to give you the best service, best price, best terms, best trade-ins. Write for price lists. Your inquiries invited. Henry Radio, Butler, Mo. 64730.

SQUEEZE Keyer (WØEPV ckt) Kit, $69.50; complete keyer, $89.50. Brown paddle, $16.95. Satisfaction guaranteed. Jimmy Moss, W5GRJ, Box 442, Natchitoches, La. 71457.

HEATHKIT SB-100, AC supply, speaker console, dummy load, and Euphonics mike. Also Hy-Gain Hy-Tower 18HT antenna and Wollensak T-1980 stereo recorder. Make an offer on any or all of the above items. Will ship. Bruce Meyer, WA5PLF, 2701 Glacier, Port Arthur, Texas. Phone 713-98-23627.

COLLEGE: Must sell: TA-33 with TR-4 rotor, $80.00. Prefer local deal. WA3BMD/1, 36 Pine, Exeter, N.H. 03833.

HQ-110C, $120.00; DX-60, $60.00; HG-10, $30.00; DK-60-G2C-AC, $18.00; SK-20, $15.00 or your best offer takes everything. Exclnt condx. WA4PFD, Terry Wells, Rte. #2, Greeneville, Tennessee 37743.

COLLEGE Forces sacrifice: Heathkit oscilloscope, $25.00; LC probe, $3.00; Ameco Nuvistor six-meter converter, $20.00; Heathkit HG-10 VFO, $20. Pair 4X150A, $5.00. New 4-125A, $8.00. Sam Champie, Box F-99, Rte 2, Durango, Colorado 81301.

GPR-90 Receiver by Technical Materiel Corporation. Top-quality general coverage similar to SP-600, $200 or your best offer. Hallicrafters HT-41 linar amplifier, $150.00. Hy-Gain 5BDT 10-80 meter trap dipole, $10.00. Monroe McDonald, K5DUX, 4130 Shorecrest Dr., Dallas, Texas 75209.

SELL: DX60A/Relay, $60.00; HG-10 VFO, $25.00; HD-10 keyer, $30.00; SX-140, $65.00; 14VQ vertical/mast, $20.00; 5-watt 10-meter transceiver, 117/12 volt p/s, $35.00; 727 mike, $5.00; H.B. p/s for HW-32A, $15.00. Victor McKeighan, 14700 N.E. 4th Ave., North Miami, Fla. 33161.

CLEANING House! Millen Preselector, $10.00; Johnson low-pass filter, $7.50; Heath grid dipper, $5.00; Heath IG42 lab signal generator, $40.00; National Alband tank, $10.00; E-V 910 mike, $10.00; Dumont electronic switch, $10.00; B&W T-R switch, $10.00, National FM adapter, $5.00; Ultimatic Keyer, $10. O. C. Lindsey, W5OBX, 1919 Ramada, Houston, Texas 77058.

SELL: Drake TR-4, MS-4, AC-3, D-104 and SWR, Manuals, mint condition. Best offer over $550.00. Marvin Tessler, 260-05 57 Ave., Little Neck, N.Y. 11362.

HEATH HW-12, HP-10 and HP-20 supplies, mike and speaker, $120.00. W5MPX, 218 John Wayne, Lafayette, La. 70501.

COMPLETE Station: Mohawk, Apache, SB-10. Make offer! K4DNY, 240 Pendleton Road, Clemson, S.C. 29631.

CHRISTMAS SPECIALS: 600 Piv at 1.5 amp, Tophats, 10 for $2.25 or 1000 Piv at 1.5 amp epoxy, 10 for $3.00. Postpaid USA. Fully guaranteed. East Coast Electronics, 123 St. Bonface Rd., Cheektowaga, N.Y. 14225.

DRAKE TR4, AC-3, MS-4, all perfect: $530.00. Heath SB-301, SB-600, new, wiring and alignment outstanding. Make offer. KH6FRO/4. Larry Seaman, Apt. I-2, MCS, Quantico, Va. 22134.

FOR Sale: My deceased husband's hardly used Gonset G-76 transceiver, AC power supply, and all necessary components for car (mobile), or home operations, and other miscellaneous ham gear. Will sell all for $200, but no individual items, sry. Mrs. C. M. Percy, 8112 Bainbridge Road, Alexandria, Virginia 22308.

SELLING Johnson 6-2 meter converter w/manuals, used. $25.00. Mike LeFan, 1802 South 13, Temple, Texas 76501.

WANTED: Heath AT-1, SP-44 Panadapter; condition unimportant. Hammarlund HC-10, W8AQA, R. B. Cooper, 132 Guild Street, Grand Rapids, Mich. 49505.

SELL SX-99, R46B, DX-40, VFI, OFI, $100 takes all, or will split. Rich Kostelc, 520 Kungsway, Joliet, Ill. 60435.

NAVY LM-13 crystal frequency indicator and AC power supply. Rack mounted. Spare crystal and tubes. Original calibration book. In exclnt condx. Price $65.00. Capt. C. G. Barany, 1520 Woodcliff Ave., Catonsville, Maryland 21228.

WANTED: KWM2 with 516F2 power supply. Sell: Viking 500 transmitter, $250.00; NC-270 rcvr (needs some work), $100; Hallicrafters rcvr R96A/SR, Army, 5 bands, 135-510 kc., 1-12 mc., $60.00; Gonset Commander transmitter and VFO, $50.00; Gonset Super 6 converter, $20.00; Army power supply PP462U, $30.00; Navy Model MN FM transmitter-receiver, 30-42 Mc., $30.00. Manuals. W2KQA, 127 Nesbit Terrace, Irvington, N.J. 07111.

WANTED: 75A-4 serial above 3500. Clean and in gud condx. George Robinson, R2, Box 217B, Newburgh, Ind. 47630.

