

January 1969

75 Cents

# QST amateur radio

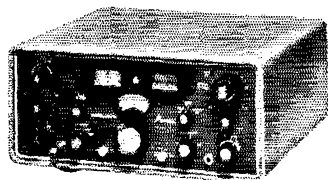


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FILE RaTtLe Hum-m-m-m-m-m-m-m RaTtLe RaTtLe  
**BOOM! BOOM! BOOM!**

**stops  
noise!**

CLATTER!  
 murmur murmur murmur murmur  
 CLATTER!  
 murmur murmur

**BANG! BANG!**

Honk! Honk! Honk!

**POW! THUMP!**

**POP! POP! POP!**



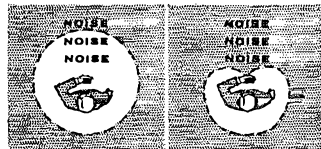
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**OUR COVER**  
WINPG on the ladder and WIICP on the ground making adjustments on the new HRH Delta-Loop beam described on page 26 in this issue.

**QST**

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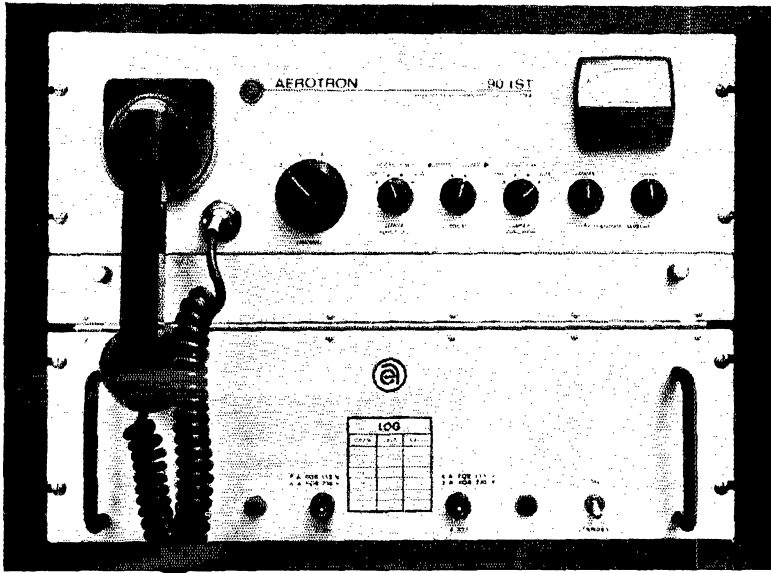
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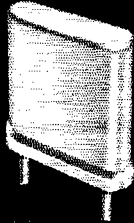
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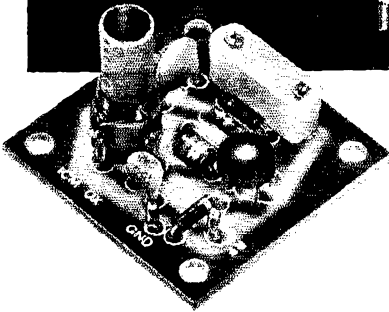
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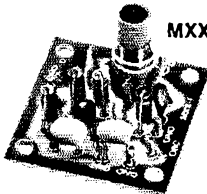
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(Specify when ordering)

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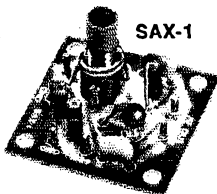
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SAX-1

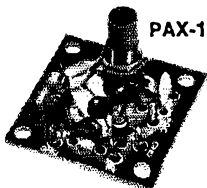
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BAX-1

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\* Member Executive Committee

## "It Seems to Us..."



### 1968 IN RETROSPECT

**B**EFORE we slice off that chunk of time labeled 1968 and toss it into the archives, let's take a quick reflection.

FCC's trumpet call of late 1967 for a return to an incentive licensing structure gave us all a year's warning, and was the major influence on U.S. amateur radio activity in 1968. Many accepted the challenge. There was a stepped-up code practice program transmitted by W1AW, a six-part license study guide serially in *QST*, long lines at examining offices, and many proud holders of new Advanced and Extra Class tickets—plus, of course, some pessimistic bystanders. The new rules' effective date of November 22 is only a few days ago as we write; how it will all turn out, only 1969 will tell.

The availability of two-letter call signs (for 25 years, Extra Class stature and \$20) prompted nearly 1000 amateurs to change their calls and become official "old timers" in ham radio. Presently under consideration in Washington is Docket 18266, which would give a second life to many ex-Novices, and maybe even some Technicians who sought but for some reason did not make General on the first try. Close cooperation between the Const Guard, FCC and the ARRL resulted in expansion of 160 meter frequencies and power available to amateurs. An unfortunate—but significant—"first" occurred: three amateurs were convicted for the use of obscene language in the amateur bands, with penalties of fines and prison sentences.

Among interesting happenings in Washington were continuing ARRL attempts at the desegmentation of 6-meters, clarification of the preferred call-sign program by the FCC, and the passage of the Anti-Noise Bill which governs manufacture of devices capable of generating interference to communications. FCC continued to get plenty of petitions requesting small variations of the incentive licensing program; some were quickly denied, and some still await FCC action. The "Carter-phone" case in court and later under FCC evaluation produced rulings pointing the way to possible early legalization of phone patch practices—by amateurs and others.

The annual Board of Directors meeting in May laid the foundation for field advisory committees, to provide another link between the Board/staff/membership triangle; committees were established on a trial basis

in the areas of contests and v.h.f. repeaters. Life Membership continued to grow, reaching a total of more than 600 applicants. Special League emblem pins were provided for them during the year, as well as to an equal number of amateurs who had records of 25 years or more of continuous membership—plus 14 in the 50-year category! Renewed interest in amateur radio was indicated by increased publication sales, especially of the *License Manual* (25% up from the previous year) and the *Handbook* (the 4,000,000th copy presented in February to the Chairman of FCC). Postal rate rises, as well as a general upswing in the economy, caused increases in the price of several publications.

On the technical side, *QST* published many articles emphasizing the design and use of circuits centered around solid state devices—bipolar transistors, FETs, and integrated circuits. Among the subjects highlighted were: Toroidal transformers and inductors, solid state receivers, integrated circuit design, an introduction to digital logic devices, satellite picture reception and integrated circuit keyers. Several solid-state frequency standards were described with new methods of measuring frequency.

Many contesters found a new challenge in revised Field Day rules. Since 1968 pointed up problems of more realistic portable operation, 1969 should show improvements in techniques and of course scores. Two "poll surveys" conducted in the quarterly CD bulletins were instrumental in effecting some much needed rules and procedure changes and attracted widespread interest among appointees. With the new band segments for Extra Class operators, W1AW moved its transmitting frequencies to a standard 20 kHz. from the low end of all the major bands. Some new items from the Communications Department: 5-Band DXCC, consolidation of many operating aids into the new Op.Aid 14, the club kit, and new standard forms for activities.

Canadians had an increased license fee imposed on them amounting to \$10.00 per year. Our Canadian Division Director, in cooperation with Provincial radio organizations and clubs, took some positive steps in objection.

The International Amateur Radio Union grew in stature and strength with the admission of Monaco, Mauritius, and Surinam, and

(Continued on page 30)

## League Lines . . .

The government of Indonesia has advised the International Telecommunications Union of withdrawal of its objection to YB amateurs working others throughout the world; as a result, FCC is able to remove Indonesia from the "banned" list (see IARU News). Three other countries (Cambodia, Thailand and Viet Nam) still have on file with ITU a statement under Article 41 of the 1959 Geneva Radio Regulations prohibiting their amateurs from communicating with hams of other countries, and until these official objections are withdrawn, FCC is obligated to honor U.S. ratification of the Geneva agreements and keep those countries on the banned list.

To provide Board and Hq. staff liaison, President Denniston has appointed Director Victor Clark, W4KFC, and Deputy Communications Manager Ellen White, W1YYM, to the Contests Advisory Committee; and Director John Griggs, W6KW, and VHF Editor Ed Tilton, W1HDQ, for the VHF Repeater group. At press time a couple dozen nominations for membership on each committee are being examined and we hope to have names of those selected in time for next month's issue.

We tried once more, but FCC has again turned down the ARRL request (this one RM-1352) that 50 Mc. be kept available for all renewable classes of license and not restricted under the Docket 15928 incentive licensing structure. Details in "Haps" next month.

Requests for more than 10,000 log sheets were filled by Hq. for the 1968 Sweepstakes. Some complained, however, of late receipt -- they failed to bear in mind the slow mail service for third class. Allow at least four weeks for normal 3rd class mail; if in a hurry, please supply first-class postage.

A footnote to the 1963 Geneva Radio Regulations (space radiocommunications, primarily) authorizes amateur space activity in the 144-146 Mc. band. As it is the only such footnote, a possible inference is to prohibit such activity in other bands, although this is an interpretation the League has been unwilling to accept. FCC, in preparation for the 1970 space conference, to solve this difficulty proposes the following addition to the basic definition of the Amateur Radio Service: "Space radiocommunication techniques, as well as those associated with terrestrial systems, may be used in this service."

We're glad to send out 25-year continuous membership ARRL lapel pins (and have mailed about 600 so far) but this must be at your request; there are some 100,000 record cards at Hq. and it is impractical to sort through them all looking for 25-year records.

Affiliation between ARRL and more than 1200 amateur radio clubs is a special relationship that is as old as the League itself. Benefits to the club include training and program films, slides and other materials; a regular club bulletin; organizational assistance. If your club membership has at least 51% licensed amateurs, and has (or can get) 51% League members, you're eligible. Write for a copy of the new club portfolio.

Your stake in amateur radio is a big one. Let your voice be heard where it counts -- by active participation in League affairs. And get a buddy to join now. The League is what you make it.

# A 1969 Model 50-Mc. Transistor Transceiver

*Improved Transmitter Performance, plus All-FET Receiver*

BY THOMAS H. CAMPBELL,\* WA7FJC

**T**HOUGH several articles have described 6-meter transistor transceivers, each with novel and useful ideas, we wish to submit another, with some different twists. Novel features include use of field-effect transistors throughout the receiver, except for the oscillator, and neutralization of the transmitter to improve modulation characteristics of its final stage.

This is not intended as a kit-type project for exact duplication. Rather, it sets forth ideas for those who may be in the process of designing such a rig, or who have the urge to do so. There is no "last step" in ham gear, especially that for the v.h.f. bands. It is hoped that prospective builders will add ideas and improvements of their own. The newcomer to construction of v.h.f. gear should approach this project with caution, but certainly not avoid it. With confidence, patience, and reasonable attention to layout of r.f. and i.f. circuits the resourceful builder of this kind of equipment can have many good operating hours for a minimum investment of time and money.

## *The Receiver*

The r.f. and two i.f. stages of the receiver, Fig. 1, use FETs in simplified cascode circuits. These give good stability and as much gain as a good amplifier with pentodes, with no more parts or cost. The mixer,  $Q_3$ , is a single transistor, with injection to the source, through a capacitor from the oscillator output circuit. It will be seen that this circuit,  $L_1, L_5$ , is double tuned. To further prevent spurious responses from oscillator harmonics the oscillator and related parts are enclosed in an aluminum shield can, from a cannibalized TV set. Stability is assured by using a transistor of moderate rat-

ing, at very low input, with its voltage regulated by a Zener diode.

I.f. selectivity is obtained through use of a crystal filter. Without this the high-frequency i.f. used would have had much too wide a response. Selectivity can also be developed with double conversion, to 455 kc., or better yet, a combination of both filter and double conversion. This may yet be done in our receiver, but the single conversion and filter shown is the simplest arrangement. Filter bandwidth is controlled largely by the value of  $R_1$ . This can be set for good phone or c.w. bandwidth by simple substitution. The lower the value the narrower the bandwidth.

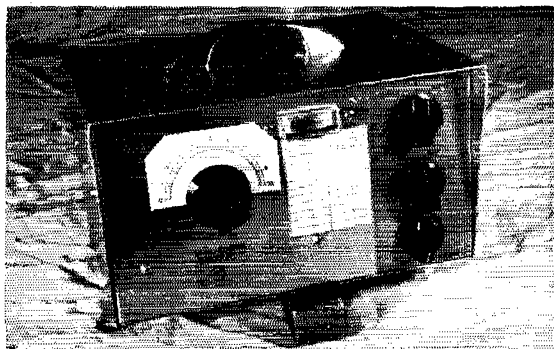
The intermediate frequency chosen, 4585 kc., has no particular significance. Anything from about 3 to 10.7 Mc. will be satisfactory. Crystals on hand for  $Y_1$  dictated the choice in this instance. Too low a frequency gives inadequate image rejection, and anything above 10.7 Mc. may require making one's own i.f. transformers. Certain frequencies should be avoided, such as 4500 kc. (interference from all TV channels) and 3580 kc. (color-TV). Difference frequencies between any two local TV or f.m. stations may generate nontunable interference that is difficult to eliminate.

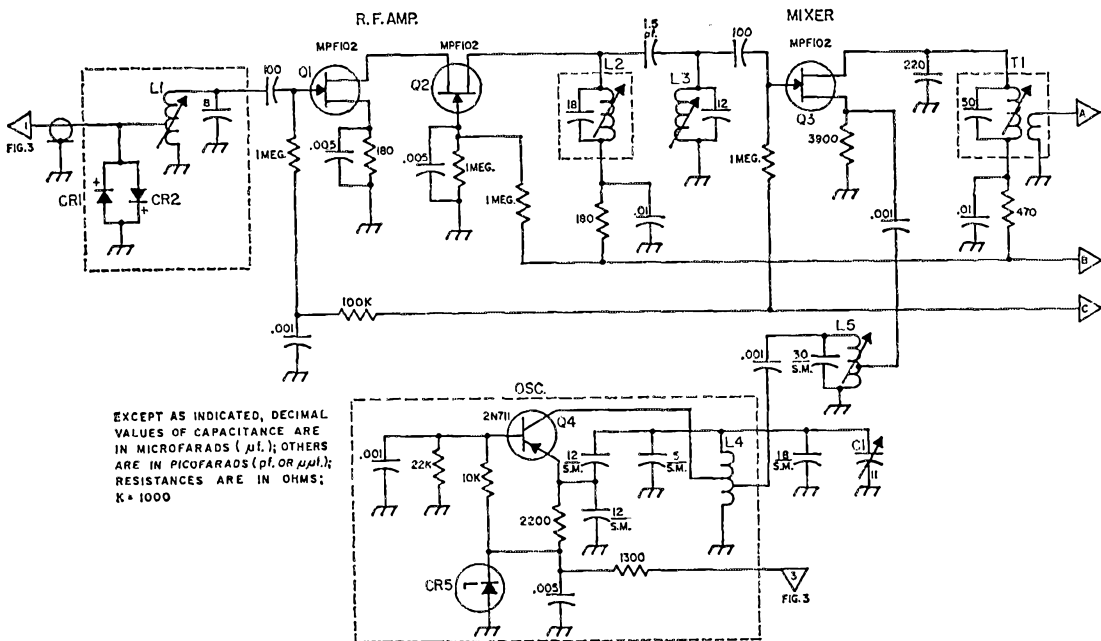
Standard 10.7-Mc. i.f. transformers were used, with external capacitance to bring the resonant frequency down to 4585 kc. The filter input coil,  $L_6$ , was made from an old 455-kc. i.f. transformer, torn apart and rewound, but it is suggested that one more 10.7-Mc. unit be used here, to save considerable labor.

The a.g.c. is obtained from the detector, and is distributed to the controlled stages through an  $R-C$  network. This system does not have the complete control over the audio output level that we had hoped for, but it does a good job of preventing overloading of the i.f. system. The S-meter is shown connected to the source lead of the second i.f. amplifier. It could just as well go to the first r.f. or i.f. stage, the choice being determined by which of these responds best to the a.g.c. voltage.

Detection is accomplished with two 1N34A diodes,  $CR_3, CR_4$ , in a voltage-doubler circuit. The audio is run directly to an FET audio

The WA7FJC 50-Mc. Hilltopper. Knob at the upper right controls the meter switch, with positions for reading relative transmitter output, received-signal strength, and battery voltage. The send-receive switch is just below, and the audio volume control and main battery switch are in the lower right corner.





amplifier,  $Q_0$ , which is transformer-coupled to the volume control,  $R_2$ . Further amplification is done in the dual-purpose amplifier and modulator.

### Transmitter Details

The transmitter r.f. section, Fig. 2, uses three inexpensive transistors and delivers just over 500 milliwatts of useful power. Two crystal oscillator circuits are shown. The simpler uses a 2N706,  $Q_{10}$ , in a circuit that works well with 25-Mc. overtone crystals, and with most 8-Mc. crystals, oscillating on their third overtone. It has even been used with some 5-Mc. crystals on their fifth overtone. The optional circuit uses a more expensive transistor,  $Q_{10}$ , and makes for more reliable overtone operation with fundamental crystals. This may be worth the extra transistor cost, if one likes to grind his own inexpensive crystals, as the writer does.

The doubler,  $Q_{11}$ , is another 2N706, giving about 100 mw. output on 50 Mc. It and the amplifier run in the transistor equivalent of Class C, and draw practically no current in case of oscillator failure. The collector is tapped down on the tuned circuit, for optimum circuit Q and rejection of unwanted harmonics.

The final stage transistor, a 2N2217,  $Q_{12}$ , has a dissipation rating of 0.8 watt in free air, or 3 watts if the case temperature is held to 25 degrees C. with a heat sink. Hence this stage is capable of considerably more output than quoted earlier, if drive is increased. For your peace of mind, it is a good rule to limit the total input to the amplifier to the maximum dissipation rating of the transistor. This will protect the transistor in case of operation with a badly mismatched load. Transistors can toler-

ate a little overload, but they give no warning when about to quit!

Note neutralization in the final stage. This may not be necessary to prevent oscillation, but it is important in securing good modulation characteristics. Just because an amplifier does not oscillate when not neutralized does not mean that feedback does not exist, but rather that there is not enough to cause the stage to take off. In reality it may be close to the edge. The feedback in such an amplifier is not a constant. It varies over the modulation cycle, and its effect on the stage gain varies, so the r.f. output is not a linear function of the modulator output.

Addition of neutralization (through  $C_g$ ) takes care of most of the average-value feedback in the circuit. A transistor cannot be totally neutralized by a simple feedback circuit, since there is also a negative-resistance component involved. Though careful adjustment will neutralize the circuit reasonably well for the c.w. condition, there will be too little on one voice peak and too much on the other. But the net effect is to neutralize about 90 percent of the normal feedback, permitting symmetrical modulation with the tuning set for maximum output. This eliminates detuning of the stage to achieve adequate modulation, a step often required with unneutralized stages. Detuning may result in satisfactory modulation, but it does so at the expense of output. Furthermore, it only reduces the effect of the problem, rather than attacking it at its source.

Modulation is applied to both driver and amplifier, in the interest of good quality. It is good practice in transistor transmitters to modulate all stages possible, except the oscillator.

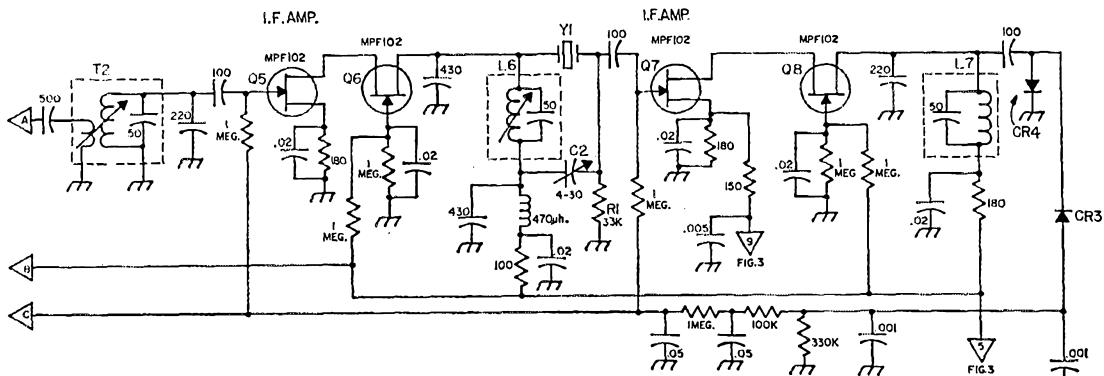


Fig. 1—Schematic diagram and parts information for the receiver portion of the WAFJC 50-Mc. transceiver. Unless otherwise indicated, resistors are 1/4-watt composition. Capacitors marked SM are silver-mica. Component numbers not listed below are for text references. C<sub>1</sub>—11-pf. variable of rugged design, preferably ball-bearing. Drive with external vernier.

C<sub>2</sub>—30-pf. ceramic trimmer.

CR<sub>1</sub>, CR<sub>4</sub>—1N34A diode.