FOR Sale: Amateur equipment, parts, high power and receiving tubes, etc. Free list. Alan Robinson, 6651 Forward, Pgh, Penna. 15217.

4-1000A linear, spare 4-1000A 4000V 1 amp. supply Variac controlled. Complete, $295.00 F.o.b. Winona, Minn. SASE for details. WØUWG, 1311-W. 5. Winona, Minn. 55987.

SELL: Complete station. Drake TR-4, RV-4, AC-3 power supply, mike and bug: $500.00. Basil Thompson, K9KRN, P.O. Box 7, Winslow, Ind. 47598.

SELL Pair new Sony correspondence tape-recorders, AVC, with mikes, tapes, $50.00. Johnson rotator, heavy duty, 3/4 RPM, with control box, $100; big prop pitch rotator, variable speed, with selsyns, DC supply, $75; 100 ft. new Prodelin solid aluminum jacket coax with coax adapters, very low-loss, $45.00; Viking Ranger, $79.00; HX-500, like new, SSB-CW-FM-FSK, mod for RTTY, $250.00. Want: Johnson KW amplifier deck only, 2.1 kc. filter for 75A-4. Gene Hubbell, W7EKE, 6633 East Palo Verde, Scottsdale, Ariz. 85251. Phone 946-6350.

SELL: HQ-180A, 1 1/2 years old, $250.00 or your best offer. WA1BHM.

SELL Complete only: Best offer, plus shipping cost. QSTs 1933, Jan., Feb., Mar. and May missing; all issues complete 1934-1966 inclusive (Feb. 1941 missing); Radio Magazine 1934, 4 issues; 1935, 6 issues; 1936, 8 issues; 1937, 8 issues; 1938, 4 issues; 1931 1 issue. Radio Magazine Handbook, 1935; Radio Amateur Handbooks years 1937, 1938, 1941, 1961. 2 issues CQ, Jan. 1947 and March 1952. Numerous other 1930 and 1940 catalogs. Radio Amateur Callbook 1934. Mrs. D. Hauck, 91 Woodland Ave., East Orange, N.J. 07017.

MONEY Talks: You need only whisper. Must sell my complete station. Asking $180.00, for the following: Exclnt Hammarlund HQ-145C, gud Viking II, Heath H6-10 VFO, cardioid mike, key, coax, finals, etc. Write for pictures. David Mitchell, WA3CPC, 502 Taylor Ave., Shillington, Penna. 19607.

HALLICRAFTERS HT-44, $225.00; PS-150-120, $75.00; SX-117, $225.00, all in mint condition, transceive cables, spare finals. Package deal: $490.00. W9HOG, 324 Crestwood Drive, Roselle, Ill. 60172. Phone evenings 312-894-1328.

HALLICRAFTERS SX-62. Want 32S-3 and 516F-2. Box 3016, R. Mantle, Midway, Washington.

WANTED: 3 Ganged tuning condenser for Hallicrafters Skyrider 5 & 10. W1KBV, Box 736, Taunton, Mass. 02780.

SELL New Eico 720 transmitter, never used: $85.00. Kenneth Horowitz, 33 Cardinal Drive, Roslyn, L.I., N.Y. 11576.

DX-60 with HG-10 VFO in perfect condx: $80.00. Carl Vail, W9MUR, 2514 Birch Drive, Richmond, Ind. 47374.

COLLINS KWM-2, 516F-2, MM-2, new, perfect, in warranty: $995.00. Pair 813s and p/s in matching cabinet: $95.00. New HW12-A, in warranty, $120.00. WA5KHR, Wally, Robeline, La. 71469.

FOR Sale: Drake R-4 receiver, $250.00; HX50, $200.00. Heath HO-10 monitor, $45.00: Mainline TT/L FSK converter with 170 and 850 cps shift and auto start, $75.00. Ham-M Rotator, $75.00. Mosley TA33 beam, $65.00. Call Desillier, K1IAG, 617-528-0184. Franklin, Mass. 02038.

SELL: 75A-2 with 2.1 kc mechanical filter, excellent, $175.00. W4QCW.

NC-303, $225.00; Ranger I, $80.00; In exclnt condx. Prefer local deal. WA3FUE, 36 Wartman Rd., Graterford, Penna. 19426. Tel: 215-489-7345.

EICO 720, $45.00; 722 VFO, $30.00; 730 modulator, $35.00; Lafayette HA-350, $90.00. All mint condx. Pat Dolan, WB2ZEL Woodgreen Way, Syosset, L.I., N.Y. 11791. Tel: 516-692-5299.

COLLINS 75S-1 receiver, $300.00. Radiola 26, make offer. QST and CQ late 1940's to date. Make offer. Old tubes, misc. test equipment. L. Koehler, W6ISN, 17075 Cedar Ave., Sonoma, Calif. 95476.

WANTED: Drake 1A, 2A, 2B for $100 in poor condition for reconditioning. WB6VCM, 959 Clinton Road, Los Altos, Calif. 94022.

DAH-DITTER. New integrated circuit automatic keyer. Fully self-completing. Built-in AC supply and keying monitor. Isolated relay output. Completely assembled, ready for operation. Price $34.95. See your distributor or order direct. Free brochure. M & M Electronics, 6835 Sunnybrook, N.E., Atlanta, Georgia 30328.

SWAN 350 xtal calibr. with 110 volt power supply and two new spare 6HF5s. $420.00. Ext. VFO 410 and VFO adapter 22, $100. Mint condx. K7SPH, Box 4099, Tucson, Arizona 85717. Tel: 296-6466.

SB-100, HP-23, HP-13, $375 or trade for Marauder and SX-101A. J. Adams, Glann Road, Apalachin, N.Y. 13732

APACHE and SB-10, very clean, all manuals, cables, and coax relay included. $140.00 or your best offer. Jim Moorman, WAØDIC, 1223 Ninth, Ames, Iowa 50010.