CR<sub>2</sub>—6.5-volt Zener diode.

L<sub>1</sub>—5½ turns No. 34 enamel on ¼-inch iron-slug form (Miller 23A000 RPC). Tap at 2 turns, or wind 1½-turn link.

L<sub>2</sub>—4½ turns like L<sub>1</sub>; no tap.

L<sub>3</sub>—6½ turns like L<sub>2</sub>.

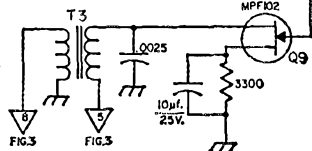
L<sub>4</sub>—6 turns No. 20, ½-inch diam., 16 i.p.i. Tap at 2 and 5 turns from ground end. (B & W 3003).

### Audio Amplifier-Modulator

Most transistor transceiver designs employ ready-made audio modules. These are inexpensive and convenient, but in this instance we wanted to do the whole job, putting the receiver and audio on a single circuit board. Only three inexpensive transistors and transformers are used, and the circuit, Fig. 3, is as simple as possible. A 2N508, Q<sub>13</sub>, drives two 2N321s, Q<sub>14</sub> and Q<sub>15</sub>, with up to one watt output if necessary.

A telephone handset is plugged into J<sub>2</sub>. In transmitting its carbon microphone is coupled to the driver stage through T<sub>1</sub>, and no speech amplifier is needed. In receiving the earphone is in parallel with the speaker, and is used when operating under noisy conditions, as in group work during Field Day.

The modulation transformer, T<sub>2</sub>, is rated at 300 mw., but considerably more can be run in voice work without serious distortion or danger of burnout. This was intended to be a driver transformer; in normal use the higher-resistance winding would be on the output side. The windings are interchanged in this application, the low-resistance winding being the output, carrying the d.c. to the modulated stages. The tap is run to the driver stage. In receiving the amplifier output runs to the stepdown transformer, T<sub>3</sub>, which matches the low impedance of the speaker voice coil. This transformer could be eliminated if a 3-winding transformer (500 c.t., 500 c.t., 8 ohms) can be obtained for use at T<sub>3</sub>.



L<sub>5</sub>—6 turns No. 28 vinyl-insulated, like L<sub>2</sub>.

L<sub>6</sub>, L<sub>7</sub>—10.7-Mc. i.f. transformer. Use primary only (Miller 2070).

T<sub>1</sub>, T<sub>2</sub>—10.7-Mc. i.f. transformer (Miller 2072).

T<sub>3</sub>—Audio transformer; pri. 10,000, sec. 1500 ohms.

Y<sub>1</sub>—Crystal between 3 and 10.7 Mc. See text.

### Adjustment

Receiver alignment is relatively simple, and it is made easier with the signal source shown in Fig. 4. The crystal can be the one used in the i.f. filter, for i.f. alignment, or the transmitter crystal, for peaking the front end. A calibrated dip meter is helpful.

Peak the receiver i.f. first. Feed the generator output (with the i.f. crystal in the generator) into the mixer gate connection to L<sub>6</sub>, and peak the i.f. for maximum S-meter response. To insure accurate peaking, adjust the voltage on the generator, via R<sub>4</sub>, so that the meter is reading around S9. During the adjustment process, set the crystal phasing capacitor, C<sub>2</sub>, at about one-third capacitance.

Next the oscillator should be put on the proper frequency. This is best done by monitoring on a calibrated receiver capable of tuning the 40 to 50-Mc. range, but a calibrated dip meter or wavemeter can be used. The oscillator should be on the low-frequency side of the signal frequency, unless you live in an area where there is extensive use of the frequencies around 40 Mc. Image rejection is better with the oscillator on the low side than on the high. You will note that adjustment of L<sub>6</sub> has some effect on the oscillator frequency. This can be used for "fine tuning," once L<sub>4</sub> has been adjusted to within 500 kc. or so of the desired frequency.

With the oscillator on the proper frequency and the i.f. system peaked, it should be possible to receive local signals. These may be used in tuning up the front end, or the signal gen-

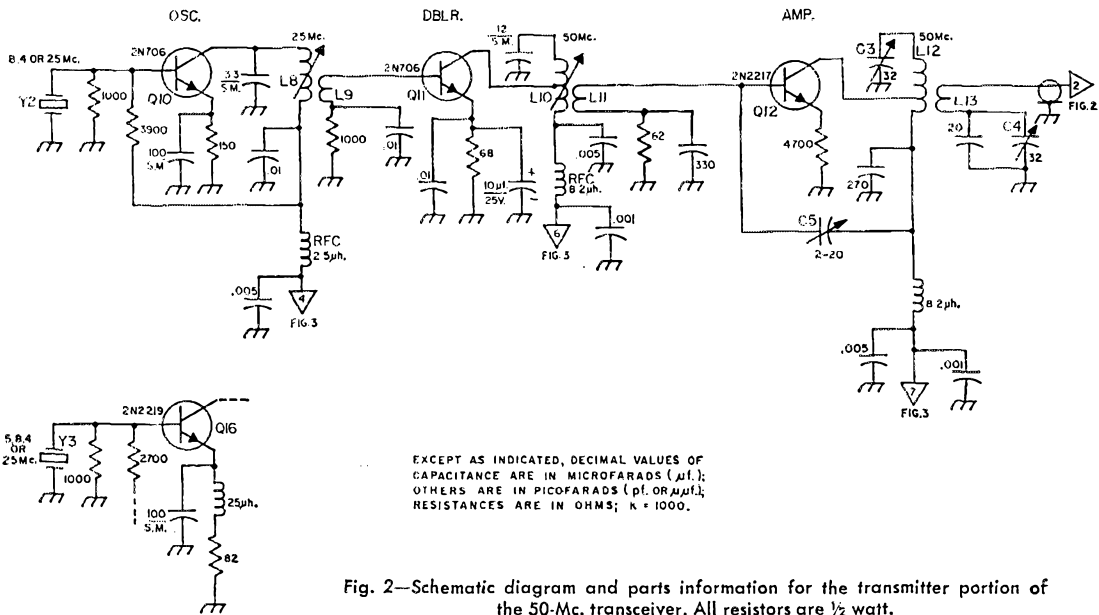


Fig. 2—Schematic diagram and parts information for the transmitter portion of the 50-Mc. transceiver. All resistors are 1/2 watt.

- $C_3, C_1$ —32-pf. miniature variable (Johnson 160-130).
- $C_5$ —2-20-pf. mica or ceramic trimmer (Elmenco 402 or Centralab 822AZ).
- $L_2$ —11 turns No. 26 enamel on 1/4-inch iron-slug form (Miller 23A000RPC).
- $L_1$ —3 turns over cold end of  $L_2$ .

- $L_{10}$ —8 turns like  $L_2$ , center-tapped.
- $L_{11}$ —2 turns over cold end of  $L_{10}$ .
- $L_{12}$ —8 turns No. 20, 1/2-inch diam., 16 t.p.i., tapped at 2 turns (B & W No. 3003).
- $L_{13}$ —4 turns, same as  $L_2$ , near RFC end of  $L_{12}$ . Can be made from same piece of coil stock.

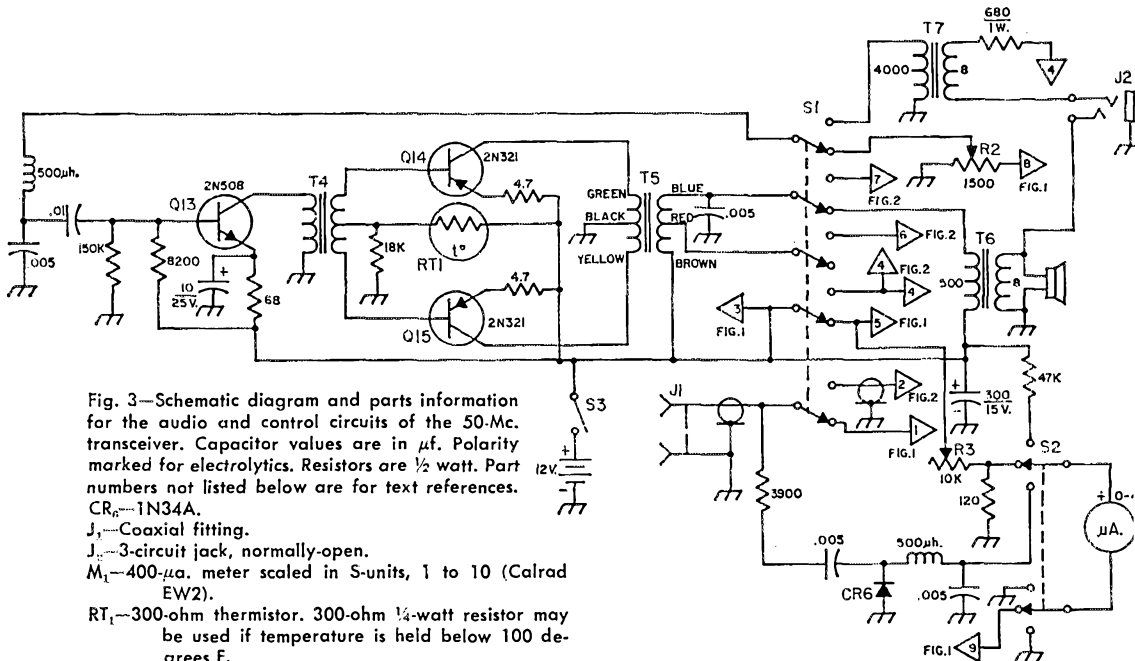


Fig. 3—Schematic diagram and parts information for the audio and control circuits of the 50-Mc. transceiver. Capacitor values are in  $\mu$ f. Polarity marked for electrolytics. Resistors are 1/2 watt. Part numbers not listed below are for text references. CR<sub>6</sub>—1N34A. J<sub>2</sub>—Coaxial fitting. J<sub>3</sub>—3-circuit jack, normally-open. M<sub>1</sub>—400- $\mu$ a. meter scaled in S-units, 1 to 10 (Calrad EW2). RT<sub>1</sub>—300-ohm thermistor. 300-ohm 1/4-watt resistor may be used if temperature is held below 100 degrees F. S<sub>1</sub>—5-pole 2-position rotary switch (CTS-IRC series T-200). S<sub>2</sub>—2-pole 3-position switch like S<sub>1</sub>. S<sub>3</sub>—Switch on audio gain control, R<sub>2</sub>. T<sub>4</sub>—Driver transformer; pri. 10,000 ohms, sec. 1000 ohms, center-tapped (Stancor TA-63, used at half rated impedance).

- T<sub>5</sub>—Output transformer, 500 ohms each winding, center-tapped (Stancor TA-52).
- T<sub>6</sub>—Output transformer, 500 to 8 ohms (Merit A-3005 or Stancor AB101).
- T<sub>7</sub>—Similar to tube-radio output transformer, 4000 to 8 ohms (Stancor A-2203).



erator can be used with the transmitter crystal. Install the i.f. filter crystal in the receiver, and tune in the signal from the generator. Adjust the generator power for moderate S-meter response, and peak the r.f. circuits. Peak  $C_{21}$  preferably on a weak a.m. signal. Check the adjustment of  $L_{11}$  for optimum signal-to-noise ratio, if there is any noticeable difference between best S/N and maximum gain.

Transmitter adjustment is simple. Connect power to the oscillator and doubler stages through a 50- or 100-ma. meter. Adjust  $L_6$  until the current jumps up, indicating oscillation. Tune for maximum, so long as it is not over 40 ma., and the oscillator will start every time. Check to be sure that the core slug actually goes through two peaks, indicating that the coil will tune to resonance. Occasionally a coil will appear to tune, when it is merely approaching resonance as the core centers in the winding.

Now connect all three stages through the meter. Connect a No. 47 lamp across  $L_{13}$ , and tune the driver collector coil,  $L_{10}$ , for maximum current, about 100 ma. Quickly tune the output circuit,  $C_3, C_4$ , for maximum lamp brilliance. If no light is observed in a maximum time of about 10 seconds, detune the driver to bring the current down to about 70 ma., and continue the attempt. Do not allow the transmitter to draw more than 100 ma. for any amount of time, unless the lamp is well lighted, as this could ruin the 2N2217.

Neutralization is done by slowly increasing the capacitance of  $C_{21}$ , while watching the current meter. At some point there will be a sudden increase in current. Quickly back off the capacitor until the current drops down. Set  $C_{21}$  so that you can turn the tuning capacitor,  $C_{23}$ , about 30 degrees farther toward maximum setting than where the output peaks, before the current jumps up. This is only an approximate setting, but it will keep the amplifier stable, and provide excellent modulation characteristics.

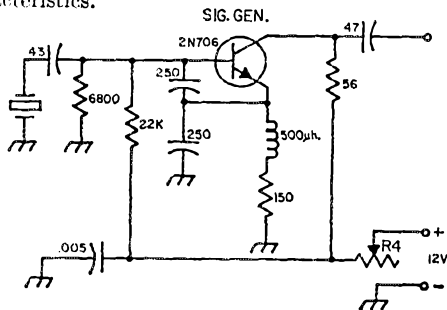


Fig. 4—Schematic diagram of the signal source used for aligning the receiver. The crystals used are those which eventually serve in the i.f. filter and transmitter oscillator.

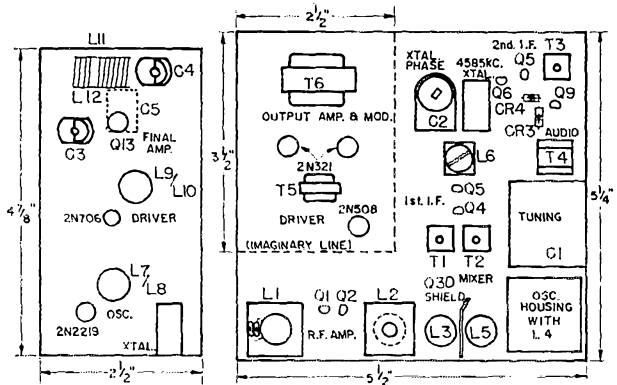


Fig. 5—Approximate mechanical arrangement of components on the two circuit boards used in the 50-Mc. transceiver. The larger contains most of the receiver and audio circuitry. The smaller is the transmitter r.f. unit.

### Construction Hints

Anyone who undertakes a project of this kind will very likely have some ideas of his own about how he will do the job, so only basic details and approximate dimensions are given. The transceiver is housed in a 5 by 6 by 9-inch aluminum box (Wycro LU-764) which was anodized on the side used as the front panel. The top was covered with a U-shaped piece, to give a more finished appearance. Batteries are mounted on the bottom plate, in two clips of four each. Removal of the plate allows replacement of batteries and access to the transmitter board and controls.

Nearly all components are mounted on two circuit boards. The receiver and modulator-audio are on one board  $5\frac{1}{4}$  by  $5\frac{1}{2}$  inches in size. The transmitter r.f. board is  $4\frac{7}{8}$  by  $2\frac{1}{2}$  inches. Both are mounted with machine screws and brass tubing spacers. The receiver board is mounted to an aluminum plate, which is in turn fastened to the box by angle brackets. This assembly can be removed for adjustment of the receiver circuits, without appreciable change in tuning resulting from changes in stray capacitance. The transmitter board is mounted in a vertical plane on the rear of the box, to allow tuning from the outside.

Approximate parts layouts are given in Fig. 5. There are many other ways the components could be arranged. This project made use of many parts of the junkbox variety that would not be duplicated in another construction job, so there is little point in going into layout in fine detail. There are two important points: isolation of the receiver oscillator circuits, and mechanical stability. It is suggested that the prospective builder collect all parts to be used before doing layout work. Coordinate the board layout with desired panel design. These steps will prevent difficulties that might arise

(Continued on page 120)

# Notes On The Heath SB-300/SB-301 And SB-401

BY M. L. PETERSON,\* W2FMX, AND FRANCIS K. WILLIAMS,\*\* WB4GTS

SEVERAL ideas concerning improvements for the SB-300/SB-301 receiver and the SB-401 transmitter have been compiled here to assist any hams who may be experiencing difficulty. Although the two authors worked independently, their efforts have been combined in the preparation of this text to make it as comprehensive as possible.

## Spurious Emission

When the Heath SB-401 transmitter is used with either the SB-300 or SB-301 receiver as a transceiver in the c.w. mode, two c.w. signals are radiated simultaneously. The undesired signal is 1 kHz. higher in frequency than the carrier, and although attenuated it is nevertheless discernible.<sup>1</sup> This second signal creates the effect of a modulated c.w. signal.

The source of the undesired signal was traced to the b.f.o. in the receiver which becomes the carrier generator for the SB-401 when used in the transceive mode. The receiver b.f.o. crystal oscillator operates at 3396.4 kHz., whereas the carrier generator used when operating c.w. is at 3395.4 kHz. The 3396.4 kHz. signal is brought into the SB-401 from the SB-300/SB-301 through a coaxial cable, but the continuity of the cable is broken at the mode switch M4R. Enough stray coupling exists in the switch and associated circuitry for this weak r.f. signal to be picked up and radiated as a second keyed signal. Removing the cable between the SB-401 and the SB-301 eliminated the undesired signal and confirmed its source.

The very loose coupling of the b.f.o. output within the receiver makes it possible to ground the b.f.o. output during transmit without having a detrimental effect on the receiver's operation. This suggested a rather simple solution. The mode switch wafer M4R has three contact lugs. Number 1 is used only as a tie point; number 2 is connected to the inner conductor of the coaxial cable going to V2C; number 3 is connected to the inner conductor of the coaxial cable going to the receiver b.f.o. connections. By placing another contact on the M4R wafer at position 4, and grounding this lug, lugs 3 and 4 will be connected when the mode switch is in the c.w. position, thus grounding the receiver b.f.o. input and eliminating the problem.

\*322 White Street, Waterville, N.Y. 13480.

\*\*Apt. 8, 204 South Veitch St., Arlington, Virginia 22204.

<sup>1</sup>Tests in the ARRL laboratory showed the undesired signal to be 32 db. below the desired carrier.—*Editor*

## Audio Tone Under Key-up Conditions

An annoying a.f. tone is often heard through the SB-300/SB-301 audio system after lengthy transmissions and prolonged key-down periods when the SB-300/SB-301 and the SB-401 are used in the transceive mode. After considerable testing, the cause of this condition was traced to a screen voltage that exists on the 6146 screens in the SB-401 in the key-up condition. When the 6146s were new, this condition did not exist. However, when subjected to some abuse, an electron-emission path is set up between the screen and plate of the 6146 final amplifier tubes. The hotter the tubes get, the greater the emission, and the higher the measured screen voltage during key up. Voltages up to 20 volts have been measured at the 6146 screens in the key-up condition. During receive, this 20 volts is applied to the plate circuit of the carrier generator tube V2B, sufficient to cause the tube to oscillate and beat with the b.f.o. signal in the receiver, producing a 1-kHz. tone.

Curing this problem is no great chore. Contact No. 7 of relay RL1 can be connected directly to ground. This will automatically ground the screens of the 6146s during receive and prevent any voltage from getting back to the carrier generator. Because the relay magnets of relay RL2 are also connected to the 6146 screen circuit, grounding the screens also helps to prevent relay RL2 from sticking.

## Relay Problem

Although not a difficulty often encountered, some fellows have noticed that relay RL1 will not drop out properly even with the VOX-delay control set fully counterclockwise when the SB-401 is used in the c.w. mode. A possible explanation of this is that there is excessive leakage through the sidetone oscillator tube V12C in the cutoff state. This signal is coupled to the VOX amplifier V12A by a 7.5-pf. capacitor, C131. Reducing the capacitance of C131 to 2.0 pf. eliminates the problem.

## Low Drive During Transceive

When using the SB-300/SB-301 and SB-401 for transceive operation, the heterodyne oscillator signal for the SB-401 is obtained from the SB-300/SB-301. In the SB-401 instruction manual, Heath recommends that the receiver heterodyne oscillator coils should be repeaked when the transceive cables are installed be-

(Continued on page 13 0)

# Ordinary And Processed Speech In S.S.B. Application

BY HAROLD G. COLLINS,\* W6JES, ex-WA6IOW/W8FNH

**B**ECAUSE of the high-amplitude peaks in the voice waveform, the natural, unprocessed voice does not provide maximum utilization of an s.s.b. suppressed-carrier communications system. It is quite apparent that many off-the-shelf processing units are becoming available for use with existing transmitters. These units, in one way or another, claim to increase talk power of the s.s.b. transmitter by increasing the average-to-peak levels in the modulation signal and hence in the r.f. envelope. With the apparent increase of interest in the subject, some of the more-simple techniques that are presently employed or are readily applicable are summarized here.