WANTED: Hallicrafters SR-34 (6 & 2). Dave Cook, 3917A Kingsbridge, Chattanooga, Tenn. 37416.

YEAR End specials: 312B-4, $135.00; SR-160, $190.00; HA-6 with ac, $179.00; SX-101 Mark III, $149.00; SW260-6 Mtr. s.s.b. $250.00; SW240, $179.00; SW140, $119.00; HR-20, HX-20 and HP-23, clean, $225.00; HW22A w/calibr. $99.00; Monitor M-40-30/40 FM 12V d.c., $59.00; HRO-60 with Lampkin 205A, $200.00 pair, or $125.00 each. Free list! Howard Radio, Box 1269, Abilene, Texas 79604.

SB-400 Transmitter, $269.00; Heath HDP-21 mike, $20.00; Vibroplex paddle, $12.00; any offer considered. Al Wiesner, Box 250, Chester, Va. 23831.

RTTY Wanted, Model 15, 19 or 28. Must be in top condition. Roye Green, 1321 Pecan Lane, West Point, Miss. 39773.

FOR Sale: Heath HP-23 power supply, new, never assembled: $40.00. Includes U.S. shipping. R. Sterzenbach, KP4DBW, Box 10816 Caparra Hts., Puerto Rico 00922.

APACHE, in exclnt condx, plus SWR meter, $120. Bargain prices on test equipment and misc. Send SASE for list. K2GKU, Goldman, 248-54-54 Ave., Douglaston, L.I., N.Y. 11362.

DONATIONS Of Ham Gear needed to start the University City High School Amateur Radio Club. Contact by mail: Ken Birkmann, WAØNVT, 8353 Fullerton Ave., St. Louis, Missouri 63132.

I'LL Pay shipping: Clegg 99'er, $65.00; WRL 6M preamp, $5.50; 2M converter Ameco, $9.75; Dow-Key T-R, $9.75; AT-1 and AC-1, $15.00; BC-455, $9.75; QF-1, $6.00; Two'er, $26.00. 6M Halo, $5.00. K4JCX, Box 162, Oak Ridge, Tenn. 37830.

DRAKE TR-3, RV-3, AC-3, DC-3, MMK-3. One owner, no scratches. In beautiful condx. Will ship in original cartons: $595.00. Two 4CX1000A tubes, brand new, never used. Best offer takes both. Mike Selwyn, W6ABP, 3054 Dona Marta Drive, Studio City, Calif. 91604. Tel: (213)-656-9419.

MINT Condx: Hallicratters SR-500 w/a.c. supply. First $325.00 gets all, including Shure 440-SL PTT. W6FBS, 8411 Yolanda Ave., Northridge, Calif. 91324.

SELL: Mor-Gain dipole 80/40, $15.00. Instructograph with all tapes and headset, $20.00. Will ship. R. Simon, 94-31 60th Ave., Rego Park, N.Y. 11373. Tel: 592-5099.

COLLINS 3510-2, Hallicrafters CRX-3, Hy-Gain 23 and 5BDT Eico 666 tube-tester Mosley TT-31 complete portable antenna with case. W1USP. Best offers. 617-934-2342.

SX-111, mint condx. $130.00; DX-40 with VFO, $35.00; Johnson T-R switch, $15.00; Dow-Key ant. relay and foot switch, $5.00; Vibroplex Original bug, $8.00; Canadian Marconi power supply 40W.115V. input, 6.3 300v. variable output, $10.00. George Wessner, K2LEZ, 111 Cameron Ave., Merrick, L.I., N.Y. 11566. Tel: 516-FR8-5272.

SELL: HQ-180A general-coverage receiver, 54 thru 30 megacycles. Factory installed noise-immunizer. Mint condx, $265.00. Geloso 212, 60-watt, 80 thru 10 M. AC-CW transmitter, 807 final, 807 modulators. Mint condx, $50.00. Morrow MBR-5 and RVP-250 p/s, $25.00. K2CFC, 127 Van Kannel Ave., Yardville, N.J. 08620. Tel: (609)-585-5184.

GLOBE 300A, $60.00; Collins ARC-2 transceiver, 2-9 MHZ, AM, CW, MCW, tracked VFO, full break-in, etc. $100.00. USM-38 scope, perfect condition, over 10 Mc. bandwidth, equiv. to Heath 10-14, $100.00; Joystick, $7.50. Roger, WB2OYK, 448 Union Ave., Rutherford, N.J. 07070.

HT-32A, SSB SMTR, $225.00; Drake 2B and 2BQ revr, $175.00. Both excellent condx. Will deliver 100 mile WA2NEC, 39 Nautilus Dr., Leonardo, N.J. 07737. Tel: 201-291-9115.

TELETYPE Model 15 RO sync with table, cover, rectifier, $60.00. You pay shipping costs. WØDKX, 532 33rd St., West Des Moines, Iowa 50265.

HY-GAIN DB-24, 20-40 beam (new), $85.00; 75A4 vernier knob (new), $20.00; 75A4 filters 3.1, 6 kc. ea. $35.00; KWS-1 power supply, $110.00; HP-23 AC supply, $37.50; Bliley 100 kc xtal 6V oven, $5.00; Codax keyer, $65.00. Many items SASE. Item F.o.b. KØARV, 2925 Wildwood Ct., Cedar Rapids, Iowa 52402.

SBE-34 mint condx, $275; mike, $10; mount, $5; bandspanner, $15; Two'er, $32; d.c. p/s, $8; mobile ant., $5; Hy-Gain 10 el. 2 mtr. beam, $8; HT-17 (807 final), $14; 14AVS w/80 coil, $14; Gonset and RME 10-75 mtr. converters, $10 each. Vibroplex Original, $14. Want: Drake 2B, 2BS, 2BQ; Heath Warrior or equiv. linear, Electronic keyer. W6NIB, 3390 Greer Road, Palo Alto, Calif. 94303. Tel: 415-327-3351.