## The Fundamental S.S.B. R.F. Envelope

The power developing capability of a given transmitter in single-sideband service depends upon the nature of the signal waveform being transmitted. The most fundamental s.s.b. waveform is generated from a single-frequency audio sine-wave tone. This single tone is translated in the s.s.b. generator to produce a single radio-frequency output.

The term that describes power in an s.s.b. r.f. envelope is *peak envelope power* or simply p.e.p. It is defined as "the average power of the highest amplitude signal measured over one r.f. cycle," or "the mean power developed at the crest of the modulation envelope," in other words, the key-down power developed within allowable distortion limits.

\* 1874 Labrador Drive, Costa Mesa, California 92626.

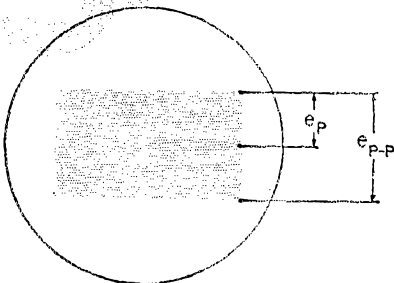


Fig. 1—S.s.b. envelope using single-tone modulation, as displayed on an oscilloscope. Power in the envelope (assuming a resistive load) is a time average value, over one r.f. cycle, and is equal to  $e_p^2/2R_{load}$ . P.e.p.-to-average ratio is 0 db.

*It is helpful to review some fundamental relationships which describe an s.s.b. tone-modulated envelope. Such commonly used parameters as peak envelope power (p.e.p.) and instantaneous peak power are defined and described in this text. A description of a speech model (peak-to-average level) in relation to the s.s.b. voice envelope is also offered. Because of the vast amount of published material available on this subject, only a cursory compilation of facts and data can be presented.*

As an example, for a given transmitter with four 811As, the maximum single-tone operating level occurs when plate current reaches 700-800 ma. With this value of plate current and a plate voltage of 1600 volts, the r.f. power output is nearly 800 watts with a plate power input of 1250 watts. The r.f. output power is the mean power value (p.e.p.) previously stated. With 800 watts into a 50-ohm load, an r.f. current  $I_{rf}$  of 4 amp. r.m.s. will flow. An r.f. voltage  $E_{rf}$  of 200 volts r.m.s. is developed across the load.

If one monitors the above r.f. envelope on an oscilloscope connected across the 50-ohm load, the instantaneous r.f. peak-to-peak voltage waveform of Fig. 1 is observed. One half the envelope height is the instantaneous peak envelope voltage; that is,  $\sqrt{2} E_{rf}$ . In the 811A amplifier above, if  $E_{rf} = 200$  volts then obviously the peak voltage is  $\sqrt{2} \times 200$ . A value of *instantaneous r.f. peak power* can be calculated which is

$$\frac{(\sqrt{2} \times 200)^2}{50} = \frac{2 \times 40000}{50} = 1600 \text{ watts}$$

The instantaneous r.f. peak power is 2 times p.e.p. or 3 db. greater in the s.s.b. envelope.

One quantity of interest remains, the transmitter p.e.p. input power during single-tone modulation. It is simply the d.c. plate voltage  $\times$  the d.c. plate current, or in the above example 1600 volts  $\times$  0.780 amp. or 1250 watts. The basic reference values are thus established.

## Speech and the S.S.B. Voice Envelope

The ratio of instantaneous peak-to-average power in speech is somewhat dependent upon

the percent of the time that the peak is allowed to be exceeded. For instance, if we can specify that the real peaks of speech can exceed some lower level that we choose to call the "peak" for 1% of the time, then the ratio of instantaneous peak-to-average speech power is about 14.5 db. This figure is for a continuous discourse. It is the figure used as the statistical peak-to-average power ratio, and it is the value used also in the following discussion as the peak-to-average power ratio for *unprocessed speech*.

Now let us apply audio to an s.s.b. transmitter (with a voice waveform such as you would see on a scope placed at the a.f. input) and modulate the transmitter to its p.e.p. capability, as seen in Fig. 2. We find the *peak-to-average power ratio* measured in the audio signal is essentially the same as the *p.e.p.-to-average power ratio* in the s.s.b. voice envelope. Hence, translating the voice signal to s.s.b. increases the measured voice peak-to-average power ratio by an amount equal to the instantaneous peak-to-average power ratio of the r.f. sine-wave envelope which is 3 db. (see previous section on fundamental r.f. envelope). What this is saying is that a peak-to-average power audio voice waveform of 14.5 db translated to an s.s.b. voice waveform will result in an *instantaneous r.f. peak-to-average power* of 17.5 db. The p.e.p.-to-average power in the r.f. wave remains 14.5 db., a ratio of 2S/L.

Employing our above 811A amplifier, again the p.e.p. output is 800 watts. Hence, if we just talk our amplifier to the p.e.p. limit, as would be observed on the r.f. monitor scope by observing instantaneous r.f. peaks, the average r.f. power output  $P_{out}$  is  $800/2S$  or nearly 30 watts. This can best be observed by monitoring the r.f. current in a 50-ohm load with a thermocouple r.f. ammeter. It has been assumed in the above discussion that the amplifier supply voltage shows negligible change from minimum-signal to maximum-signal plate current.

The thermocouple r.f. ammeter indicates the r.m.s. value of current for any signal-envelope waveshape. The r.f. current in its varying state with modulation applied should average between  $\frac{3}{4}$  to 1 ampere in the above example. Unfortunately, cranking up the mike gain causes linear-amplifier limiting or flat-topping to occur. This does, however, increase the average power output and hence the loudness at the receiving station. Along with this increase in average power comes a broadening of the transmitted bandwidth in the form of distortion products caused by non-linear operation. In an unprocessed-modulation s.s.b. transmitter, generation of the odd-order products by opening up the mike gain becomes annoying to intolerable in adjacent channels rather rapidly.

### Speech Processing

If one could increase the average power in the modulation envelope while effectively limiting the modulation envelope at the p.e.p. capability, and minimize adjacent channel interference by reducing the number of generated distortion

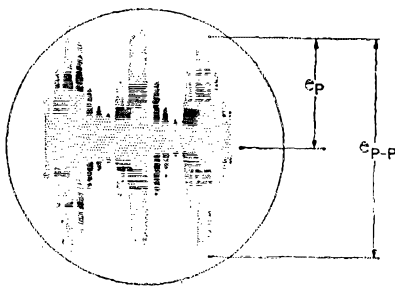


Fig. 2—S.s.b. r.f. envelope using unprocessed voice modulation. P.e.p. is the mean power developed at the crest of the modulation envelope, i.e.  $e_p^2/2R_{load}$ .

products, then an increase in the transmitter's effectiveness would be obtained. To say it another way, talk power would be increased if the average-to-peak power ratio of the in-band modulation envelope was greater.

In order to increase the average-to-peak power ratio, it is necessary to modify the signal waveform. This inevitably leads to distortion of the voice signal, and reduces intelligibility. One measure of intelligibility is the effective received signal-to-noise ratio. If distortion is treated as if it affects intelligibility the same as noise, then the effective received signal-to-noise ratio is

$$\left[ \frac{S}{N} \right]_{eff} = \frac{S_{av}}{(N + D)}$$

where  $S_{av}$  = The average sideband power at the receiver.

$D$  = Effective noise power produced by the distortion products of the processor.

$N$  = The average noise power from all other sources.

Since  $S_{av}$  and  $D$  are both functions of the processor limiting level, intelligibility can be maximized by choosing the proper level of limiting for a given level of noise power  $N$ . From this we conclude that the best method of speech processing is the one that gives the greatest increase in talk power with the least distortion.

The most useful way of evaluating the benefits of a processor is to observe the improvement in the speech intelligibility threshold in the presence of noise with the same peak power as the unprocessed signal. Intelligibility threshold is defined as the condition where a connected discourse is just barely understandable in the presence of white noise which is limited to the signal bandwidth. Thus intelligibility threshold improvement, or ITI, may be defined as the effective signal-to-noise ratio with processing, to the signal-to-noise ratio without processing. From the above, it then follows that the intelligibility threshold improvement, ITI, may be expressed by

$$ITI \text{ (in db.)} = 10 \log_{10} \frac{S_{av}}{S_{0av}} - 10 \log_{10} \frac{(N + D)}{N}$$

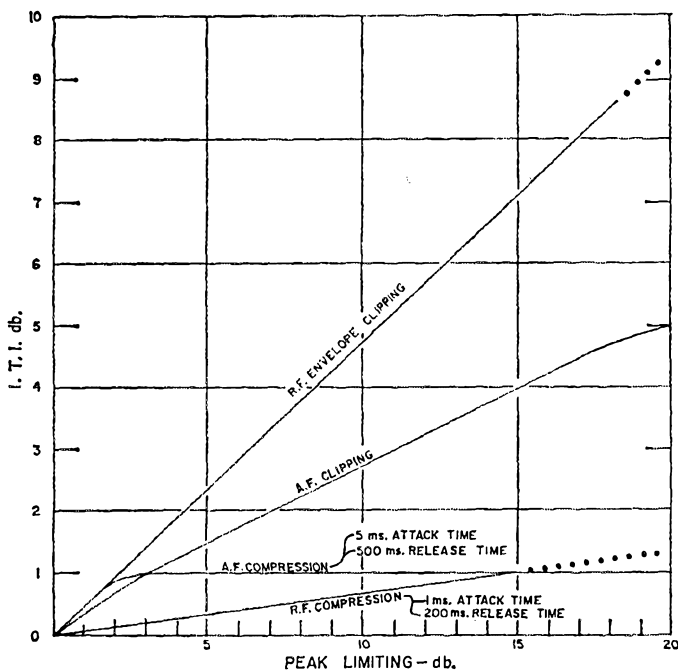


Fig. 3—Comparison of effectiveness of simple speech processing techniques applied to s.s.b. transmission. Typical compression and release times are indicated.

where  $S_{av}$  = average sideband power at the receiver without processing. Since  $S_{av}$  and  $N$  are considered as constant and equal bases for all systems, we conclude that the best method of speech processing (i.e. the method yielding the greatest ITI) is the one that maximizes the ratio of  $S_{av}/D$ .

Note that the above threshold improvement *cannot* be directly measured by the receiver S-meter. An increased S-meter (i.e. average) reading is in response to greater average sideband power at the receiver which also includes quantity  $D$  produced by processor limiting. A simple means of measuring ITI is by the use of a calibrated attenuator at the station receiver antenna input. The received test signal, with the processor switched out, is reduced to the threshold level where it becomes barely understandable. The processor is then switched in and the test signal is now reduced further by the attenuator to where it again becomes barely understandable. The increase in attenuation is thus a reasonable value for ITI.

Fig. 3 shows a comparison of four methods of speech processing used in s.s.b. work. This figure illustrates the intelligibility threshold improvement or db. improvement in signal-to-noise ratio at the receiver *vs.* db. of peak limiting in single-sideband speech. The r.f. compressor has a 1-ms. attack time and 200-ms. release time, which is typical of a.l.c. circuits. As these time constants are shortened, the a.l.c. circuit ultimately approaches that of r.f. clipping. The audio compressor's attack time is of the order of 5 ms., and it has a release time of 500 ms. As these time constants are shortened, the performance approaches that of an audio clipper.

### Speech Clipping

Investigations have shown that speech remains intelligible under conditions of heavy peak clipping or what is termed infinite clipping. This process retains only the zero crossovers and all envelope amplitude information is therefore destroyed. The fact that infinitely clipped speech is recognizable at all may be surprising until it is remembered that speech sounds consist of the fundamental frequency plus harmonics. Clipping will produce more harmonics which may upset the original harmonic structure of the sound, however not enough to destroy recognition of the original harmonic relationship of the sound.

It may be recalled that s.s.b. has been criticized in the past for its theoretical inability to transmit an audio square wave. Such would require an infinite amplitude capability, infinite bandwidth, and preservation of amplitude and phase relationships. In any practical modulation system, bandwidth is limited, and this reduces the required s.s.b. p.e.p.-to-average power ratio. This is particularly true when filtering is incorporated after clipping to restore original signal bandwidth. Table I illustrates the important relationships.

Clipping may also be accomplished at s.s.b. r.f. or i.f. frequencies. This has the advantage that fewer in-band distortion products are created for a given amount of clipping, as harmonic distortion would then appear at multiples of the r.f. frequency. An r.f. filter following the clipper is necessary to maintain original bandwidth.

### A.F. Clipping

Consider a speech wave that is infinitely clipped at audio frequencies, band-limited from

300-2700 Hz. and is used to modulate an s.s.b. transmitter. With an r.f. passband of  $f_c + 300$  to  $f_c + 2700$  Hz., the highest harmonic retained is the ninth;  $2700/300 = 9$ . From Table I, the p.e.p.-to-average power ratio of the s.s.b. envelope will not exceed 2.7/1 or 4.3 db. This would result in an increased average power output of 14.5 db. - 4.3 db. = 10.2 db. Again in the example of the 811A amplifier, the measured output with speech clipping, using the r.f. thermocouple ammeter and load resistance technique would be about 300 watts (2.1+ amp.).

Observing the above transmitted signal from the receiver side, it was shown experimentally that 15 db. of clipping (with a relatively constant level speech) improves the speech intelligibility threshold by nearly 4 db. Increasing the clipping level to 25 db. gives an additional 1.5 db. improvement. Fig. 3 shows about 5 db. improvement with 20 db. of clipping. The intelligibility threshold improvement is less than the 10 db. gain, and it is evident that the distortion produced degrades the intelligibility about the same as noise.

#### R.F. Clipping

Infinite clipping of the s.s.b. signal followed by only enough filtering to remove the r.f. harmonics would give a p.e.p.-to-average power ratio of nearly 0 db. The result would approximate a constant-amplitude frequency-modulated r.f. sine wave. Increased filtering to remove out-of-band intermodulation distortion products will raise the p.e.p.-to-average power ratio toward 3 db. Like a.f. clipping the intelligibility threshold improvement is less than the theoretical gain in average-to-p.e.p. ratio of the transmitter. The expected improvement in intelligibility threshold if no distortion masking is present is: 14.5 db. - 3 db. = 11.5 db. In the example of the 811A amplifier the measured power output with r.f. speech clipping using the thermocouple ammeter technique is in the region of 400 watts (3 db. less than p.e.p. capability). The r.f. ammeter would indicate a level of 2.8 amp. under these conditions.

Evaluation of s.s.b. clipping from the receive side with constant-level speech, and filtering to restore the original bandwidth, results in an

improved intelligibility threshold of 4.5 db. with the clipping threshold set 10 db. below the signal peak. Increasing the clipping level to 18 db. gives an additional 1/2 db. improvement, or 8.5 db. total increase. The difference between expected and measured intelligibility threshold value is less with s.s.b. clipping than with the earlier discussed audio clipping. This verifies that distortion produced by r.f. clipping is less than that caused by a.f. clipping.

#### Speech Compression

Because of the syllabic character of speech, it would seem that an optimum compression system could operate to maintain a flat envelope. Peak volume compression acts much like delayed a.g.c. and is capable of producing a flat output once the compression threshold is exceeded. Ideally, the flat part of the compression characteristic should have a range of 35 to 40 db. Practically however, background noise very often reduces the range of the lower limit of the input. Compression much beyond 20 db. with high background noise will offer little improvement.

Compression may be accomplished at audio frequencies or at the s.s.b. transmitter's r.f. or i.f. amplifiers. In practice, fast attack a.g.c. is desired to prevent overshoot on steep voice wavefront signals (1 ms. or less). Too slow a release means the a.g.c. cannot follow rapidly decaying syllables. The d.c. control voltage does not change appreciably from one cycle to the next. Weak syllables following a strong one are then also compressed.

#### A.F. Compression

A common a.f. compression attack time is in the region of 10 ms. and release time in the order of 300 ms. In order to follow the envelope of speech, considerably shorter attack and release times are necessary for an effectively improved intelligibility threshold. The ideal attack time for a syllabic compressor's a.g.c. loop should be 1 ms. or less. The release time should be faster than 10 ms. Difficulties arise with such a fast release time constant, as feedback by the a.g.c. line can be regenerative or degenerative depending on the phase shift in the control loop.

Slow time constant compression is valuable for maintaining relatively constant average volume speech, but such a compressor adds little to the intelligibility threshold at the receiver, only about 1-2 db.

The faster time constant syllabic compressor, on the other hand, can give up to 5-5 1/2 db. improvement in the intelligibility threshold. This level requires a rather high degree of peak compression, between 25-40 db. As is shown in Fig. 3 the intelligibility threshold improvement of audio compression ultimately will approach that of audio clipping. Then the speech compressor behaves just like a clipper with the same threshold because the output waveshape is identical. The amount of distortion produced is the same

**TABLE I**  
Relationship of Power in a Band-limited Square Wave and its S.S.B. Envelope

A.F. Square Wave		S.S.B. Envelope P.E.P./Av. Pwr.	
Maximum Harmonic	Pk./Av. Power	Ratio	Db.
Fifth	1.5	2.0	3.0
Seventh	1.47	2.4	3.8
Ninth	1.46	2.7	4.3
Fifteenth	1.4	3.4	5.3

as that produced by conventional clipping with the same limiting threshold.

### R.F. Compression

S.s.b. transmitters generally utilize converters to translate the audio frequencies up to an r.f. band. After translation, the r.f. s.s.b. signal is linearly amplified by class A and class B stages to the required power level. Examination of the envelope of the r.f. signal for s.s.b. speech shows a variation in amplitude at the syllabic rate not too unlike that of the envelope of the speech.

The most common type of speech processing presently employed in today's s.s.b. transmitters is a.l.c. (automatic load or level control). This form of processor has been employed over the last 10-12 years. It has found wide acceptance in maintaining the peak r.f. output of the transmitter at a relatively constant level when the modulation varies over a considerable range. Present a.l.c. systems by nature of their design time constants offer a limited increase in transmitted average-to-p.e.p. power ratio. A value in the region of 2-5½ db. is typical.

In the example of the 311A amplifier, the measured power output, using the thermocouple-ammeter technique, is increased to the region of 45-100 watts. The r.f. ammeter would indicate an average level between 1-1½ amp. r.m.s. under these conditions. Examining the above transmitted signal from the receiver side, 15 db. of peak a.l.c. improves the intelligibility threshold by 1 db. to as much as 3 db. The intelligibility threshold improvement is again less than the transmitted increase, as was noted in the preceding processing techniques.

An r.f. syllabic compressor can be made to function in the i.f. stages of the transmitter. Sufficient a.g.c. is employed to flatten out the amplifier output characteristic above the threshold. This requires not only fast attack to follow the envelope rise but also fast decay to follow the fall of the envelope. The frequency ratio between the r.f. s.s.b. voice signal and the voice syllabic rate is of course much greater than the ratio between the voice signal (audio) and the syllabic rate. Gain control time constants can be made much faster without the hazard of regenerative signal feedback and resultant severe distortion and even oscillation.

An r.f. syllabic compressor will naturally initiate distortion of the s.s.b. envelope in relation to the voice signal. Harmonic distortion generated in the r.f. envelope will of course be in multiples of the r.f. frequency and therefore lie outside the r.f. passband. No even-order distortion products will appear in the output. This has the advantage that fewer in-band distortion products are created for a given level of compression. An r.f. filter in the output removes IM-distortion products falling outside the original passband.

With such circuit application and oper-

ating in the region of 40 db. peak compression, the intelligibility threshold for constant level speech can be made to improve nearly 6 db. This compares with the 8.5 db. improvement obtained by nearly 20 db. of r.f. clipping followed by filtering.

Since clipping produces as good a result as compression, why is r.f. compression considered in view of its greater complexity? For a given improvement in marginal intelligibility the r.f. compressed wave has about 6 db. less third-order IM-distortion and about 12 db. less fifth-order IM-distortion than the r.f. clipped wave. Thus, under nonmarginal conditions the r.f. compressed signal should have the better quality.

### Conclusion

From the previous discussion it is seen that speech processing increases transmitted average-to-p.e.p. power, thereby improving the intelligibility threshold. This has been determined experimentally in actual communications set-ups by careful examination of what is presented as intelligibility in the receiver output.

Audio clippers (and fast syllabic a.f. compressors) add harmonic distortion as well as intermodulation distortion in the signal passband; r.f. clippers (and fast syllabic r.f. compressors) generate harmonic distortion at frequencies that

**TABLE II**  
Parameters of Described Speech Processing Methods.

NOTE: unprocessed speech is given in text as having a peak-to-average power ratio of 14.5 db. Values marked by asterisk\* are approximate from author's measurements and observations.