FOR Sale or trade: Heathkit HR and HX-20 xmtr-revr combination with Heath 12 VDC and 110 VAC power supplies. Just completely reconditioned. In exclnt condx. $300, or will trade for gear in operating condition for 144 mc. or above, ham TV station or crank-up tower. Richard Nongard, W9NXI, 32 Cambridge Lane, Lincolnshire, Ill. 60015.

HX-10 Marauder transmitter, 200 watts SSB, CW, AM, RTTY. Laboratory wired, tested, and calibrated. Never operated. Absolutely perfect condition. You must see this unit to believe how perfectly it performs and how great it looks. Best offer over $180 or first $240 takes it. K2ODT, 7 Dairy Farm Road, Stonybrook, L.I., N.Y. 11790. Tel: 516-751-8898.

WANTED: Elmac AF-68 and/or PMR-8, working, with manuals K5IXZ, McKee, 1520 Holly Vista, Waco, Texas 76711.

T-50 HR-10, excellent condition, perfect Novice station: $70.00. Will separate. WB2VIN, Yellin, 315 Rogers Ave., Brooklyn, N.Y. 11225.

NCX-3 Transceiver, with NCX-A power supply, $180.00. W. Johnson, 129 20th St., New Orleans, Louisiana 70124.

FOR Sale: Drake 2B and 2BQ. In gud condition. $180.00. WA8-DVX, 619 N. Sugar, Celina, Ohio 45822.

WANTED: Swinging chokes 5-25 henrys 500 Ma. Give dimensions. Voltage rating. Bob Ruffer, W5LGD, 4013 Cleveland Place, Metairie, Louisiana 70003.

SELL: Still in carton: Hy-Gain DB-24A beam (20 and 40 meters) with balun. $120.00. F.o.b. K7NNZ, 7918 E. Palm Lane, Scottsdale, Arizona 85257.

BEST In brass. Stainless steel threaded, washer hardware. See November ad. Lists 10¢ (stamps). Walt, 29716 Briarbank, Southfield, Mich. 48075.

48 Foot tower, 3-element Tri-Band beam, prop pitch motor, selsyn indicators. Package deal only. Make offer. K7TBJ, 6905 So. 130, Seattle, Washington 98178.

HT-37, SX-111, and HT-40, SX-140. Prefer to sell as two matched sets. Must sell, getting married. Ed Garman, 1620 Nish Road, Crystal Lake, Illinois 60014.

FOR Sale: Apache, SB-10 and Mohawk, $225.00; HW-32, $80.00; Z-Match antenna tuner, $30.00: BC-221 with calibration book, $35.00. Lynn Faulkner, W8NTV, Grafton, W. Va. 26354.

EICO 753 transceiver and power supply, factory-wired. Previous use by club on Field Day only. Now updating equipment. Best reasonable offer by Jan. 1st. K9WMD, 411 Woodland Ave., Bloomington, Illinois 61701.

FOR Sale: Complete Novice station: DX-60A, 10 crystals, 40-meter dipole, key; HR-10, calibrator, speaker, receiving antenna, all plugs, coax, free delivery. $175.00. Dick Dinges, 16 South Main, Cape May Courthouse, New Jersey 08210.

FOR Sale: HRO-60 communications receiver with 100 kc. xtal calibrator and CE sideband slicer, $200: HT-32 xmtr. in xclnt condx. $200; 4-1000A GG bandswitching linear amplifier, complete with 4000 VDC power supply, $300.00. W6KW, 11422 Zelzah Avenue, Granada Hills, Calif. 91344.

NCX-3, $220; HQ-170, $160.00. Both are in A-1 condx. Bruce Tis, K1WVY, 39 Farmstead Lane, West Simsbury, Conn. 06092.

"L'IL Lulu 6-meter pair; beautifully engineered and constructed. Features include crystal filter, product detector, built-in 117/12V supplies. New price was $485. First $160.00 gets it. K3CXZ, RD Box 90-2, State College, Penna. 16801.

4-1000-A linear, white 38 in. cabinet on rollers: 3-4 in. Triplett meters, 4000V supply, a beauty! Pix available: $395.00. New 4-1000A, $65.00. Used $35.00. 3-10002 new, $65.00; E-V 664 mike, $30.00; Collins PM2 solid state supply, $110.00. WA6-MSE, 6803 Amestoy Ave., Van Nuys, Calif. 91406. Tel: 344-6309.

NC-173 Receiver, $65.00. Gud condx. Knight T-150A xmtr, $75.00. Also exclnt condx, or your best offer. Postpaid. Randolph Neal, W4OLO, 2802 Irwin, Huntsville, Ala. 35801.

SELL: R-390, R-390A, 51J4, 51S1 receivers. W2ADD.

RICO 753 transceiver, 751 AC supply. Factory checked for stability. In use. Excellent CW reports. $200.00. WA8COA, Weaver, 11652 Hollinsworth Way, Forest Park, Cincy, Ohio 45240.

FOR Sale: SBE 33 with mike: $150.00. R. C. Dale, 86 Westgate, Wellesley, Mass. 01701.

RANGER I, in mint condx: $85.00. WB6WEG, 2202 Raleigh Ave., Costa Mesa, Calif. 92627. Phone (714)-548-9751.

WANT: Collins PTO's, 70E-8A and 70E-12, 8R-1 calibrator, vernier knob. Also old rack model HRO and any accessory coils such as broadcast AB, etc. Sell 32V-3, clean, $160.00. W2DYU, 360 Marlboro Rd., Englewood, N.J. 07631. Phone (201)-567-2027.