Processing Technique	Processor Peak Limiting Db.	Transmitter Gain in An.-To-P.E.P. Output Db.	Intelligibility Threshold Improvement ITI, Db.
A.F. Clipping (300-2700 Hz. band-pass)	25	10.2	5½
	15	7.5*	4
Common A.F. Compression (Slow time constant)	20	—	1
Syllabic A.F. Comp. (300-2700 Hz. band-pass)	25-40	8-10*	5-5½
A.L.C. (Fast attack time, slow release time)	15	2-5½	1-3
R.F. Clipping (300-2700 Hz. band-pass)	18	11.5	8.5
	10	6*	4.5
R.F. Syllabic Compression (Fast attack and release time)	40	—	6

are multiples of the r.f. filter frequency and are therefore rejected. Only odd-order products falling within the filter passband will appear in the output. Hence for these reasons, r.f. processors "sound better" than do a.f. processors.

In the absence of noise, speech processing (r.f. or a.f.) changes the character of the sound. Hard limiting produces noticeable distortion. Low-level sounds on most consonants have an increased prominence. Breath sounds and background noise also assume greater significance. Use of large amounts of clipping or syllabic compression makes a noise cancelling microphone a very desirable item to suppress ambient background noise.

Listed in Table II is a summary of parameters for the processing techniques previously described. A conclusion readily drawn from observing Table II is that the greatest intelligibility threshold improvement is obtained from an r.f. clipper employing about a 20 db. clipping level. Intelligibility threshold values are justified on empirical grounds. Caution should be exercised in extrapolating results; e.g., if a.f. and r.f. compression are employed together, only the larger improvement factor should be considered as they are not directly additive.

Today most of the speech processing is taking place outboard from the transmitter or by adapters incorporated into existing equipment. Solid-state devices lend themselves ideally in the design of effective compact units. From this it seems only logical to presume as well that the next generation of s.s.b. equipment will have speech processing (other than just a.l.c.) included in the design concept.

The author wishes to extend appreciation and

thanks to Mr. Stanley Brown and to Mr. Clarence Munsey, K6IV, for their helpful suggestions in reviewing this writing. Certainly the greatest credit must be given to those authors listed in the bibliography, for without their work this article would probably not have evolved. QST

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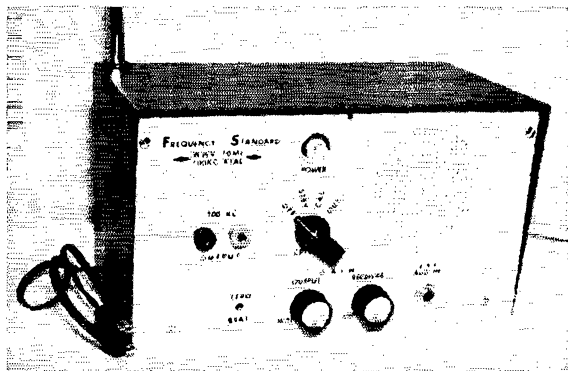
### Tentative dates for major **1969** ARRL operating activities.

<p style="text-align: center;"><b>January</b></p> <p>2 Qualifying Run, W6OWP 4-5 VHF SS 11 Qualifying Run, W1AW 11-13 CD (c.w.) 18-20 CD (phone) 25-26 Simulated Emergency Test</p>	<p style="text-align: center;"><b>February</b></p> <p>1-2 DX Text (phone) 1-16 Novice Roundup 5 Qualifying Run, W6OWP 8 FMT 11 Qualifying Run, W1AW 15-16 DX Test (c.w.)</p>	<p style="text-align: center;"><b>March</b></p> <p>1-2 DX Test (phone) 6 Qualifying Run, W6OWP 12 Qualifying Run, W1AW 15-16 DX Test (c.w.)</p>
<p style="text-align: center;"><b>April</b></p> <p>2 Qualifying Run, W6OWP 10 Qualifying Run, W1AW 12-14 CD (c.w.) 19-21 CD (phone)</p>	<p style="text-align: center;"><b>May</b></p> <p>1 Qualifying Run, W6OWP 10 FMT (Official Observers, only) 16 Qualifying Run, W1AW</p>	<p style="text-align: center;"><b>June</b></p> <p>4 Qualifying Run, W6OWP 14 Qualifying Run, W1AW 14-15 VHF QSO Party 28-29 Field Day</p>
<p style="text-align: center;"><b>July</b></p> <p>3 Qualifying Run, W6OWP 12-14 CD (c.w.) 15 Qualifying Run, W1AW 19-21 CD (phone)</p>	<p style="text-align: center;"><b>August</b></p> <p>5 Qualifying Run, W6OWP 13 Qualifying Run, W1AW</p>	<p style="text-align: center;"><b>September</b></p> <p>4 Qualifying Run, W6OWP 11 Qualifying Run, W1AW 13 FMT 13-14 VHF QSO Party</p>
<p style="text-align: center;"><b>October</b></p> <p>1 Qualifying Run, W6OWP 11-13 CD (phone) 17 Qualifying Run, W1AW 18-20 CD (c.w.)</p>	<p style="text-align: center;"><b>November</b></p> <p>6 Qualifying Run, W6OWP 8 FMT (Official Observers, only) 8-10 SS (phone) 15 Qualifying Run, W1AW 15-17 SS (c.w.)</p>	<p style="text-align: center;"><b>December</b></p> <p>3 Qualifying Run, W6OWP 16 Qualifying Run, W1AW</p>



*With the ever increasing number of hamband-only receivers, WWV reception is often a problem. This article not only describes a simple WWV receiver, but a 100-kc. calibrator, all in one box.*

Completed unit in homemade cabinet. The 100-kc. output jacks  $J_2$ ,  $J_3$  are mounted to the left of the function switch  $S_2$  located in the center of the panel. Just below  $J_3$  is a hole through which  $C_3$  may be adjusted for zeroing with WWV.  $R_2$  is mounted below  $S_2$ .  $R_1$  is mounted to the right of  $R_2$ . The external audio input jack,  $J_1$ , is mounted below the speaker. The whip antenna is visible in the left rear corner of the box.



## A 10-Mc. WWV Receiver and Crystal Calibrator In One Box

BY C. A. STILES, JR.,\* K5MRK

AFTER many years as a ham I still wanted a WWV receiver and calibration oscillator in one package. The circuit that I finally used is a collection of various design ideas and some cut and try experimentation. To hold down the cost many junkbox parts were used, but all the components may be purchased through electronic parts suppliers if the builder desires.

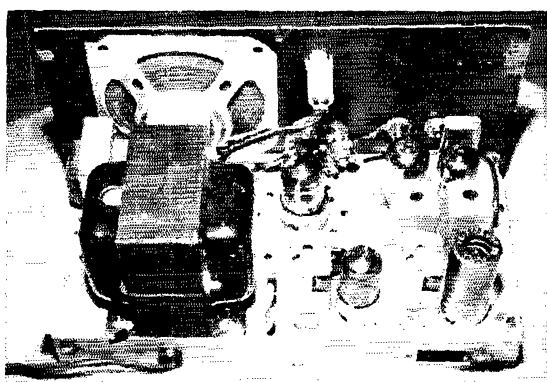
### Circuit

Fig. 1 schematically represents the combination 10-Mc. WWV receiver and 100-kc. calibrator. Basically the receiver is a fixed tuned, 455-kc. i.f., superheterodyne. A 6BZ6 is used as an r.f. amplifier. Either a collapsible whip or

\*3459 Pinto Trail, Fort Worth, Texas 76116.



Bottom view of the chassis. Note that point to point wiring is used in the entire project. The large capacitor visible above the line cord entry point is a dual section electrolytic capacitor used in the power supply circuit.



Top view of the chassis.  $T_4$  is mounted in the upper left corner of the chassis.  $J_1$  is mounted to the right of the speaker. The 100-kc. crystal,  $Y_1$ , is visible in the upper right corner of the chassis.  $V_2$  is mounted directly in front of the crystal.

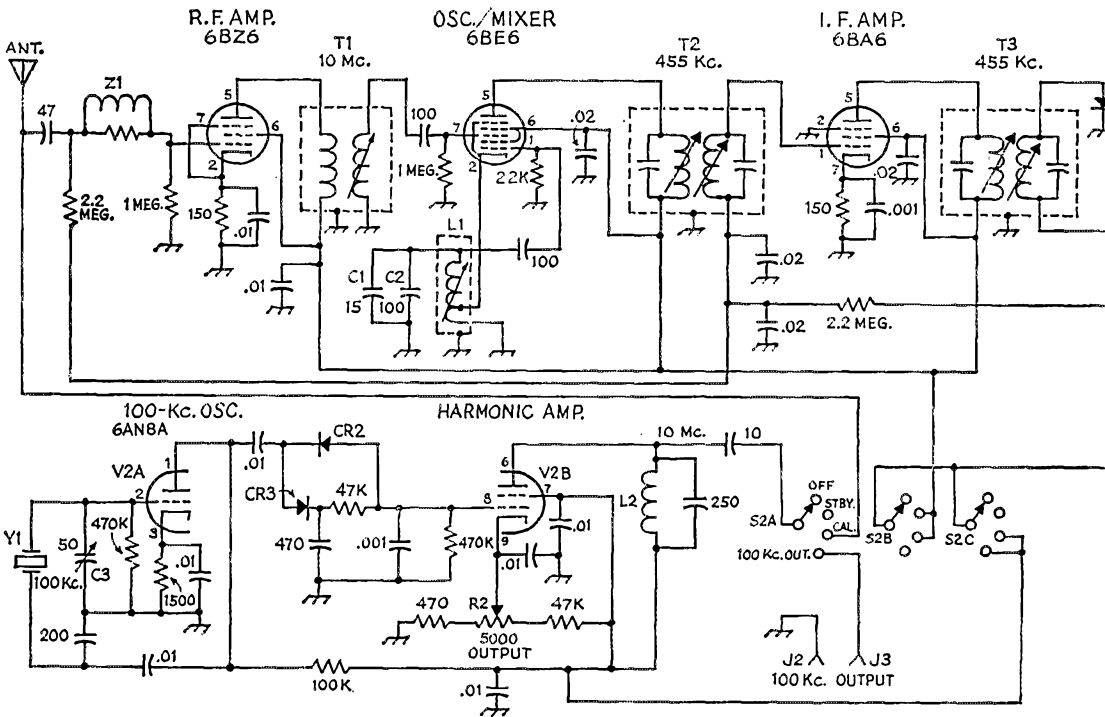


Fig. 1—Schematic diagram of 10-Mc. WWV receiver and 100-kc. calibrator. Unless otherwise indicated, capacitors are 1000-volt disk ceramic, resistors are ½ watt. Capacitors marked with polarity are electrolytic.  $L_1$  and  $T_1$  are mounted in Miller S-33 shield cans. Control grid of 6BZ6 r.f. amplifier is pin 1.

- $C_1$ —15-pf., N750 ceramic (Centralab type TCN).
- $C_2$ —100-pf., NPO ceramic (Centralab type TCZ).
- $C_3$ —50-pf. midget variable (Hammarlund MAPC -50).

- $CR_1$ —1N295.
- $CR_2, CR_3$ —1N34.
- $CR_4$ —500 p.i.v. 750 ma. silicon diode.

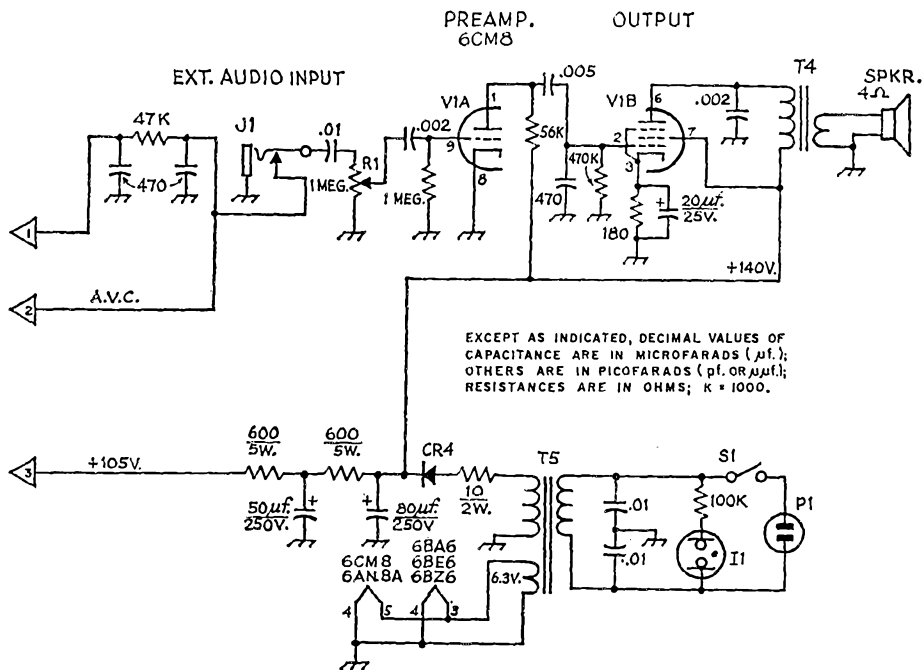
short length of hook-up wire may be used as an antenna. A parasitic suppressor,  $Z_1$ , has been included to minimize the chance of v.h.f. oscillations. Following the r.f. stage is a 6BE6 oscillator-mixer. The tuned circuit comprised of  $C_1$ ,  $C_2$ , and  $L_1$  determines the oscillator frequency. Because the receiver is fixed tuned, the oscillator must be very stable if WWV is to remain tuned in. To minimize oscillator drift, temperature compensation has been employed. The values of  $C_1$  and  $C_2$  specified represent those values that minimized drift for the author. Other builders may have to do some experimentation in order to obtain satisfactory results. A single 6BA6 i.f. amplifier and diode detector complete the receiver's r.f. circuitry.

A.g.c. voltage is obtained following the detector to limit the gain of the r.f. and i.f. amplifiers when a strong signal is being received. A 6CM8 is used as the audio section of the receiver; the triode section functions as a pre-amplifier while the pentode section is the audio output stage.  $R_1$  controls the gain of the audio amplifier. As an added feature, the audio section may be used with external a.f. sources plugged in at  $J_1$ . With an external signal ap-

plied to  $J_1$ , the audio from the receiver's detector circuit is automatically disconnected.

The 100-kc. oscillator and harmonic amplifier circuits are the same as those which appeared in several editions of the *Handbook*. Capacitor  $C_3$  permits the oscillator signal to be zeroed to WWV for calibration purposes.  $CR_2$  and  $CR_3$  have been included to enrich the harmonic output from the oscillator. The output of the harmonic amplifier is fixed tuned to 10 Mc.  $R_2$  controls the output level of the harmonic amplifier.

A single transformer,  $T_3$ , supplies all the required operating voltages. The d.c. operating voltage is obtained from a half-wave supply using an RC filter.  $S_2$  is the function switch. In the off position only the audio section of the receiver is activated. When in the standby position the receiver circuitry is completely operational. Putting  $S_2$  in the calibrate position activates both the 100-kc. oscillator and the receiver. It is in this position that the 100-kc. oscillator's frequency may be checked against that of WWV. In the 100-kc. output position, the calibrator signal is applied to  $J_2$  and  $J_3$  while the receiver section is made inoperative.



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS ( $\mu$ f.); OTHERS ARE IN PICOFARADS (pf. or  $\mu$ mf.); RESISTANCES ARE IN OHMS; K = 1000.

- $I_1$ —Neon indicator.
- $J_1$ —Phone jack, closed circuit.
- $J_2$ —Banana jack.
- $L_1$ —Approx. 2.4  $\mu$ h. (Miller C-5496-C).
- $L_2$ —1.0  $\mu$ h. r.f. choke.
- $P_1$ —A.c. line plug.
- $R_1$ —1-meg., audio taper,  $\frac{1}{2}$ -watt control.
- $R_2$ —5000-ohm, linear taper,  $\frac{1}{2}$ -watt control.
- $S_1$ —S.p.s.t., mounted on  $R_1$ .
- $S_2$ —3-pole 4-position non-shorting rotary switch (Malory 3234J).

- $T_1$ —5-15 Mc. coil (Miller C-5495-RF).
- $T_2$ —455-kc. i.f. input transformer (Miller 12-C9).
- $T_3$ —455-kc. i.f. output transformer (Miller 12-C10).
- $T_4$ —10K to voice coil output transformer (Knight 54 E-1448 or equivalent).
- $T_5$ —135 v. at 110 ma., 125 v. at 40 ma. (not used), 6.3 v. at 2 amp. (Burstin-Applebee 13B114).
- $Y_1$ —100-kc. crystal.
- $Z_1$ —7 turns No. 22 space-wound on 47-ohm  $\frac{1}{2}$ -watt composition resistor.

### Construction and Alignment

The entire project was built into a home-made box and chassis. Any chassis on which all the parts can be mounted should be fine as there is nothing critical about construction details. With good planning as to the placement of parts, everything should fit nicely on a  $9 \times 5 \times 2$ -inch chassis.

One word of caution—make sure that the 0.001- $\mu$ f. bypass capacitor from pin 7 of the 6BA6 i.f. amplifier is grounded directly to a solder lug using very short leads. This will help prevent any oscillation in this stage.

To check the operation of the combination receiver and calibrator initially, it is helpful to know that power is being supplied to the unit; make sure that the filaments light and that there is B-plus voltage. To begin alignment put the function switch  $S_2$  in the standby position. Peak the i.f. transformers  $T_2$  and  $T_3$  for maximum noise output. The transformers won't require much adjustment as they are preset at the factory. If a modulated signal generator is available it may be used for alignment purposes. With the generator set to 10 Mc. and

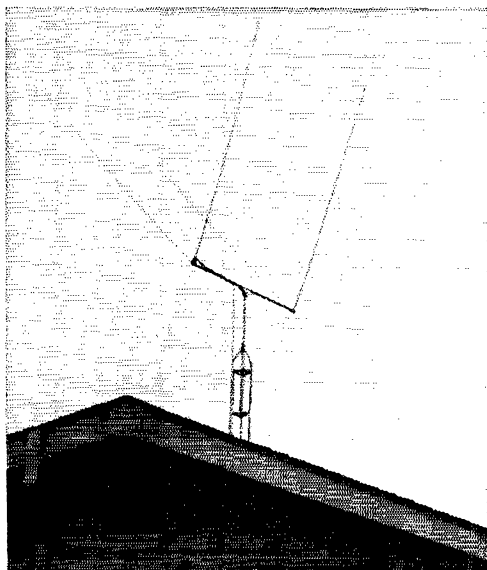
coupled to the antenna, vary  $L_1$  until the signal is received. Either 10.455 Mc. or 9.545 Mc. may be selected as the oscillator frequency; the selection as to which one is best is determined primarily by which frequency results in the least amount of image difficulties. Once the oscillator frequency has been set,  $T_1$  may be peaked. If a modulated generator isn't available, the oscillator coil  $L_1$  can be adjusted until WWV is tuned in. This really isn't so difficult as the 9.5- to 9.8-Mc. shortwave broadcast band can be used as a guide.  $T_1$  can be adjusted for maximum audio output when WWV is transmitting a modulated carrier. Even if a signal generator was used, the final setting of  $L_1$  may have to be varied slightly to get WWV tuned in. With all test signals removed and when WWV is transmitting an unmodulated carrier, the 100-kc. oscillator may be calibrated by varying  $C_3$  when  $S_2$  is in the calibrate position.

For a few evenings work and a little expense this very handy piece of equipment can be built. I've gotten a lot of fun out of this little gadget and I hope you will too!

QST

# The HRH Delta-Loop Beam

## A New Idea In Parasitic Beam Construction



This is a 10-meter, 2-element Delta Loop that is very similar in construction to the antenna described in the article.

BY HARRY R. HABIG,\* K8ANV

**T**HE evolution and design of the antenna shown in the photographs came about primarily because of my lack of confidence in the mechanical durability of quads. Anyone who has ever built and used quads knows how difficult it is to keep them up in icing and high wind conditions.

Being an old-time mechanic, I felt there had to be a better design for an antenna that used full-wave elements in a parasitic array, so some years ago a start was made to find that better design. One thing that nearly all readers will agree is that Mother Nature is about the best designer there is. Along these lines, just observe the growth of branches on tree limbs. You'll find that many of the smaller branches will grow up in a semivertical pattern from the limb; see Fig. 1. It takes a considerable amount of icing and wind to break such branches, indicating the soundness of the design. This same idea should apply to elements mounted on a boom.

\* 3531 Beldare Ave., Cincinnati, Ohio, 45220

*Here's an antenna that should excite the interest of the amateur fraternity. The Delta-Loop beam has all the features of a quad without many of the disadvantages.*

To test the idea, an element of aluminum tubing was mounted on a boom. The element was mounted as shown in Fig. 3. The boom was then secured to the family car with the element in a vertical position. The assembly was then tested at 65- to 75-m.p.h. Even though the element was only secured to the boom as shown in Fig. 3, there was no "set" or permanent bending. This test opened the door to several possibilities in beam design.