RTTY Model 19, Table, power supply, mainline TT/L demodulator, all cabling and switching built in for use with any exciter using break-in keying, auto-switching for NSFSK CW ID. Some paper and TD tape. Sry, will not ship. Delivery and set-up assistance within 100 miles radius of Boston, Mass. $300.00. K1TWK, Ken Nokes, Island Park Road, Ipswich, Mass. 01938. Tel: 617-356-4771.

TRANSCEIVER, NCX-3 110 AC power pack, mike, original manuals. National customer service bulletins. $269.00. W5GTL, Box 37, Lake Jackson, Texas 77566.

GALAXY V MK II, new. Have two. Sell one with AC supply, $400 cash. Hewlett-Packard 400C lab AC voltmeter, $50.00. Realistic DX-150 allwave communications receiver, all transistor, new, $100. WØTKX, 10040 Brookside Ave., Bloomington, Minn. 55431.

SELL: NC-125, $55.00; Globe VIO, VFO, $30.00; Chief 90, $20.00, or trade cash for AC tape-recorder ($80 range). R. Wilson, 114 Grand, Storm Lake, Iowa 50588.

FOR Sale: Hallicrafters SR-150 transceiver, TS150-12, TS150-120 supply, and MS150 Mobilemount, in mint condx: $375.00. Write to W2KHK, L. H. Anderson, 31 Agate Road, East Brunswick, N.J. 08816.

COLLINS 75S-3B, $475.00; 32S-3 and 516F-2, $575.00. Like new condx. Both for $1000. Don Goodrum, K4DBH, 2957 Meadowlark Dr., East Point, Georgia 30044.

LAFAYETTE HA-700 receiver, $70.00; Lafayette HB-200, with crystals, $70.00. Bruce Baker, WB2ZIN, 50 Carriage Lane, Roslyn Hts., N.Y. 11577. Tel: (516)-621-1811.

KW Final for sale, 813s GG. All new B&W parts, including LPF. No junk! $125.00 with power supply. W9KAQ, 2S-145 Burning Trail, Wheaton, Ill. 60187. Phone: (312)-653-1875.

400 Watt Globe King 400-B; VFO; extra King Cabinet, G66B with P/S; G-11 Phasemaster, Jr. SSB transmitter; 4-5.3 Mc. VFO; Harvey-Wells "Z" Match; RME MC-55 10-80 M. converter; Mobile transmitter with HP-10; RME DB-23, Signal Splitter; coaxial relay. No first reasonable offers refused. Metzler, R1, Box 39, Manheim, Penna. 17545.

TRI-EX 88 ft. tower, $150.00; 85 ft. 50-ohm alum. coax, $25.00. Will deliver within radius of 100 miles of Reno. Paul Etcheberry, WA7GHQ, 1220 S. Marsh Ave., Reno, Nevada 89502.

CRYSTALS Airmailed: SSB, Nets, MARS, Marine etc., Novice .05% crystals $1.50. Custom finished etch stabilized FT-243.01% any kilocycle or fraction 3500 to 8600 $1.90 (five or more this range $1.75 each). (nets ten or more same frequency $1.40). 1700 to 3499 and 8601 to 20,000 $2.75 with overtones supplied above 10,000. 10,001 to 13,500 fundamentals $2.95. Add 50¢ each for .005%. Add 75¢ each for HC-6/u metal miniatures above 2000. Builders crystals and crystal groups from QST and all ARRL publications. Ask us. Be specific. Write for order-bulletin and listings. Crystals since 1933. C-W Crystals, Marshfield, Missouri 65706.

PREPARE For FCC Amateur Exams. Use Posi-Check. Extra and General Class FCC type exams, complete in detail and style, even to IBM type answer sheets. A proven aid to learning. General Posi-Check consists of 297 questions and explained answers for only $2.98; Extra Class 115 questions, diagrams and explained answers for $2.00. 139 of the questions in General Posi-Check apply directly to Extra Class. Get both for $4.50 postpaid. This material should cover any amateur exam. Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322.

SWAN 400 w/latest factory modifications, 406B VFO, 14-117 power supply, RC-2 trunk mounting kit, extra power cables, all manuals. Shure 404C microphone, New-Tronics Hstler 8010 meter antenna system. Perfect condx, hardly used, $489.00. Certified check or m.o. Will deliver locally. Drake TV-1000-LP low-pass filter, $9.00. Dow-Key DK-60-2C relay, $8.00; Hy-Gain Model 23 beam, $4.00. Eric Landau, WA2KER, 415 E. Olive St., Long Beach, N.Y. 11561.

FOR Sale: HQ-180C, $265.00; Gonset Sidewinder (2m) with AC/DC power supply, $235.00; AN/ID-60/APA10 Panadapter (60 cps power supply), $35.00. Wanted: New 4X250B. Henry Ingwersen, PA0AFN/W1, Box 87, Topsfield, Mass. 01983.

HAVE One original Spark Gap, Type L, KW-1, Pri 110 V, SEC, 40,000 V. Clapp-Eastham Co., J. J. Baxter, 100 N. Austin St., Comanche, Texas 76442. Tel: a.c. (817)-356-3461 or 356-2254.

COLLINS KWM-2/136B-2, 516F-2, 312B-5, $1250.00. All in mint condx. Ship USA factory cartons. Don Leddin, W5PWM. Tel: 214-AD-1-4756. 301 Dorothy Drive, Richardson, Texas 75080.

SELL: NCX-5 MKI with carrier insertion, and NXC-A. First certified check over $357.00. WA9QHP, Mike Culver, 14 North Prospect Ave., Madison, Wis. 53705.

HEATH VHF-1 Seneca, $120.00; Hallicrafters HA-6 transverter, in exclnt condx, $90.00. Dick John, K7MDH, 4002 East Fourth, Tucson, Ariz. 85711.

TOROIDS: 88 mhy, unused, center-tapped, 5/$1.50 ppd. RTTY paper, $3.50 case. Johnson Matchbox (250-23), $38.00. Hallicrafters HA-8 modulation indicator, $8.50; Ameco CN144W two-meter converter with p/s, $35.00. NCX-3, $185.00. Globe Chief 90A, $38.00. Mainliner TT/L teletype converter, $75.00. Teach TC-2 tube-checker, $15.00. Viking tape deck, #75 with preamp, $45.00. Want: NC-300, 2M, FM gear, FAX machine, rotator, AM tuner. Stamp for list. Van, W2DLT, 302Z Passaic Ave., Stirling, N.J. 07980.

GONSET G-50, 6-meter transceiver, like-new condx, with antenna filter and manual, $120.00; Gonset Super Six (6 volts) mobile all-band converter, with manual, $15.00. LM-13 frequency meter, no book, $22.00. BC-221-AG frequency meter, with calibration book, $38.00. John Longley, W2ANB, Slingerlands (Alb. Co.) N.Y. 12159.

FOR Sale: TV Camera, $150.00; Apache transmitter, $75.00; Telex Magna-Twin headphones, $12.00; Knight R-100A receiver, factory-reconditioned, with speaker: $65.00. 100 feet Belden 8/U polyfoam coax, $5.00. Terry Windmiller, WA4YSG, 752 N E 128th St., N. Miami, Fla. 33161.

SELL: Collins 75A4, $799 with 2 filters and manual, exclnt condx, $500. HT-44 and P/S, $275.00. Eico 720, $50.00. Pick-up deal only, sry. WB2OYA, 1719 Gerritsen Ave., Brooklyn, N.Y. 11229.

CLEGG 22'er, in exclnt condx, late 1900 series, $175.00. Max Voekelin, K1QIP, 244 Haverhill St., Reading, Mass. 01867.

SELL: Heath Marauder HX-10, SSB/CW/AM transmitter in exclnt condx, like new, $225.00. WB2OHK, Art Cacella, Jr., 16 Hillwood Road, East Brunswick, N.J. 08816. Tel: a.c. (201)-257-0705.

FOR Sale: SB-200 Heathkit linear amplifier, in exclnt condx, $200. cash. Will ship. WA4HAH, Tom Porter, 230-22nd St., S.W., Birmingham, Alabama 35211. Tel: 781-1810.

NCL-2000 linear, in mint condx. Only about 20 hours operating time. $400.00. Will deliver in NYC area. WA7BGZ/2, call: (212)-269-0425.

SELL: Like new condx: Drake T4X, AC3, $300.00; R-4, $250.00; Valiant II, $150.00. Sry, no shipping. W8RRR, William Hern, Jr., 8457 Hollow Corner, Almont, Mich. 48003.

ELDICO SSB 100F, mint, manual, $200.00. Drake 2B crystal calibrator, mint, manual: $180.00. Local deal preferred. Dr. Herbert Berner, W2AM. Tel: ES7-1850 evenings. Brooklyn, N.Y.

SELL: HT-32, $200; 2B, $160.00. Pair, $335.00. WA4RLU, Bob Wesselles, POB 512, Parksley, Va. 23421.

NEED Cash. Collins 75A4, HX-50, best offer. W2WMG, Box 74, Massapequa Park, L.I., N.Y. 11762.

SB-300, SB400, speaker and mike, $450.00, or TR-4, $395.00; AC-4 and RV4, new, $150.00. New DC-3 and complete Hustler with 40-20, mobile mike, mobile mount and Noise Kit, capacitors, $150. NCL-2000, $395.00. Mint. Victory Barry, 306 E. Gilpin Ave., Norfolk, Va. 23503.

WANTED: Marconi 1064 signal generator, or equivalent. Cash/Swap. W4JQO.

COLLINS KWM-2 Ser. No. 13055, 313B5, 516F2 with speaker, 516E-1D.C. Supply, 351D-2 mount with cables, all units like new condx, with manuals and factory boxes. Very low time, mobile for two weeks vacation only. Take the entire package for only $1050. Will consider individual offers. WB6NHR, Don O'Neil, 444 Milky Way, Lompoc, Calif. 93436. Tel: 805-733-2783.

WANTED: Rack panel for HT-41 and 20-A. W1CNY, 228 Hickory Hill Lane, Newington, Conn. 06111.

826 Tubes needed. Surplus, and in top condition. Need about one dozen. Quote price. Leonard Zell, K7CNO, 800 Southwest Morrison, Portland, Oregon 97205. Phone: (503)-227-8471.

FOR Sale: Tri-Ex 65 ft. crank-up tower: $500.00; Apache and SB-10, $125.00; Warrior linear amp, $150.00; HQ-10 'scope, $50.00; SX-101A, $150.00; SWR meter and bridge, $5.00; 1 kw. lo-pass filter, $5.00; complete package: $500.00, with all manuals and cables, plus extras. Also have 6146 tubes, $2.00 each. K2OCB, Mel Ornstein, 62 Hagaman Street, Carteret, New Jersey 07008. Tel: (201)-541-9266.

WANTED: Hammarlund Super Pro, National MB-29, MB-30, Hammarlund Hi-Q 30, Scott shield grid 9 McMurdo-Silver, Silver Marshall, Norden Hauck, Magnaformer, John Caperton, 516 Country Lane, Louisville, Ky. 40207.

HQ-110-A, Ser. 9933, Will ship prepaid, $120.00. Alex Norcross, 4801 Hilton, Albuquerque, New Mexico 87110.