A loop aerial can take many shapes. Anyone who studies the history of the quad will find that many different configurations have been used. Why not use a triangle? <sup>1</sup> It should be possible to achieve a very good design using a vertical triangle. See Fig. 2. This shape appears ideal for a beam with full-wave elements, and has most of the advantages of the quad without many of the disadvantages. This led to the construction of several antennas of the type shown in the photographs, and some of these advantages become quickly apparent.

First, the entire antenna is *above* the boom. Second, the antenna is constructed primarily of aluminum tubing, which provides extra strength as compared with wire elements. Third, the antenna has Plumber's Delight type construc-

<sup>1</sup> A triangular loop configuration also was described in *QST* in April, 1968, "Technical Correspondence" by Norman Watson, W6DL, independently of K8ANV's design. Mr. Habig has been working for some years on this design and has a patent pending. — Editor.

tion, meaning that the antenna is at ground potential for lightning protection, plus the fact that this type construction lends itself to gamma matching of the feed point, eliminating the need for a balun. Last, but not least, we find the antenna is very attractive in its symmetry. Of course, the important point is how well does the antenna perform?

Several 10-meter models have been tested and the unit shown in the roof-mounted position is my present 20-meter Delta Loop. Using a gamma match with 50-ohm coaxial feed, a 10-meter model was matched at 28.8 MHz. The antenna consisted of a driven element plus reflector with the elements spaced  $6\frac{1}{2}$  feet apart, or approximately 0.2 wavelength. Surprisingly, the antenna was extremely flat across the entire 10-meter band, the worst mismatch being *less* than 1.2 to 1.<sup>2</sup>

I have no means of measuring gain or front-to-back ratios. However, with the spacing and element sizes the same as a quad, the gain should be the same, or at least so close the difference would be insignificant. On-the-air tests have shown the antenna to be as good as or better than quads I have had up. Front-to-back and front-to-side reports have been outstanding, both on ground wave and skip.

#### Element Lengths

Many tests have been made on driven elements to determine the effect of element lengths on s.w.r. It was found that the flattest curve was obtained with a formula of  $\frac{1005}{f_{\text{MHz}}}$  (feet) for the driven element. The reflector should be about 3 percent longer, or  $\frac{1030}{f_{\text{MHz}}}$  if directors are desired it would

<sup>2</sup> Editors note: A 10-meter model of the Delta Loop beam tested at A.R.R.L. Headquarters was matched at 28.8 MHz. and an s.w.r. curve was made using a Bird Wattmeter. The largest mismatch also was less than 1.2 to 1 MHz. (at 29.7 MHz.).

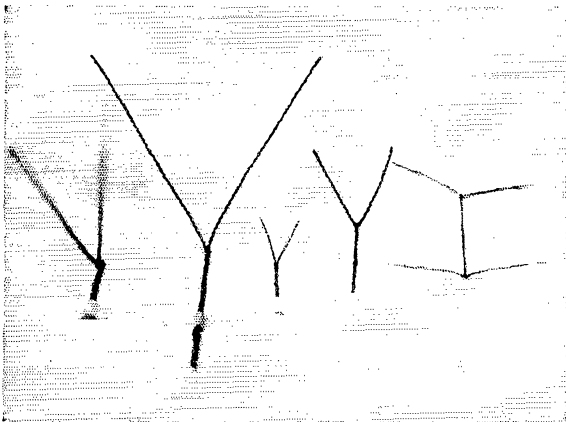


Fig. 1—The basic idea for the Delta Loop beam was conceived from the growth of tree limbs and branches. Here is just a few of nature's configurations that lend themselves to antenna design!

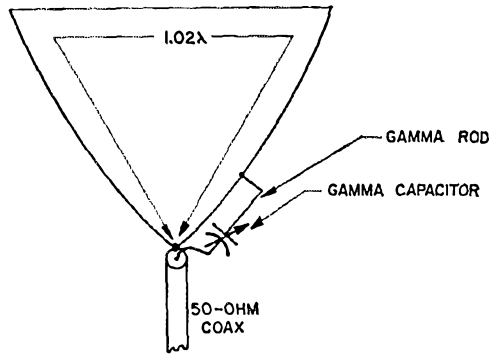


Fig. 2—This drawing shows the driven element and feed method of the Delta Loop. Tests have shown that the overall length of the antenna is slightly longer than a wavelength (1.02λ). Each side of the antenna is approximately  $\frac{1}{2}$  wavelength long. The top, or wire section, is made slightly shorter to put tension on the vertical members.

#### Bill of Materials

- Tubing used is 6061 T6.
- 4 — 12-foot lengths of  $\frac{3}{4}$ -inch o.d., 0.035 wall (elements).
  - 1 — 12-foot length  $1\frac{3}{4}$ -inch o.d., 0.065 wall (boom).
  - 8 —  $\frac{3}{4}$ -inch diameter stainless steel hose clamps.
  - 1 — 9-inch length of  $\frac{3}{8}$ -inch o.d. by  $\frac{5}{16}$ -inch i.d.
  - 1 — 9-inch length of  $\frac{1}{2}$ -inch o.d. to slide over  $\frac{3}{8}$ -inch section.
  - 25 feet of copper wire No. 12 or 14, or equivalent in stranded wire.

appear that a length three percent shorter than the driven element would be adequate.

As to element spacing, I have long been an advocate of wide spacing (0.17 to 0.2 wavelength) whenever possible. In the 10-meter tests 0.2 wavelength spacing was used.

For those readers that are interested, I have included complete construction information on a 10-meter model, including list of the required tubing.

#### Construction Notes

Fig. 3 shows the method of mounting the element tubing to the boom. The angle between the semi-vertical elements is shown as 75 degrees but this can vary a few degrees either way without any appreciable effect on the performance of the array. It is difficult to drill and line up the element support holes in the boom and come out to *exactly* 75 degrees.

There are a couple of methods of making the holes in the boom to hold the elements. One of the simplest is to use a Greenlee-type chassis punch. This makes a clean hole in the boom.



Here is our roof mounted 20-meter Delta Loop beam that is now undergoing a series of tests.

Another method is to drill holes large enough to take the end of a  $\frac{3}{4}$ -inch reamer and then ream out the holes to the necessary diameter.

One not accustomed to working with angles might find it difficult to drill holes at a 75-degree angle. A simple method is to first drill holes to take a single element. Next, make a jig from a piece of stiff cardboard or similar material, using a protractor to get the 75-degree angle. Then insert the single element into the boom and lay the jig along the element; this will give you the correct alignment for the other element.

The elements are inserted through the boom just far enough to take a cotter pin on the underside of the boom. On the top side, a hose clamp is used to hold the element to the boom and prevent slippage. A length of copper wire can be wrapped around both elements just below the clamp to insure a good contact between the elements and the boom. Hose clamps are also used at the tops of the elements to hold the horizontal wire.

Fig. 4 shows the details of the gamma matching section. The gamma section is made up from the inner conductor of the coax, including its insula-

tion, and two sections of telescoping aluminum tubing. The outer covering and braid is removed from a 52-inch length of RG-8/U coax. In Fig. 4, a male coax fitting is shown with a short length of braid, 2 inches long, which is grounded to the boom via a clamp and bracket. If desired, a chassis-type coax fitting, type SO-239, could be mounted on the boom with a small metal bracket. The capacitor section is made of two lengths of tubing,  $\frac{3}{8}$ -inch, and  $\frac{1}{2}$ -inch diameter, respectively, and both 9 inches long. The  $\frac{3}{8}$ -inch tubing fits over the insulation around the coax inner conductor while the  $\frac{1}{2}$ -inch tubing slides over the  $\frac{3}{8}$ -inch material. The larger tube is drilled and tapped to take a locking screw. Spacing of the section from the element is 3 inches.

In adjusting the gamma, figures given in Fig. 4 can be used as a guide. In order to avoid matching errors, the gamma should be adjusted with the s.w.r. bridge right at the beam. Set the shorting bar to the dimension given in the diagram and slide the  $\frac{1}{2}$ -inch tubing over the smaller tubing, looking for a setting that gives

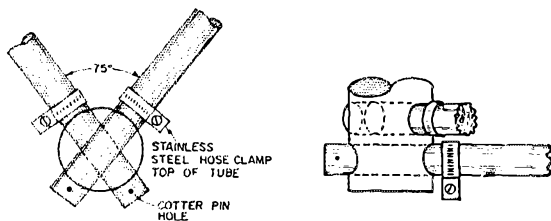


Fig. 3—This drawing shows the method of mounting the element to the boom. A cotter pin is used on the under side of the boom and a hose clamp on the top to hold the element securely to the boom.

a match. If one cannot be obtained, move the shorting bar and sliding tubing assembly a short distance, say an inch, and then try different settings of the  $\frac{1}{2}$ -inch tubing until you find a match. We found that the settings were not critical in getting a match. Once the beam is matched, the regular feed line to the station can be attached to the feed point. The connection should be taped to prevent moisture from getting into the fitting and coax.

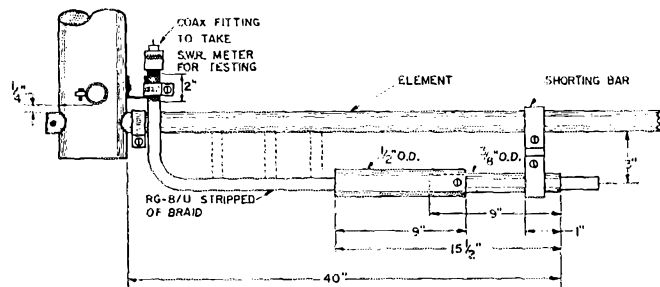


Fig. 4—Here are the details on the gamma-matching section. As mentioned in the text, the coax fitting can be a female type, SO-239, mounted on a small bracket which is mounted on the boom. Spacing insulators for spacing the gamma line from the element can be made up from pieces of Lucite or Plexiglass.

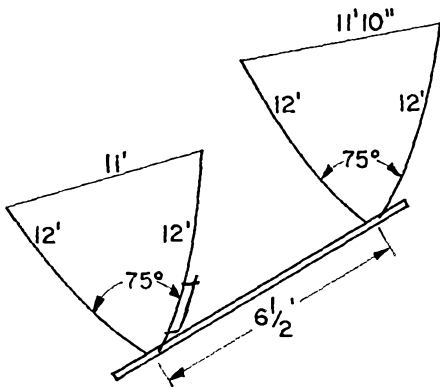


Fig. 5—For those interested in exact figures, this sketch provides the element and boom lengths for a Delta Loop beam for 28.8 MHz.

As stated earlier, the antenna is extremely flat across the entire 10-meter band. The present model was designed for 28.8 MHz. and matched at this frequency. The s.w.r. at the highest point, at 29.7 MHz., was about 1.2 to 1. This dropped to 1 to 1 at about 29 MHz. and stayed at 1 to 1 all the way down to 28 MHz. This feature of the antenna certainly is a help when using a transceiver designed for 50-ohm output. The beam has proved its ruggedness through winds and icing conditions. All in all, we think the Delta-Loop beam is one of best performers we have seen. QST

## ● *Beginner and Novice*

# The Delta Loop Beam On 15

## *Constructional Information on A New Antenna*

BY LEWIS G. McCOY,\* W1ICP

THE Delta Loop beam described in the previous article appears to be ideal for the more ambitious Novice or General who is interested in 15-meter operation. Some of the features of the 15-meter beam described in this article include a very low s.w.r. across the entire band, use of readily available materials, "Plumber's Delight" type construction -- which is always an appealing feature of any beam antenna -- and last but not least, excellent performance. On the last point, the antenna shown in the photographs was tested during a DX contest with a transmitter input power of 100 watts. The boom of the antenna was mounted only eight feet above the ground, but in about five hours of contest operation 58 different countries were worked -- and, believe it or not, the majority of the reports received were 5-9. Possibly conditions were above par, but even so the antenna shows it can do a real job under crowded band conditions.

As stated above, the beam uses Plumber's Delight type construction. For the newcomer's information, this type of construction has the antenna elements connected directly to the boom which in turn can be connected directly to earth ground without having any effect on the performance of the antenna. This is desirable because of the lightning protection offered by the system.

Fig. 1 is a drawing of the Delta Loop driven element. The overall length around the driven element is slightly over one wavelength. Each

side is approximately  $\frac{1}{2}$  wavelength long. The reason we say "approximately" is that the top section of the antenna is made of wire and is slightly shorter than  $\frac{1}{2}$  wavelength in order to put tension on the wire. A gamma-match feed system is used, eliminating the need for a balun.

The formula used in figuring the driven element length is  $\frac{1005}{f_{\text{MHz}}}$ , where  $f$  is the desired resonant frequency of the driven element. The answer will be in feet. The reflector length formula is  $\frac{1030}{f_{\text{MHz}}}$ . For a frequency of 21.2 MHz. this figures

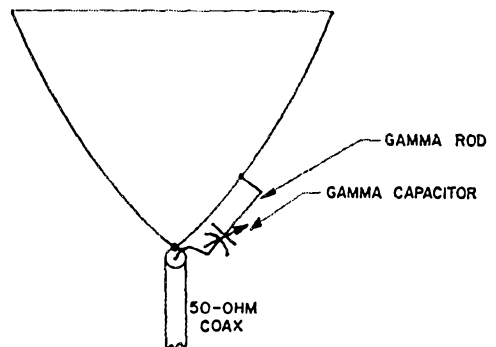
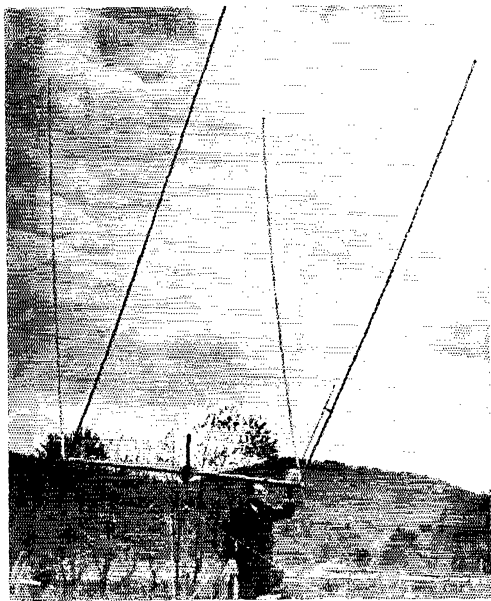


Fig. 1—Basic configuration of the Delta Loop driven element. Each side is approximately  $\frac{1}{2}$  wavelength long.

\* Novice Editor



This view shows the completed antenna being matched.

out to a driven element 47 feet 5 inches long and a reflector that is 48 feet 7 inches long. Element spacing is approximately 0.2 wavelength or about 9 feet. Fig. 2 shows the two elements with the lengths of each segment.

### Material Requirements

The beam elements were built primarily from Reynolds Do-It-Yourself aluminum tubing, which *should* be available from most hardware dealers. The reason we say "should" is because in some sections of the country hardware stores don't stock the tubing. However, most dealers will order the tubing for you. If you live in an area near or in a city of reasonable size, a look through the Yellow Pages will show any aluminum tubing dealers. The Reynolds Do-It-Yourself tubing comes in 8-foot lengths but most of the commercial tubing available from metal distributors comes in 12-foot lengths. If you obtain the 12-foot types, be sure to specify type 6061 (61S) alloy as this material affords excellent strength for antenna elements. The boom used in this antenna was made from this alloy and is 2 inches in diameter with a 0.065-inch wall. Another source of aluminum or steel tubing is electrical supply houses; although this type of aluminum is a little too soft for the elements it would be suitable for a boom. Also, electrician's thin-wall steel tubing is available in various sizes, including the 2-inch diameter, for a boom. In a pinch, the boom could be made of wood, such as a length of 2 × 4. In such a case, the bottoms of the elements could be connected together with a length of wire

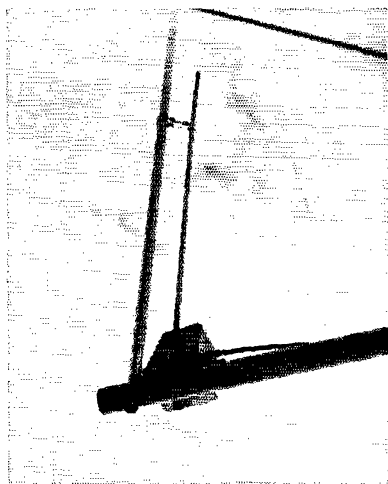
to maintain the Plumber's Delight feature. The shopping list included here should prove of help in purchasing the parts.

### Construction

The first step in building the antenna is to make up the vertical elements. The description given here is based on using the Reynolds tubing. Using a hack saw, cut the  $\frac{7}{8}$ -inch tubing into two-foot sections. This particular type is made by Reynolds for the purpose of telescoping the 1- and  $\frac{3}{4}$ -inch diameter sections together and comes in 6-foot lengths. After cutting off four 2-foot lengths you'll have one 4-foot piece remaining. Cut this into four 1-foot lengths and set these pieces aside for the time being.

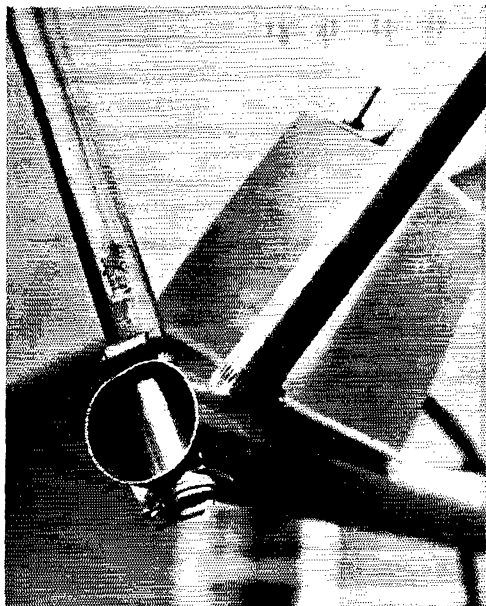
Next, cut two lots, the thickness of the hack-saw blade, about 2 inches deep in one end of each of the 1-inch and  $\frac{7}{8}$ -inch diameter lengths. Slide the  $\frac{7}{8}$ -inch tubing inside the 1-inch diameter to a length of about six inches and then slip the hose clamps over the slots and tighten them. The  $\frac{3}{4}$ -inch tubing can then be inserted into the slotted ends of the  $\frac{7}{8}$ -inch tubing and these sections clamped with hose clamps. Two of the elements should be adjusted to the proper length for the driven element and two for the reflector, as per Fig. 2 (or whatever length you wish from the formulas). Some amateurs may prefer to cut their antennas for the c.w. portion of the band and others for the phone section.

The next step is to cut the 1-inch holes in the boom to take the ends of the 1-inch diameter elements. We used a 1-inch chassis punch to make the holes, but a 1-inch metal reamer



The plastic freezer box is held in place by the small metal bracket which is attached to the boom with self-tapping screws. Also on the bracket is a coax fitting to take the RG-8/U coaxial feed line. The gamma rod is mounted on top of the box and is held to the element with the shorting clamp.





In this close-up view of the end of the boom the mounting of the element ends are clearly shown. Cotter pins are used on the bottom end of the element and hose clamps on the top side of the boom. This secures the elements to the boom. The plastic freezer box that houses the gamma capacitor is clearly visible behind the elements.

could also be used. The aluminum is easy to cut or punch so making the holes should be no problem. What *can* be a problem is lining up the holes so that the 75-degree angle between the elements is obtained. We made a jig from a piece of cardboard, using a protractor. Once one set of holes for the director and reflector were made the elements were temporarily

mounted in the boom. The cardboard jig was laid on the elements and the 75-degree holes were marked off and drilled.

When the holes are all drilled, the boom can be laid on the ground and the element ends inserted into the boom holes. We allowed about 1/4-inch extension of the base of the elements through the boom so as to allow space for cotter-pin holes. However, before drilling the cotter-pin holes, insert the four 1-foot lengths of the 7/8-inch tubing into the elements at the boom. This will serve to give added strength to the elements at the support point. Drill each of the four ends to take the cotter pins and install the pins. Tighten down the hose clamps on the top side of the boom to secure the elements in place.

Drill the tops of the elements to take the 1/4- X 1-inch aluminum bolts and the top wires can then be installed.

The close-up view shows the gamma installation. The gamma capacitor is mounted inside a plastic freezer container which is held in place by a small metal L-shaped plate mounted on the box and the boom, using four self-tapping screws. This plate also holds an SO-239 coax chassis fitting to take the feed line. We like to install an s.w.r. bridge directly at the beam when making s.w.r. or matching tests to reduce matching errors, and having the fitting there simplifies the procedure. The gamma rod, made from a length of 3/8-inch aluminum tubing 36 inches long, is flattened at one end for a length of 1 1/2 inches. The flatted portion is bent over at right angles and drilled to take one of the 1/4- X 1 1/4-inch aluminum bolts, which is mounted through the top of the freezer box. The gamma rod is held in place by this bolt and by the shorting bar between the rod and the element. The shorting bar is made from a piece of aluminum, 1 inch wide and long enough to fit around the two pieces of tubing and provide a separation of 3 inches between the rod and the elements.

#### Shopping List

Quantity	Length (ft.)	Diameter (in.)	Reynolds No.
4	8	1	4242
4	8	3/4	4222
2	6	7/8	4231
1	9	2	See Text.

3 feet of 3/8- or 1/2-inch diameter aluminum tubing.

12, one-inch diameter hose clamps, stainless steel.

35 feet of No. 12 or 14 copper wire, solid or stranded.

1 variable capacitor, 100 pf. maximum, 0.025 spacing or greater.

1 one-quart freezer container.

1 SO-239 Coax chassis connector.

5 1/4-inch diameter aluminum nuts and bolts, 1 1/4-inches long.

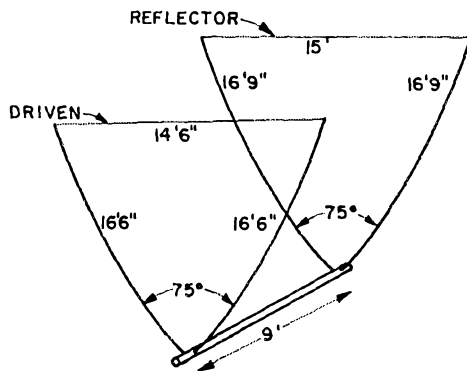


FIG. 2.—This drawing shows the element dimensions and the boom length. All measurements on the elements are made from where the element enters the boom; the portion of the element extending through the boom is not counted.

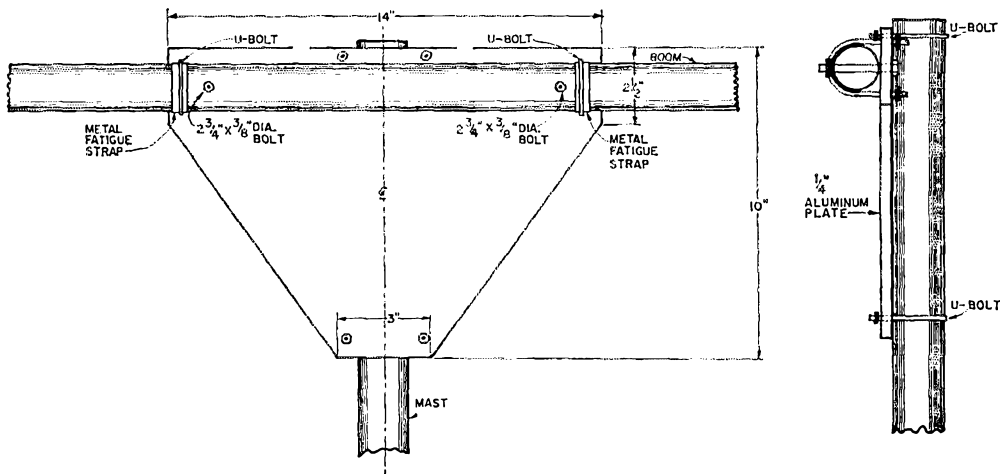


Fig. 3—Construction details for the boom-to-mast mounting bracket. The U bolts holding the boom are 2-inch type. Those holding the mast will depend on the mast diameter—we used 1/2-inch U bolts for a 1/2-inch diameter mast.

How you mount the antenna boom to the supporting mast will depend a great deal on what type of tower or supporting structure you have. The method shown in the photo is a fairly simple one, and easy to make up. Fig. 3 shows details of the construction of the mounting unit. The one shown in the photo supporting the beam was made from two pieces of 1/16-inch thick aluminum plate. However, we found that even with the double plate there was still too much "give" in the mounting setup, so a replacement was made from 1/4-inch thick aluminum. This made the mount completely steady. Either a plate of 1/4-inch aluminum or 1/8-inch steel should be adequate for the jobs. The 2-inch U bolts that hold the boom to the mounting plate were adequate, but just for added insurance, 3/8-inch, 2 3/4-inch long machine bolts (2 required) were installed through the boom and mounting plate for greater holding strength.

During our tests, a weather front moved through the area and we had wind gusts up to 40 m.p.h. plus icing and snow loading on the antenna. The antenna and elements showed very little movement in these winds, and the entire antenna appeared very strong.

#### Adjustments

Adjustment of the gamma section is quite simple. Install an s.w.r. bridge at the gamma feed point and tune up the rig on the desired frequency. Set the gamma shorting bar 24 inches from the base of the gamma rod and tighten the gamma-bar nuts and bolts just enough to make electrical contact. Set the s.w.r. bridge to read reflected power and adjust the gamma capacitor for a dip. The object is to find a setting of the capacitor and the gamma bar that gives a reading of zero in the reflected position. This may take a few tries, but you'll find the settings are not critical. If you adjust the antenna near the ground you

may find it will require a new adjustment when it is up in its permanent location.

How you mount the antenna in its permanent location will depend on what you have to hold the antenna. If you use a boom mounting-plate-to-mast assembly such as already described, the U bolts holding the boom could be left slightly loose and the 3/8-inch bolts left out. The antenna could then be installed in an upside-down position and then rotated into place. Two men are better than one for this job, but one man *can* do the job. If a hole, say 1/2-inch diameter, is drilled through the boom a 1/2-inch rod could be slid through to serve as a lever to rotate the boom and antenna into an upright position and the U bolts and hardware could be then tightened down.

We think the Delta Loop beam is an excellent antenna and offers many possibilities. Certainly the results obtained to this point prove the antenna is real performer. Our tower is a crank-up job, making antenna testing a fairly simple project. The antenna was first matched at the 8-foot level (boom height) and at the cranked-up height, about 55 feet above ground. A very slight readjustment of the gamma capacitor was required at the greater height in order to get down to a 1-to-1 s.w.r. However, the change in s.w.r. from the 8-foot to 55-foot heights was very small. Also, the highest s.w.r. was at 21,450 kHz., the top end of the band, with a mismatch no worse than 1.2 to 1. At 21,300 kHz. the s.w.r. dropped to 1 to 1 and remained at that figure all the way to the lower band edge.

The entire antenna weighs about 15 pounds (using the aluminum boom) so the antenna could be rotated with a heavy-duty TV rotator. One last note: we sprayed the cotter pins and hose clamps with a clear acrylic spray to reduce corrosion. This simple precaution should be taken in all antenna construction to prevent or reduce rusting.

**QST**

# Simple Measurement of High Capacitances

BY JOHN HARVEY CHASE,\* W4TG

HERE is a simple way to check values of the larger sizes of capacitors. The accuracy for low-loss capacitors is quite high, and the measurement of electrolytic capacitors is close enough for all practical purposes.

Most readers are familiar with the simple formula for capacitive time constant,  $T = RC$ , and its corollary,  $C = T/R$ , where  $T$  is the time in seconds required for a capacitor of  $C$  farads to discharge through a resistance of  $R$  ohms to 37 percent of the voltage to which the capacitor has been charged. The same relationship exists if  $C$  is in microfarads, and  $R$  is in megohms. By charging a capacitor from some convenient voltage source, then connecting a known value of resistance across the capacitor, and measuring the time required for the voltage to drop to 37 percent of the charged value, capacitance  $C$  may be determined. As an example, a capacitor is charged from a 10-volt source. With a  $\frac{1}{2}$ -megohm resistor connected across the capacitor, it is found that the capacitor discharges to 3.7 volts (37 percent of 10) in 25 seconds. The capacitance is then  $C \mu f. = 25/0.5 = 50 \mu f.$

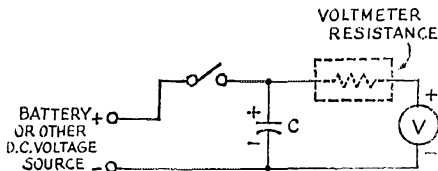


Fig. 1—Capacitance-checking circuit. The switch is closed to charge the capacitor, and the voltage noted on the meter. The switch is then opened, and the time required for the voltage to fall to 37 percent of the original voltage is measured. For highest meter-reading accuracy, the voltage source should have an output voltage,  $E$ , that gives at least half-scale deflection at the voltmeter range selected from Table I, as described in the text.

Fig. 1 shows the diagram of the testing circuit. The voltmeter resistance itself is used as the known resistance through which the capacitor discharges. The discharge can be timed with a stopwatch for short periods, or an electric clock for longer periods. To make a measurement, close the switch, and record the voltage. Also, make note of the point of the voltmeter scale that represents 37 percent of this value. Start timing at the instant the

\*5335 Duke St., Apt. 601, Alexandria, Virginia 22304.

TABLE I

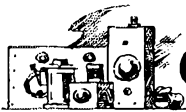
Volt. Scale	Meter Resistance (Ohms/Volt)			
	1K	10K	20K	50K
1.2	833	83.3	41.6	16.7
1.5	667	66.7	33.3	6.65
2.5	400	40	20	8
3	333	33.3	16.7	6.65
5	200	20	10	4
6	167	16.7	8.33	3.33
10	100	10	5	2
12	83.3	8.33	4.16	1.67
15	66.7	6.67	3.33	1.33
50	20	2	1	0.4
60	16.7	1.67	0.83	0.333
100	10	1	0.5	0.2
150	6.67	0.67	0.333	0.133
250	4	0.4	0.2	0.08
300	3.33	0.33	0.167	0.067
500	2	0.2	0.1	0.04
$\mu f.$ per second				

switch is opened, and stop the timing at the instant the voltmeter needle crosses the 37 percent value. Then the capacitance is determined by dividing the time in seconds by the voltmeter resistance in megohms.

Table I is arranged in terms of microfarads per second of time for typical voltmeter movements (in ohms per volt) and voltage ranges. As an example of its use, suppose that voltmeter with a movement of 20K/volt is used on its 60-volt range (voltmeter resistance =  $20K \times 60 = 1.2$  megohms). With the switch closed, the meter reads 40 volts. The switch is then opened. It is found that the voltage drops to 14.8 volts (37 percent of 40) in 25 seconds. From Table I, the multiplying factor for a 20K/volt meter when using its 60-volt range is found to be 0.83. Therefore, the capacitance is  $25 \times 0.83 = 20$  (approx.) microfarads.

For good meter-reading accuracy, the charging-source voltage should give at least half-scale voltmeter deflection on the voltage range selected. (However, the voltage rating of the capacitor should not be exceeded, of course.) Since accurate timing of intervals of less than one second will usually be impossible without special equipment, the multiplying factors shown in Table I indicate the practical mini-

(Continued on page 132)



## A One-Tube Converter For 15 or 10 Meters

**T**HIS simple circuit uses a 6USA in an efficient mixer-oscillator configuration. The pentode section of the tube performs as a mixer, and the triode half of the 6USA is used as a third-overtone oscillator.

The converter is shown as an accessory item for the popular Command series receiver—a BC-454 in this instance. The i.f. tuning range for 15-meter reception is 3.5 to 4.0 MHz. For 10-meter use, the i.f. range is 3.5 to 5.2 MHz. It is not necessary to use a Command receiver as the i.f. unit. Any receiver that tunes the required i.f. range can be used satisfactorily. If c.w. and s.s.b. reception are desired, the receiver should be equipped with a b.f.o.

Referring to Fig. 1,  $L_2$ ,  $L_3$ , and the four associated capacitors form a bandpass circuit to provide suitable front-end selectivity to lessen

the chance of image responses.  $L_4$ , the output capacitance of  $V_{1A}$ , and the 15 pf. capacitor from the mixer plate to ground form a broadly resonant, low- $C$  output circuit. This arrangement helps to give a flatter response at the i.f. tuning range than would result if a high- $C$  output circuit was used.

A fundamental-type crystal can be employed at  $Y_1$  and operated on its third overtone, or a standard third-overtone crystal can be used. Either will function in this circuit without any changes being necessary.

The converter can be assembled on any small Minibox or homemade chassis. Tune-up is simple. With power applied, and with the converter connected to an i.f. receiver and an antenna, tune  $L_6$  until a significant increase in background (or atmospheric) noise is heard in the speaker. This

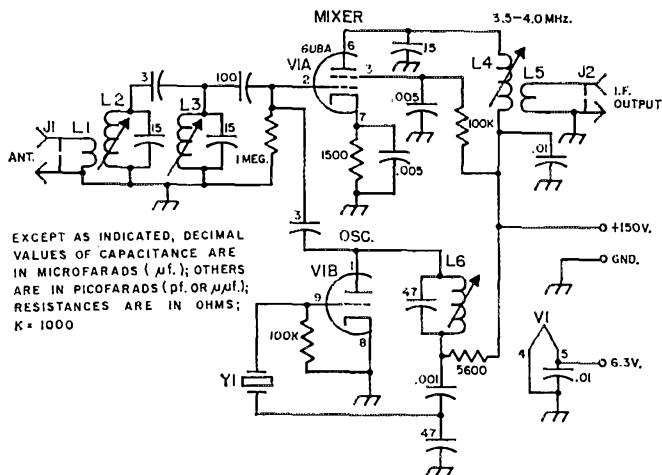


Fig. 1—Schematic of the converter. Fixed capacitors are disk ceramic; resistors are  $\frac{1}{2}$ -watt composition.

$J_1$ ,  $J_2$ —Phono connector.

$L_1$ —5 turns No. 30 insulated wire over ground end of  $L_2$ .

$L_2$ ,  $L_3$ —10 meters: 0.44- to 0.76- $\mu$ h. slug-tuned inductor (J. W. Miller 4501 suitable).

15 meters: 1.7- to 2.7- $\mu$ h. slug-tuned inductor (J. W. Miller 4503 suitable).

$L_4$ —66- to 114- $\mu$ h. slug-tuned inductor (J. W. Miller 4511).

$L_5$ —10 turns No. 30 insulated wire wound below B-plus end of  $L_4$ .

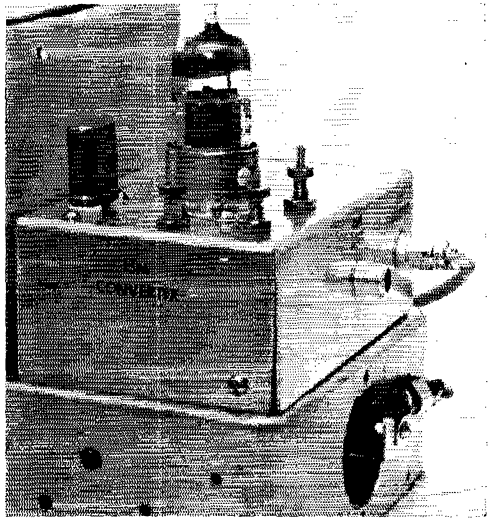
$L_6$ —0.44- to 0.76- $\mu$ h. slug-tuned inductor (J. W. Miller 4501).

$Y_1$ —10 meters: 24.5-MHz. third-overtone crystal (International Crystal Co.) or 8166-kHz. fundamental crystal (JAN Crystals).

15 meters: 25.0-MHz. third-overtone crystal (International Crystal Co.) or 8333-kHz. fundamental crystal (JAN Crystals).

will indicate that the crystal is oscillating. Next, tune in a weak signal and peak  $L_2$  and  $L_3$  for maximum response near the center of the band.  $L_4$  can be peaked for the center of the band too. If more uniform response is desired across the i.f. tuning range,  $L_2$ ,  $L_3$ , and  $L_4$  can be stagger-tuned for different parts of the band.

Although the schematic calls for 150 volts d.c. as the operating voltage, up to 225 volts can be applied to the circuit without exceeding the tube's ratings. — *WTCR*



At the rear of the Command set, the area that was once used to accommodate a dynamotor is now occupied by the converter. Spade bolts join the homemade chassis of the converter to the receiver.

## “... I won't hold ya, W6ISQ”

BY JOHN G. TROSTER,\* W6ISQ

**O**KAY there Pedro. Real glad to work ya for a new country. I won't hold ya. Lots of other fellas trying to work you, so I'll let ya go. You're still a good 5 by 9 here and, ahhhhhh . . . ohhh, just for the log here, did you say my report was a 5-9 or a 5-9 plus? Break, break.”

“You're a 4 by 5.”

“Ahhhhhhh . . . hmmm . . . well, okay old man. Won't keep it here . . . let ya run there . . . ahhh . . . oh, say listen, Pedro, I just remembered I got a new Signal Expander that ought to double my signal strength over there. Yeah. Just QRX a second and I'll give ya a demonstration . . . QRX . . . ahhhhhh . . . hececececeilla . . . hececececeilla . . . now I got the Signal Expander plugged in. Am I back up to 8-9 now? Break.”

“You're a 2 by 5. Terrible distortion.”

“Ahhh . . . ohhhh . . . anyway, thanks again for the new country, Pedro. Quite a pileup here, so let ya go now. Oh, say, Pedro, your name is Pedro isn't it? Gimme a quick roger Pedro, then I'll let ya go.”

“Name is Sinbad.”

“Ohhhh, sorry Sinbad. Don't know how I . . . anyway, many thanks for the fine report . . . and the good, errrr . . . handle there. You're down to a 5 by 7 now, soooo, let ya buzz off there and hope to see ya on the other bands too. Say before ya go, give me a quick roger if ya work 15 meters too . . . ahhhh, and how about 10 . . . and also 80 and 40. Is that a roger?”

“Roger . . . roger . . . negative . . . roger.”

“Aw, that's real swell old man. So I won't

keep ya. See ya down the old log and hope to get your QSL real soon. Ohhh, almost forgot, Sinbad, was your Post Office Box number 943 or 543. Gimme a quick break. Break.”

“There is no box number. QSL to the bureau.”

“Ahhh, sure thing. Must of forgot. Well listen, Sinbad, I'll pass along my best of best 73s and ahhh . . . I'll let ya go there before the band goes out. Real sorry I have to run out on ya like this Sinbad, but your signal is down to about a 2 by 2 now, and I'm afraid I'm gonna lose you. So best of 73s Sinbad, I won't hold ya . . . let ya run along there . . . and . . . ohhhh . . .

QST—

## Strays

Again this year, the Federation of Eastern Massachusetts Amateur Radio Associations will present a cash award and a handsome plaque to a ham in the first call district who has met one or more of the following qualifications:

- 1) Performed a meritorious public service to his community through the medium of amateur radio;
- 2) Made a major contribution to the science of amateur radio;
- 3) Helped greatly to stimulate interest in amateur radio in others;
- 4) Aided other radio amateurs to acquire a greater knowledge and skill in operating or building amateur radio equipment. Send complete information on your nominee to Eli Nannis, W1HKG, Chairman Awards Committee, 37 Lowell St., Malden, Mass. 02148. All nominations must be in before April 21, 1969. The award is known as the John Mansfield Memorial Award and it will be presented to the winner at the banquet of the New England ARRL Convention on May 21, 1969.

\* 45 Laurel Ave., Atherton, Calif. 94825.

# ~~SLOTTED LINE~~ ~~SLOTTED LINE~~ for U.H.F. S.W.R. Checks

It is unfortunate that at frequencies where precise adjustment of antenna matching is most important, equipment for the job is hard to come by. There are adequate bridges available, but they are expensive. Devices for s.w.r. monitoring generally used by amateurs are of questionable value at frequencies higher than our 144-Mc. band. Instruments of the Monimatch family, when set up for use on frequencies lower than 50 Mc., give a very broad null in the 420-Mc. band, and are useless higher in frequency. If their coupling to the line is adjusted for a good null at 420, the sensitivity is very poor on lower bands. "How can I measure s.w.r. at 432 Mc.?" thus is a much-asked question.

W8FKC provided a good answer in *QST* some years ago,<sup>1</sup> in the form of an easily-built bridge that would work over the range from 200 to above 1300 Mc. Another, illustrated here, is the slotted line. This device, common in laboratories, has been little used by amateurs, probably because it has been thought that one good enough for actual measurement of s.w.r. would be difficult to build or expensive to purchase.

At the Central States V.h.f. Conference held at Lake Ozark, Mo., in August, 1968, Pitt Arnold, W0IPE, described a slotted line that should be within the building capabilities of most u.h.f. enthusiasts. The author claims no originality in connection with the version pictured here. We merely took Pitt's dimensions, and made up a model from materials on hand. It works well enough so that we feel sure it will be useful to anyone interested in reasonably accurate adjustment of v.h.f. and u.h.f. antennas.

## How It Works

A slotted line, as its name implies, is merely a section of transmission line, to which is fitted a movable probe to permit sampling the r.f.

<sup>1</sup>Burhans, "U.H.F. Coaxial S.W.R. Bridge," June, 1960, *QST*, p. 30. Issue no longer available, but photocopies can be made for 50 cents, for the 2-page article.