NCL-2000 $395.00; RV-3, $60.00; T4-X, $330.00; R-4A, $330.00; GPR-90 $200.00; 75A-4, 1.5, 3 & 6, $395.00; SX-101 A with matching speaker, $195.00. I am not quitting ham radio, just too much equipment. All pieces are in perfect shape. 75A-4 is the cleanest. W9CKF, Porter Barnes, 2922 Muensterman Ave., Evansville, Indiana 47712. Tel: 812-425-9857.

SEASON'S GREETINGS to all from "D.B." and Paul, W4-UDG and W4HHK-A4HHK, Box 430, Collierville, Tennessee 38017.

WANTED: GSB-201, working or not. Case must be in gud shape. Jim, WA6WIX, Box 981, Arleta, Calif. 91331. Tel: (213)-767-8151.

DX-60A, HG-10 VFO, electronic keyer, T-R switch, $120.00; HQ-180C, general coverage receiver, $290.00. Complete rig: $395.00. All in exclnt condx, manuals. Lee Gilbert, WB2ULB. Tel: (516)-WE-8-1857.

RTTY: Terminal unit, plus AFSK. Featuring Twin City Circuitry, in beautiful cabinet: $50.00. Eico #425 'scope, $30.00; SWR bridge, $15.00. Will sacrifice all for $75.00. F.o.b. 583 Trysting Place, Cedarhurst, L.I., N.Y. 11516.

COLLINS 32V-2 and B&W 51SB single sideband generator. Best offer over $150.00. Local deal only, sry. Bud Lawrie, W2OLV, 47 Richard Terr., Red Bank, N.J. 07701. Tel: 747-9738.

SELL: Collins 30S-1, $750.00; 32S-3 with 516F-2 p/s, $600.00; 75S3B, $495.00; 312B4 control, $125.00; CE MM-2 'scope with RM, $50.00; HA-1 keyer with deluxe key, $50.00; Singer PR-1 Panadapter, $35.00. All are in mint condx, and f.o.b. Rev. Paul Bittner, 814 4th St., S., Virginia, Minn. 55792. Tel: 218-749-1600.

KNIGHT R-100A receiver, with crystal calibrator, $65.00; T-150A transmitter, $65.00; Instructograph with 10 tapes $30.00; Vanguard 2-meter converter, 14 Mcs. IF, $8.00. All with manuals. In gud condition. Frank Furze, Jr., WA1FHD, RFD #2, Newtown, Conn. 06470. Tel: (203)-426-9428.

"HOSS TRADER" Ed Moory has the Xmas spirit and offers following Yuletide Bargains: New equipment, factory warranty: Drake R-4A, $309.95; T4-X, $314.95; NCL-200, $575.00; New Eico 3-band transceiver kit, Model 753, $135.95; matching 751 supply and speaker, $49.95; New; display models with warranty: Swan 350, $339.95; Swan 500, $409.95; TR-4, $489.00; New display Galaxy V, $329.96; Matching AC supply, $59.95; Drake L-4 linear opened and displayed, $569.00. Package deal: New Mosley Classic 33 beam and demo Ham-M rotator, $189.95; special Rohn 50 ft. fold-over tower, prepaid, $189.50; demo Ham-M rotor, $85.00. Package deal new SB-34 and mike, $349.00. Reconditioned gear: SX-101, $109.00; HT-32B, $289.00; Drake 2B $179.95; 2-A, $149.50; Henry 2-K linear, $449.00. Ed Moory Wholesale Radio Co., P.O. Box 506, DeWitt, Arkansas 72042. Phone 946-2820.

FOR Sale: Heath RD-AF signal generator, Model G5, $10.00; HP23 ac power supply, brand ndw, $35.00; Heath oscilloscope Model 0-7 w/probe, $20.00; signal tracer w/probe, $8.00; Hickok mutual cond. tube-tester, $12.00; EIF Matchbox, Mod. 250-23, $30.00, and low-pass filter Model 250-20, $9.00; GC transistor tester, $5.00. Marsh, K2DZR, 16 Dellwood Court, Colonia, N.J. 07067.

CHEYENNE, Comanche, ac power supply, $85.00; Hallicrafters mobile PS-150-12 supply, $55.00; Two'er, mobile supply, halo antenna, 4 xtals, $35.00. Tecraft CC-144 two meter converter, IF 14-18 mc., as is, $10.00. Wal Btilofsky, WA2ZEW, 4 Dudley St., Cambridge, Mass. 02140.

SELL Or trade for mobile equipment, Hy-Gain 611B. Convention prize, never opened. WB6TNG, 4729 West 191 St., Torrance, Calif. 90503.

HQ-145C, Eico 720 for sale; also VFO and accessories. Complete, operating station. David F. Bantz, 915 W. End Ave., N.Y.C. 10025.

COLLINS 75S-1, 32S-1, 516F-2, like new, $700.00. W9JFB, Kenneth Pippen, 852 Marion St., Nappanee, Indiana 46550.

GLOBE V-10, VFO 180 through 6 meters. Excint condx. $25.00. Tom Benewicz, WA2OBT, 11 Montrose Terrace, Allendale, N.J. 07401.

SHACK Cleanout! Drake L4 and p/s, mint, $525.00; Millen KW Transmatch, mint, $85.00; Galaxy III, ac and dc supplies, Ext. PTO and mobile mount, excint, $300.00; SX-73 (like SP-600) rack-mount, $200.00; Ameco CN-144 (141F) and PS, $30.00; Waters 369 wattmeter, mint, $75.00; Eico 315K sig. gen., $35.00. Jack Headley, WØKXZ, Box 538, Brookings, S.D. 57006.

4-1000-A items. Two good tubes, chimney, aluminum air system socket, blower, filiment transformer. All for $50.00, or write for single items. WØHNA.