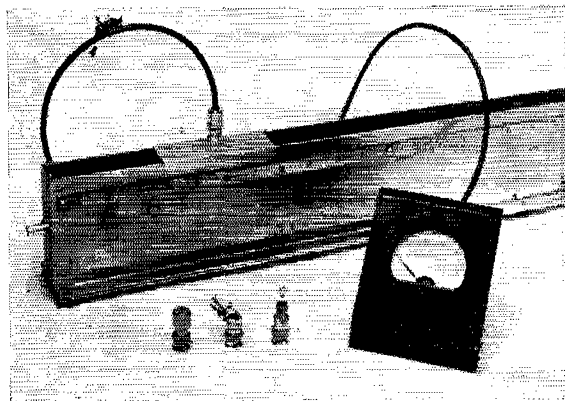
voltage along the line, through at least one maximum and one minimum point. If more peaks can be checked, so much the better, but you can get by with just one "max and min." At least two of one and one of the other is better, and the minimum length for a good 420-Mc. slotted line is about three feet. Some useful work can be done with our 3-footer on 220 or even 144, however, if the length of line feeding into it is adjusted so that at least one peak and one valley can be observed.

In addition to measuring standing-wave ratio, the slotted line is useful for measuring wavelength in the manner of Lecher wires. The scale mounted on the front of the instrument is for this purpose.

If a diode is used for rectifying the r.f. current, varying readings on the meter in series with the diode show only that there is *some* s.w.r. on the line. When you adjust the load or matching device for the least change in reading with probe movement, you have made the best adjustment you can, with the matching system or load in use. The numbers themselves are not meaningful otherwise, until you do some calibrating. More on this later.

## Construction

How the line section is made should be fairly clear from the photographs and Fig. 1. Ours is not exactly like W0IPE's, as we made use of what was immediately at hand. The inner conductor is half-inch o.d. aluminum tubing, centered between two plates about four inches high. The space between the inner surfaces of the plates is 0.9 inch. We used two L-shaped plates, bolted to a base plate. All are  $\frac{3}{16}$ -inch sheet aluminum. A better arrangement might be to use thicker side plates, with tapped holes in their bottom edges. The principal item of importance is that the assembly be sturdy enough so that the spacing between the side plates will remain constant when the instrument is used.



Input end of the slotted line. Peaks or nulls of diode current, indicated on the meter as the probe is moved along the line, show half-wave intervals. Scale measures half-wavelengths in inches, or in centimeters if a suitable scale is available. Three dummy loads are shown in the foreground: a sealed resistor load in a BNC fitting, left; a tuned frequency-sensitive load, center; and a No. 47 pilot lamp and fitting, right.

If solid rod is available for the inner conductor, the ends can be drilled and the center pins of the coaxial fittings inserted therein. Pitt recommended N-type fittings, connected to the line in this way, with about  $\frac{1}{8}$  inch space between the rod end and the fitting flange. I could not locate solid rod of the right size, so used aluminum tubing, with straps of thin brass bolted to its ends. These were bent toward each other and soldered to the center conductor of the fitting. BNC terminations were used for convenience, and because we had them on hand. That we were never able to eliminate rise and fall of r.f. current along the line completely, regardless of load used, probably indicates that this makeshift is not quite as good as the method recommended by WØIPE. It is plenty good enough, however, for the line to be markedly more sensitive to small s.w.r. variations than anything we'd used previously.

The end plates and the mounting for the probe are made of  $\frac{1}{32}$ -inch sheet aluminum, bent in U shape, with BNC sockets (UG-290/U) mounted with their diagonals perpendicular to the long axis of the plate, and centered in the large surface. The tip-to-tip dimension of this fitting's flange is just over 0.9 inch, so the corners should be filed down to make the assembly a smooth fit

over the top or end surface of the line. Occasional light applications of silicone-base lubricant will permit the probe assembly to slide easily along the top of the line. The end plates are made in a similar manner, and are fastened to the front and back surfaces of the line with self-tapping screws. The dimensions of these parts are given in Fig. 1. Mounting holes need be drilled only in the end plates, of course.

Rubber feet with 8-32 screws are used to fasten the base plate to the side plates. The holes in the flanges of the latter are tapped for 8-32 thread, though larger holes could have been made and nuts used on the screws embedded in the feet.

A 3-foot scale is mounted along the front surface of the line, for measuring the distance between voltage peaks or valleys. A millimeter scale would have simplified the mathematics involved in frequency measurement, but we could not find one in nearby hardware stores. The scale is a replacement unit for use in a pocket tape, and was originally 6 feet long. It is mounted on stand-off washers, so that the edge of the probe mount will slide just inside its top edge.

The size of the coupling loop on the probe and its position with respect to the inner conductor of the line will depend on the power input to the line, and on the sensitivity of the meter used. If

a self-controlled oscillator is to be used as an energy source it will be desirable to couple as loosely between the source and the line as possible. Loose coupling between the probe and the line is also desirable, as too much coupling will

broaden out the peak and valley indications and make frequency measurements inaccurate. The best bet, for most uses, is to make the loop on the probe of such size and shape that it can be used for close coupling, and then bend it up to operate with the loosest coupling that will give a satisfactory meter indication.

If a self-controlled energy source such as a u.h.f. dipper is used with the line, it can be coupled to a small loop of insulated wire, mounted in a BNC fitting and plugged into the input end of the line. With a transmitter having 50-ohm output, a coaxial cable is used between the transmitter and the line input. When the transmitter has one watt or more output the coupling between the line and the probe can be quite loose. As the instrument is actually used you will find it possible to work out optimum coupling for various purposes. For the time being, a loop of the type shown and described will be adequate for most uses.

### Uses

Let's check some r.f. dummy loads at 432 Mc. The first requirement for this is that the energy fed into the line be free of harmonics. This can be assured if a coaxial or strip-line filter<sup>2</sup> is used between the r.f. source and the line. Filtering is

<sup>2</sup> Hilton, "Coaxial-Tank V.H.F. Filters," October, 1964, *QST*, p. 11. Other filter designs in Chapter 11, *The Radio Amateur's V.h.f. Manual*.

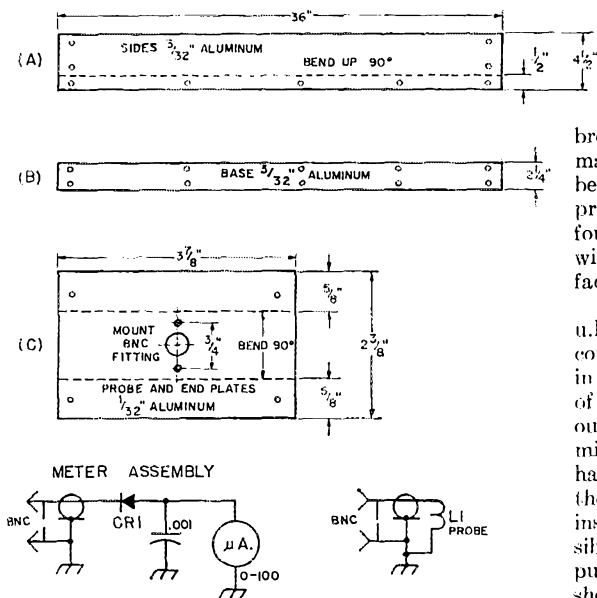


Fig. 1—Details of the principal metal parts of the u.h.f. slotted line. Schematic diagrams and parts information for the probe and meter assembly are given at the lower right. The two sides, A, should be mounted on the base, B, so that the spacing between the inner walls is 0.9 inch. The probe and end plates should be bent to provide a sliding fit over the line assembly. The inner conductor, not shown, is  $\frac{1}{2}$ -inch diameter, 35 inches long.

CR<sub>1</sub>—Any u.h.f. diode.

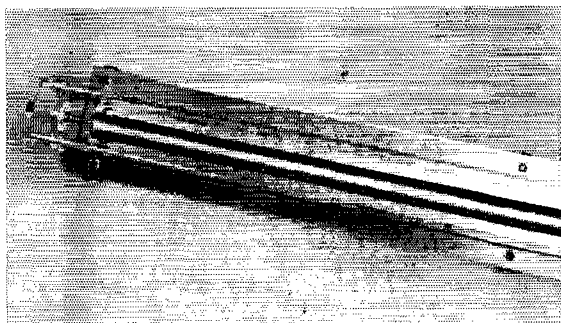
L<sub>1</sub>—4-inch strip of  $\frac{3}{16}$ -inch thin copper or brass, bent into loop about  $\frac{1}{2}$  by  $\frac{3}{4}$  inch in size. See photograph and text.

especially important if the energy source is a varactor multiplier. Unless filtered properly, the output of a varactor stage is almost certain to have enough power at unwanted frequencies to foul up the slotted line indications.

To familiarize yourself with the operation of the slotted line it is well to start with a load that will represent some mismatch. A No. 47 pilot light soldered into a BNC fitting will do, and it has the advantage of giving some visible indication of relative power. Put such a load on the output end of the slotted line, and connect the input to the energy source. For demonstrations we use a 2-meter Communicator, W1CER's varactor tripler (March, 1966, *QST*, page 18), and the 432-Mc. strip-line filter from the *The Radio Amateur's V.H.F. Manual*. This combination gives about one watt of pure 432-Mc. energy, which is plenty for good operation of the line and lamp load.

This setup should be adjusted so that the lamp load shows some glow. Now insert the probe and watch the meter indication carefully. It may be found that with the coupling loop as shown in the photograph the meter will tend to go off scale before the probe is resting in its normal operating position. If so, bend the loop back until a satisfactory reading is obtained. Now slide the probe slowly along the line, and record the maximum and minimum current readings. You'll probably find that the meter will go to zero at the minimum r.f. voltage points, when the coupling is adjusted for about a  $\frac{3}{4}$ -scale reading at the peaks. Obviously, a No. 47 lamp is not a very good load at 432 Mc.!

A much better one-watt load can be made by soldering a 50-ohm 1-watt composition resistor inside a BNC fitting. Cut a copper or brass disk the size of the end of the fitting, and drill a hole that will just pass the resistor lead, at the center of the disk. Solder the resistor lead to the disk, and then solder the disk to the end of the fitting. With this load in place you'll probably find not



Underside of the slotted-line probe. Position of the coupling loop with respect to the center conductor should be adjusted for the minimum coupling usable at the power level of the energy fed into the line, if maximum accuracy is to be achieved. A light coating of silicone-base lubricant on the inner edges will assure smooth operation and good electrical contact.

much more than 10 percent variation in probe current along the line, at 432 Mc., and perhaps less at 220 or 144 Mc. This is a pretty fair load, but remember that its dissipation capability is limited. Do not run it at one-watt input or more for any longer than necessary to get readings. Continued heating of the resistor is likely to cause it to change value and destroy the usefulness of the load.

A good load, but one that is frequency-sensitive, can be made by mounting the resistor in the fitting, with a variable capacitor in series. Select the resistor, if possible, so that its d.c. resistance will be between 50 and 52 ohms. Adjust the capacitor with an insulated screwdriver until a setting is found that shows the smallest variation in current as the probe is moved along the line. The best we've done with this arrangement is a variation of about 2 microamperes in a reading of about 50  $\mu$ a. Use readings that are available at some distance in from the ends of the line for this adjustment, as coupling to the line changes appreciably in the last few inches at each end.

Wavelength measurements should now be tried. The distance between two nulls or two peaks of probe current is a half-wavelength. Be careful not to overcouple with the probe for this work, or the indication will be excessively broad, or even double-humped. If a self-controlled energy source is used, tight coupling will pull the frequency enough to render measurements highly inaccurate.

A grid-dip oscillator, set at an unknown frequency, can be coupled to the input end of the line by means of a 1-inch diameter loop of wire soldered into a BNC fitting. Operate the slotted line without a load, or with a load having an impedance other than 50 ohms, so that an appreciable s.w.r. will be seen with the probe. Measure the distance between peaks or nulls. The zero point may be the better for this purpose. Move the probe until zero reading is obtained. Now move slowly each way until one microampere is seen on the meter. Observe these two 1- $\mu$ a. points, and take the midpoint between them. Greater accuracy is possible this way than by merely looking for the zero point. Now move along the line to the next null, and find its exact location in the same manner. We find the points to be 12 $\frac{5}{8}$  inches apart, let's say. The frequency of oscillation is then found from the formula:

$$F = \frac{5905}{S}$$

where  $F$  is the frequency in Mc. and  $S$  is the spacing of the nulls in inches. So

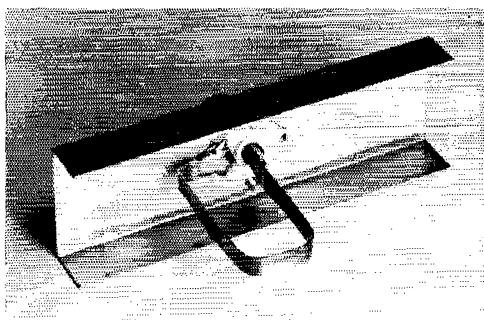
$$F = \frac{5905}{12.625} = 468 \text{ Mc.}$$

If you have a millimeter scale the numbers are simpler, for

$$F' = \frac{300,000}{2S}$$

where  $S$  is the spacing of the nulls in meters. A millimeter scale would show these same nulls





Interior of one end of the slotted line. Strips of thin brass, bolted to the center conductor, are soldered to the BNC fitting centered on the end plate of the line.

to be 32 millimeters apart, which is a *half* wavelength.

$$F = \frac{300,000}{2 \times 32} = 468 \text{ Mc.}$$

If coupling is held sufficiently loose so that nulls can be read accurately, frequencies in the vicinity of the 420-Mc. band should be well within one percent when measured in this way.

#### Calibration

Because of the characteristics of the diode, the relative currents indicated on the meter are not directly translatable into s.w.r. The meter reads rectified current, whereas the s.w.r. is the ratio of  $I_{max}$  to  $I_{min}$  in r.f. current. If we have a meter capable of reading r.f. power output with a fair degree of accuracy we can make a calibration of the d.c. meter readings in terms of r.f. power.

Our current calibration turned out as shown below:

D.C. Ratio	R.F. Ratio	D.C. Ratio	R.F. Ratio
100:90	1.07 to 1	100:40	1.49
100:90	1.11	100:30	1.6
100:70	1.175	100:20	1.8
100:60	1.26	100:10	2.25
100:50	1.35	100:5	3.2

It can be seen from these figures that a half-scale swing from maximum to minimum indicated current represents an s.w.r. of only 1.35 to 1. This is about the minimum s.w.r. that can be observed with a good through-line wattmeter, unless you use fairly high power for the forward reading, and then substitute a more sensitive plug-in pickup device for reading the reflected. Using a 5-watt transmitter on 432, with a 10-watt plug-in unit for reading both forward and reflected power, you can just see the meter move on the *reflected* position, with this 1.35:1 s.w.r. Our slotted line makes it possible to measure ratios down well under 1.1 to 1.

How important it is to be able to do this depends on what you are trying to do in your antenna work. A mismatch of 1.3 to 1 will never kill you on 432. Most installations probably are much worse than this, and their users never know it. But if you intend to do any real evaluation of antennas it is of utmost importance that the antennas being compared be adjusted for as close to a perfect match as possible. A careful examination of the frequencies over which your antennas work, in terms of fairly sensitive s.w.r. measurement, may be quite revealing. But this is another story; one that we have attempted to tell in many previous discussions of u.h.f. antennas.

— W1HDQ

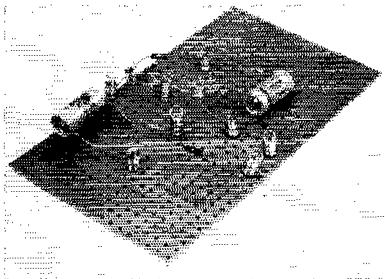
## • New Apparatus

### Houle Solderless Connectors

**I**n order to construct ham gear that looks good in addition to working well, it's usually necessary to build a breadboard model. The time it takes to determine component values experimentally can be shortened considerably by using Houle universal solderless connectors as shown in the photograph.

A Houle solderless connector consists of a spring of piano wire that has been plated for good conductivity, and a self-tapping sheet-metal screw. The latter is furnished to secure the spring to punched circuit board. After a connector has been mounted, it's only necessary to flex the finger loop at the top of the spring to insert one or more component leads between the loops of the coil. There is no need to waste time soldering and unsoldering.

Houle solderless connectors are available for two hole sizes, 0.093 inch and 0.062 inch. The price classes for both types are \$1.50 for 25 connectors, \$5 for 100 connectors, and \$40 for 1000 connectors. The connectors are available from Houle Mfg. Co., Inc., P.O. Box 2495, Livonia, Michigan 48150. —W1YDS



## Strays

#### Feedback

Our Field Day scores listing should have included the Class 3A tally of VE3KCD/3, the Kitchener-Waterloo ARC, with 749 contacts in the B power classification and a total score of 5291 points. Sri, OMs.

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We failed to list WN9UNX (now WA9ZHC) as a C.W. Certificate Winner in the Armed Forces Day 1968 Communication Test Results in the November 1968 issue of QST.

# Transistorized A.G.C. And Squelch Circuits

BY JAMES R. ANDREWS,\* WA0NHD

**I**n the process of designing my own transistorized receiver, I developed some rather novel a.g.c. and squelch circuits. They have proven to be quite useful in practice. Amateurs having solid-state receivers or contemplating building such, will find these circuits interesting.

This article presents general circuit ideas. The component values are given on the schematics only as a rough guide, as they were chosen for my particular receiver. The actual values used will have to be chosen to suit each individual case.

## A.G.C. Amplifier

The a.g.c. amplifier shown in Fig. 1 is designed to provide a.g.c. voltage for transistor r.f. and i.f. amplifiers. The circuit is basically a common-emitter d.c. amplifier followed by an emitter follower. Special care has been taken to give the system a fast-attack, slow-decay response that is useful for s.s.b. operation.

An a.m. diode detector is used to provide the input signal to the a.g.c. amplifier.  $R_1$  and  $C_1$  filter out the audio signal. The resultant d.c. signal is amplified by the common-emitter amplifier consisting of  $Q_1$ ,  $R_2$ , and  $R_3$ .  $R_2$  is used to achieve thermal and gain stability. The collector voltage of  $Q_1$  controls the emitter follower  $Q_2$ . The resultant voltage at the emitter of  $Q_2$  is the a.g.c. voltage. For 80 conditions, transistor  $Q_1$  is not conducting and the a.g.c. voltage corresponding to maximum receiver gain is set by the voltage divider consisting of  $R_3$  and  $R_4$ .

The fast-attack, slow-decay characteristic is obtained through the action of  $Q_3$ ,  $CR_1$ ,  $C_2$ , and  $C_3$ . When an input signal is applied,  $Q_1$  starts to conduct causing its collector voltage to rise

\*3450 Ash Avenue, Boulder, Colorado 80302.

toward zero. During the time of decay either capacitor  $C_2$  or  $C_3$  is decoupled by diode  $CR_1$  to allow a fast a.g.c. attack. Transistor  $Q_3$ , operating as an emitter follower, rapidly discharges the decay capacitor,  $C_2$  or  $C_3$ , to the resultant level. When the input signal drops off, the collector current in  $Q_1$  decreases. Diode  $CR_1$  then becomes forward biased and the base of transistor  $Q_2$  is held at the voltage of the decay capacitor. Because capacitor  $C_2$  must be charged through resistor  $R_3$ , there is a slow decay in the a.g.c. voltage.

The circuit in Fig. 1 has an a.g.c. voltage rise-time of 100 milliseconds. The settling time, i.e. the time required for all oscillations of the a.g.c. voltage to cease, is 340 ms. The a.g.c. voltage has a fall time of 600 ms. in the fast mode and 3.5 seconds in the slow mode. Fig. 2 shows how to apply the a.g.c. voltage to a typical transistor i.f. amplifier.

An S-meter circuit that can be used with the above a.g.c. amplifier is shown in Fig. 3. Transistor  $Q_4$  is used in an emitter-follower configuration. A 6.8-volt zener diode,  $CR_2$ , provides a fixed bias reference voltage. The S meter is bridged between this -6.8-volt bias and the emitter of  $Q_4$ .

## Squelch

The squelch circuit shown in Fig. 4 combines a Schmitt trigger<sup>1</sup> and a gated emitter follower. The firing level of the Schmitt trigger determines the a.g.c. voltage at which the squelch opens. This level can be adjusted by varying control  $R_{10}$ . The squelch circuit is also designed to hold the squelch open for two seconds after the a.g.c.

<sup>1</sup> Millman and Taub, *Pulse, Digital, and Switching Waveforms*, McGraw Hill, Inc., New York, 1965, pp. 389-402.

Fig. 1—A.g.c. amplifier. Capacitance shown is in  $\mu\text{f}$ .; resistance is shown in ohms;  $K = 1000$ . Capacitors are 25-volt electrolytic; resistors are  $\frac{1}{2}$  watt. Components not specified below are for text reference.