DISCOUNT Prices—Time Payments. New equipment in factory sealed cartons. Swan SW-500 $430, SW-350 $365, SB-34 $360, Drake R-4B $375, T-4X $349.50, L-4 $599. Send for discount price quote on any type amateur gear. Payments as low as $10 monthly. No finance charge if paid within 45 days. New Ham-M rotator $99.95. Galaxy linear $391.50, complete selection of National, Drake, Swan, Galaxy, SBE, Hygain, Mosely, Trlex, New-Tronics, at discount prices. Reconditioned specials. HW-12 $75, HW-32A $89, NCX-3 $179, Ranger II $129, 32V-2 $129, Globe King 400 $79, Globe King 500C $199. EDWARDS ELECTRONICS, 1320-19th St., Lubbock, Texas 79401. Phone: 806-762-8759.

TRANSMITTER: 80 thru 6, built-in VFO, 150 watts. Never used. $65.00. Burton, 526 W. 152 St., New York, N.Y. 10031. Tel: AU-6237.

FOR Sale: Collins S/Line, mint condx, 75S-3, 32S-3, power supply, station console 30L-1, 664 mike, $1675.00. Write R. Downing, K1ERL, 86 Spring Lane, West Hartford, Conn. 06107.

KWM-2 matching 516-F2 AC power supply. Brand new condition. $750.00. WA4JNW, Harold Greenwell, 1619 Gray Road, Chattanooga, Tenn. 37421.

STATION: Complete deluxe Novice station including Heath Mohawk receiver, and Eico 720 transmitter. Both in excellent condition. Many high quality accessories. Must sell immediately. $200.00 complete. Marc Linden, 55 Wellington Road, East Brunswick, N.J. 08816. Tel: 201-257-2154.

SP-600 JX, in excint condx: $375.00. Firm. Sry, will not ship. G. Vilardi, WA2VTR, 14 Oakwood Terrace, Spring Valley, N.Y. 10977.

URGENTLY need one 200 watt MacIntosh Industrial amplifier with power supply. State price and condition. W6IMT, 6415 West 89th St., Los Angeles, California 90045.

JOHNSON Thunderbolt amplifier 2000 watts PEP. Freq 3.5 to 30 Mc., power attenuator included. $375.00. Roy Miglorino, K2DTV, 287 E. 19th St., Patterson, N.J. 07524.

EICO Transceiver. AC/DC power supplies. In excellent condition. Will sell for $135.00. Rev. Joseph Romano, 43 Shelburne Street, Burlington, Vermont 05401. Tel: 802-862-2845.

FOR Sale: Viking Valiant 500, in excellent condition, with power supply and manual provision for SSB 600 watts c.w. 500 AM. Also homebrew receiver. Highest offer for receiver so far $180.00 plus another rig, nine IF's, triple conversion, detector, and 100 Kc calibrator. Make offer. Write to: John Wallis, 116 Ward Street, Larkspur, California 94939.

WANTED: John F. Riders radio service manual Vol. 14. Howard W. Sams communication manual Vol. 1, 2, 42/322, 42/447. Service manual for "Scott" Philharmonic 30-tube receiver AA-128. Will purchase. Alan G. Edwards, G3MBL, 244 Ballards Lane, London, N. 12, England, UK.

PROP Pitch motors: These hard-to-find motors will turn any antenna. Two sizes, small 10,000:1, Large 7,000:1; $30.00 each. While they last. Shipped F.o.b. California. John Link, 1081 Aron St., PSJ, Cocoa, Fla. 32922.

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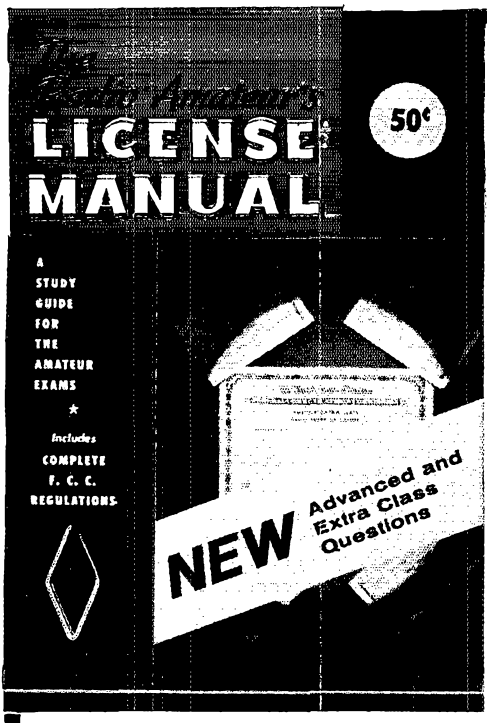

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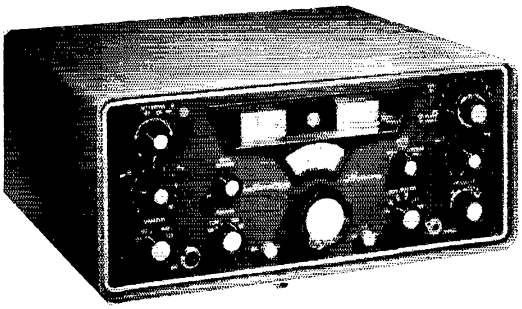

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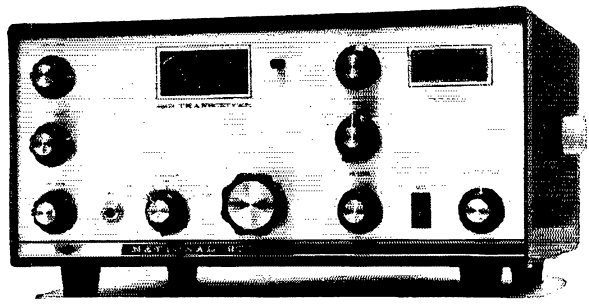

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