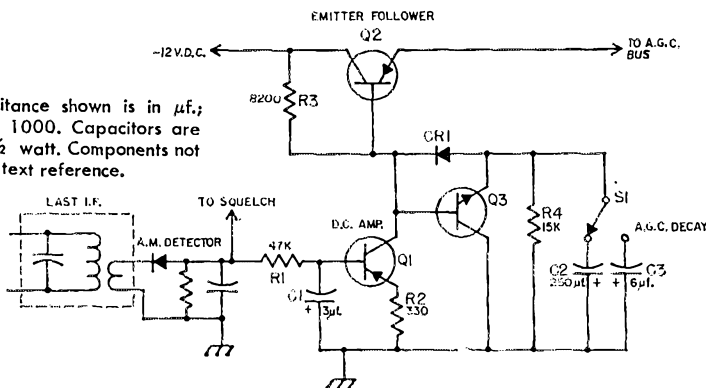
$CR_1$ —Germanium 1N34.

$Q_1$ —Germanium p-n-p 2N1309.

$Q_2$ —Germanium n-p-n 2N404A.

$Q_3$ —Germanium n-p-n 2N1308.

$S_1$ —S.p.d.t.



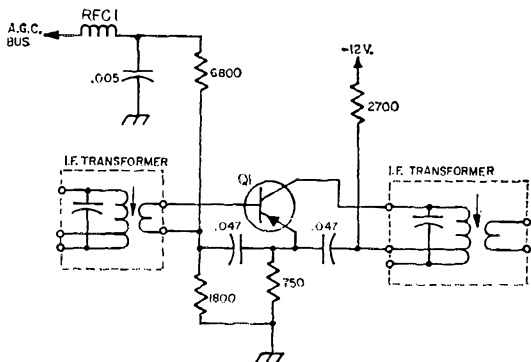


Fig. 2—Typical a.g.c. controlled i.f. amplifier. Capacitance shown is in  $\mu\text{f}$ .; resistance is shown in ohms; K = 1000. Q1 is an HEP-52. RFC1 is a 30- $\mu\text{h}$ . choke.

voltage drops below the firing level of Q5 and Q6. This delay allows the squelch circuit to be used for s.s.b. operation.

To explain the squelch circuit operation, it is necessary to first describe the Schmitt trigger. The Schmitt trigger consists of two d.c. coupled amplifiers, Q5 and Q6, with positive feedback obtained from a common emitter resistor R15. Assume initially that the a.g.c. input is at or near ground potential. Q5 is cut off. Q6 is biased into the conduction region by the voltage divider R13, R16, and R17. The base voltage of Q6 is  $V_1 = -4.3$  volts, while the collector is at  $-8$  volts. Now assume the input voltage becomes more negative. Q5 will not conduct current until its base voltage reaches  $V_1 = -4.3$  volts. If the circuit loop gain is greater than or equal to one because of the positive feedback, the trigger will switch states. Q5 will be conducting and Q6 will be cut off with its collector voltage at  $-12$  volts.

Similarly, if the input is more negative than  $V_1 = -4.3$  volts and then rises toward zero potential, the Schmitt trigger will rapidly switch states

again when a voltage  $V_2 = -2.9$  volts is reached. With R14 effectively shorted out,  $V_2$  is equal to  $-2.9$  volts. To eliminate hysteresis, R14 is adjusted to make  $V_2$  approximately equal to  $V_1$ . The output of the Schmitt trigger at the collector of Q6 will be either  $-12$  or  $-8$  volts depending upon the level of the a.g.c. input.

The remainder of the squelch circuit consists of a gating transistor Q7 and an emitter follower Q8. Initially let us assume that we have an 80 a.g.c. voltage of  $-7$  volts. Thus the output of the Schmitt trigger is at  $-12$  volts. Q7 is cut off and the base voltage for Q8 is 0 volts. The emitter of Q8 is biased at  $-4.7$  volts by a zener diode CR3. Thus the emitter follower Q8 is strongly cut off and will not pass a f. signal.

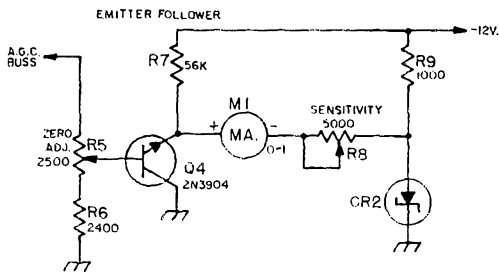


Fig. 3—S-meter circuit. Resistance shown is in ohms; K = 1000. Resistors are  $\frac{1}{2}$  watt. Components not specified below are for text reference.

- CR2—6.8-volt zener, 1N5235.
- M1—0.1 milliammeter.
- Q4—Silicon n-p-n 2N3904.
- R5—2500-ohm,  $\frac{1}{2}$  watt linear control.
- R8—5000-ohm,  $\frac{1}{2}$ -watt linear control.

Now assume the a.g.c. voltage starts to rise with an incoming signal. When this voltage reaches the Schmitt trigger firing level  $V_2$ , the voltage at the collector of Q6 switches rapidly to  $-8$  volts. This turns Q7 on hard and drives it into saturation, which in turn lowers the base

(Continued on page 128)

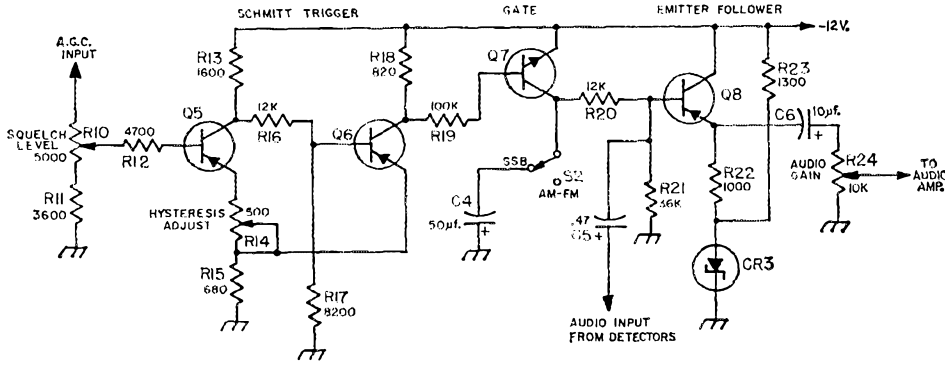


Fig. 4—Squelch circuit. Capacitance is shown in  $\mu\text{f}$ .; resistance is shown in ohms; K = 1000. Resistors are  $\frac{1}{2}$  watt. Components not specified below are for text reference.

- C4—50- $\mu\text{f}$ ., 25-volt electrolytic.
- C5—0.47- $\mu\text{f}$ ., 15-volt or greater, paper or tantalum.
- C6—10- $\mu\text{f}$ ., 25-volt electrolytic.
- CR3—4.7-volt zener, 1N5230A.
- Q5, Q6, Q8—Silicon n-p-n 2N3906.

- Q7—Silicon n-p-n 2N3904.
- R10—5000-ohm,  $\frac{1}{2}$ -watt linear control.
- R14—500-ohm,  $\frac{1}{2}$ -watt linear control.
- R21—10K-ohm,  $\frac{1}{2}$ -watt audio taper control.
- R24—10K-ohm,  $\frac{1}{2}$ -watt audio taper control.
- S2—S.p.d.t.



# Hints and Kinks

## For the Experimenter



### DIODE T.R. SWITCH

I BUILT the 5-watt transistor transmitter described in June 1967 *QST* and also in the 1968 *Handbook*. In order to use a single antenna with this rig and work full break-in, I constructed the solid-state t.r. switch shown in schematic form in Fig. 1.

Diode  $CR_1$  shorts the added receiver input circuit,  $C_3L_1$ , to ground when the key is closed. The series combination of  $R_1$  and  $RFC_1$  equalizes the d.c. voltage on one side of  $CR_1$  to that on the other. Without  $R_1$  and  $RFC_1$ , collector current leakage in the p.a. transistor might forward-bias  $CR_1$  when the key is open. This would result in some loss in the received signal.

The t.r. switch was built on the same chassis as the transmitter. In order for the additional parts to fit, a larger-sized chassis than specified in the original article had to be used.

The antenna changeover system performs as I hoped it would: there is virtually no loss in the transmitter output or the received signal, there is very little transmitter signal feedthrough to the receiver during key-down conditions, and the added tuned circuit ahead of the receiver helps to reject images. — *Roy Koeppe, K6KOL*

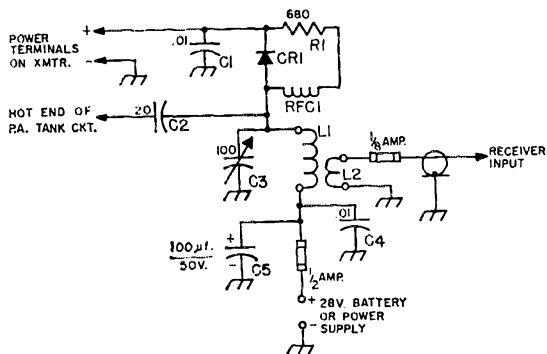


Fig. 1—Circuit of the solid-state t.r. switch. Except as indicated, decimal values of capacitance are in  $\mu\text{f}$ ; others are in picofarads. Resistance is in ohms.

$C_1, C_2, C_4$ —Disk ceramic.

$C_3$ —100-pf. miniature variable.

$C_5$ —Electrolytic. (Capacitor necessary only if dry-cell battery is used for power supply.)

$CR_1$ —Silicon diode, 400 p.i.v. at 50 ma.

$L_1, L_2$ —Same type plug-in coil as used in p.a. tank (see text), but no tap on  $L_1$ .

$R_1$ — $1/2$ -watt composition.

$RFC_1$ —1-mh. or 2.5-mh., 50 ma. r.f. choke.

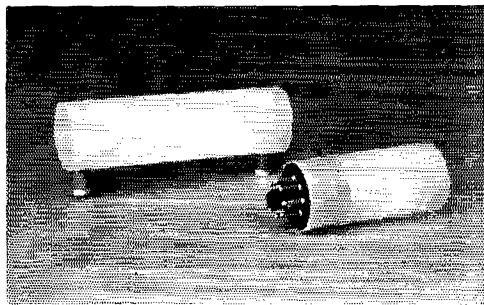


Fig. 2—Coil forms made from golf club protection tubes.

### COIL FORMS FROM GOLF CLUB PROTECTION TUBES

COIL forms can easily be fabricated from  $1\frac{1}{4}$ -inch diameter golf club protector sleeving. Plug-in coil forms may be made as follows:

1) Remove and discard the glass envelope and the elements from an old octal tube that has a  $1\frac{1}{4}$ -inch diameter base.

2) Cut an appropriate length of the plastic tube and press fit it over the octal base. An example of this type of coil form is shown on the right side of Fig. 2.

Permanently mounted coils may be made by cutting an appropriate length of tubing and mounting it on two standoff insulators or wooden pegs. This kind of form is shown on the left side of Fig. 2.

The plastic golf club protection tubes we used were made from polyethylene, the same high quality dielectric material used in the manufacturer of 300-ohm TV transmission line. A single 34-inch length, which was more than enough to make a half-dozen coil forms, cost eleven cents at the local sporting goods store. — *Arthur S. Gillespie, Jr., W4VON*

### IDENTIFYING ILLEGIBLE TYPE NUMBERS ON VACUUM TUBES

RECENTLY while engaged in a summer shack cleaning, I decided to sort a pile of pulled tubes, many of which had illegible type numbers. Recalling an ancient gimmick, I placed the unreadable tubes in the refrigerator for a few minutes. Upon removal of the tubes, selective moisture condensation made the numbers readable on 85 percent of the units cooled. In all cases it was previously very difficult to find even the location of the type numbers. — *Russell Shattuck, AF6-YA*

## 115-VOLT THREE-WIRE TESTER

To help eliminate the chance of electrical shock, many manufacturers are equipping their newer pieces of ham gear with three-wire a.c. plugs. If you plan on installing three-wire receptacles in your ham shack to accommodate these connectors, for the sake of safety use the standard connections for three-wire plugs and receptacles shown in Fig. 3. To be doubly sure all a.c. receptacles in your home have been properly wired, use the handy tester shown in Figs. 4 and 5.

Basically the three-wire tester consists of three neon indicators,  $I_1$ ,  $I_2$  and  $I_3$ , which function as a.c. voltmeters. An indicator is connected across each of the three possible pairs of connections so that any possible receptacle connection can be tested. As set up, an indicator will *not* glow behind the hot terminal; more about this later.

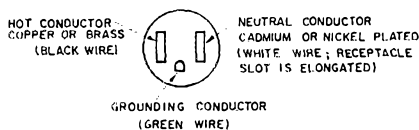


Fig. 3—Wiring side of receptacle or pin view of plug.

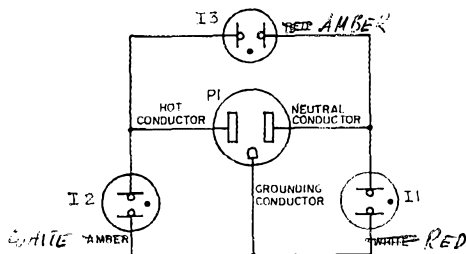


Fig. 4—Three-wire tester, pin view of plug.

- $I_1$ —White lens neon indicator (Industrial Devices 2150-A4).
- $I_2$ —Amber lens neon indicator (Industrial Devices 2150-A3).
- $I_3$ —Red lens neon indicator (Industrial Devices 2150A1).
- $P_1$ —Grounding-type male a.c. plug (Amphenol 61-M).



Fig. 5—Three-wire tester.

Table I

Indicators Glowing	Condition
Red and amber	Correct receptacle wiring.
Red and white	Hot and neutral terminals reversed; reverse polarity.
White and amber	Grounding conductor hot; should never happen.
Red only	Improper grounding; grounding conductor not grounded.

For the tester to be safe, it must be housed in a shock-proof container. I used an "Eventflo" 4-ounce plastic baby bottle which is sturdy, inexpensive and readily available. One can be obtained in most drug and dime stores for only 35 cents.

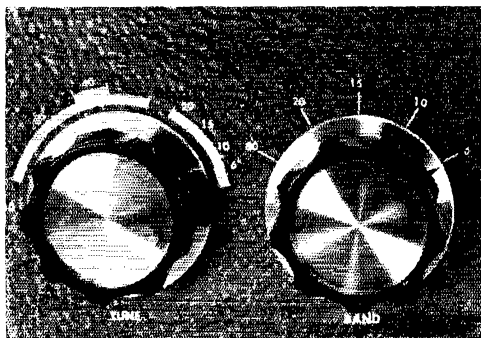
Begin constructing the tester by enlarging the hole in the bottle cap with a half-round rat-tail file so that the a.c. plug,  $P_1$ , can be accommodated. Remove with a pocket knife the burrs which result from the filing operation. Before mounting  $P_1$ , bend the grounding strap on the inner surface of  $P_1$  back to the screw and break the strap off at the screw. Mount  $P_1$  on the screw top of the bottle with the spring-retainer clip provided and then screw the cap of the bottle to the desired tightness. Spot holes for mounting the neon indicators directly behind the plug pins. In order to keep the indicators secure when mounted, drill the mounting holes just a little small. Mount the white indicator,  $I_1$ , behind the copper or brass pin of the plug; mount the amber indicator,  $I_2$ , behind the cadmium or nickel-plated pin of the plug; and mount the red indicator,  $I_3$ , behind the grounding connector. To further secure the neon indicators, pour Duco cement into the bottle until the bottom surface is completely covered. Solder lugs can be added to the plug,  $P_1$ , as a soldering convenience.

To use the three-wire tester, just simply plug it in. Table I is a tabulation of the possible conditions that might be observed. Remember, as shown, the neon indicator that *doesn't* glow indicates the hot pin. If you have two-wire receptacles, an adapter for the tester must be used. In some systems, connecting the external adapter wire to the wall plate or mounting screw is sufficient to get two indicator lights to glow. Older electrical systems may require a grounding lead from the adapter wire to a radiator or cold water pipe. In either case, when using an adapter remember that the grounding lead on the adapter must be connected. — Nancy A. Finlay

## INEXPENSIVE CHIMNEY

A CHIMNEY for a double-mantle Coleman gas-oil line lantern makes a dandy chimney for a 4-400A or similar tube. They have a 5-inch i.d., are 5 inches high, and cost only about a dollar. — Bob Wheaton, W5PKK

# Using The Heath SB-200 Linear On Six Meters



Decals have been added to "dress-up" the front panel and indicate the changes made.

BY HENRY A. BLODGETT,\* W2UTH/W2FRL

To eliminate a 6-ft. rack—full of low-frequency and 6-meter amplifiers, power supplies and control systems—and substitute a table-top amplifier, my interest focused on the Heath SB-200 after I heard that WA4-VUT had made it work on 6 meters by eliminating the 10-meter band. As purchased, the Heath SB-200 is a 1200-watt p.e.p. input, 80 through 10 meter, band-switched linear amplifier. Discussions with W2PNQ resulted in a mutual decision to give the rig a try, but to eliminate the 40-meter band instead, since neither of us professed much interest in that band. The conversion was first completed by W2PNQ, and to him goes most of the credit for laying the ground work.

Basically the modification is completed in two separate steps, both of which may be completed in a short evening's work. First of all, the pi-network output circuit of the SB-200 is modified so that it will tune the 6-meter band as shown in Fig. 1. Secondly, a 6-meter tuned cathode input circuit is installed as shown in Fig. 2.

The 40-meter tap on the final amplifier tank coil  $L_T$  is no longer used. Instead, a new tap one turn from the plate end of the 10-15-meter tank coil  $L_6$  is added to provide for 6-meter operation. The band-switching sequence becomes 80, 20, 15, 10, 6 meters, with the 20-meter coil tap being connected to the former 40-meter band-switch contact. The higher-frequency bands are also moved up on the

band switch rotation in a similar manner.

The author chose to modify the existing tuning capacitor,  $C_{25}$ , although a Johnson (154-12) 55-pf. capacitor may be substituted if an additional 100-pf. capacitor is connected in parallel for 80-meter operation. To modify the Heath capacitor, four plates are removed, one rotor and one stator from each end of the capacitor. The result is a capacitor with a minimum capacitance of 9.5 pf. and a maximum of 126 pf., sufficient to tune the 80-meter band with no problem.

To modify the input circuit, the 40-meter cathode coil,  $L_C$ , and the associated capacitors,  $C_{31}$ ,  $C_{32}$ , are removed. The succeeding coils are advanced one position; i.e. the 20-meter

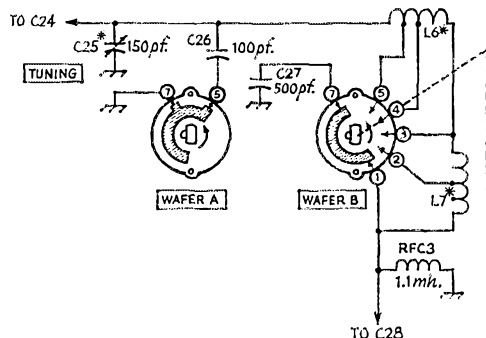


Fig. 1—Output circuit. Components which have been altered are marked with an asterisk. Specific details are included in the text.

\*1515 Victor-Holecomb Road, Victor, New York 14564.

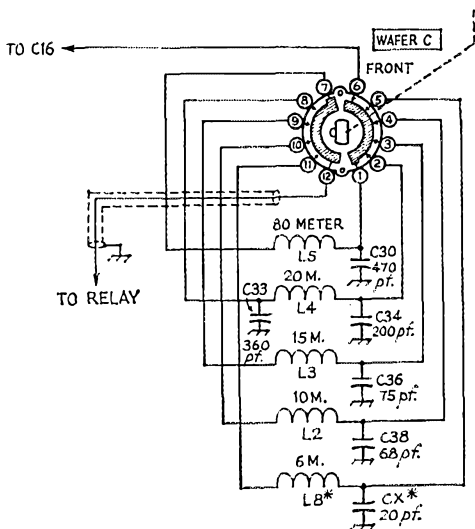
Fig. 2—Input circuit. New components which have been added are marked with an asterisk. Specific details are included in the text.

coil is mounted in the 40-meter chassis position and is connected to the old 40-meter band-switch contact. All the original turns of the 40-meter cathode coil are removed. A new 6-meter coil is wound on this form with three turns of No. 16 enameled wire. Alternatively, a new 10-meter coil (which also tunes 6 meters) may be purchased from Heath as part No. 40-72S. The 6-meter cathode coil,  $L_6$ , is mounted in the old 10-meter coil location,  $CA$ . A 20-pf. dipped mica capacitor  $C_x$  is also added to complete the 6-meter L network.

### Manual-Type Instructions

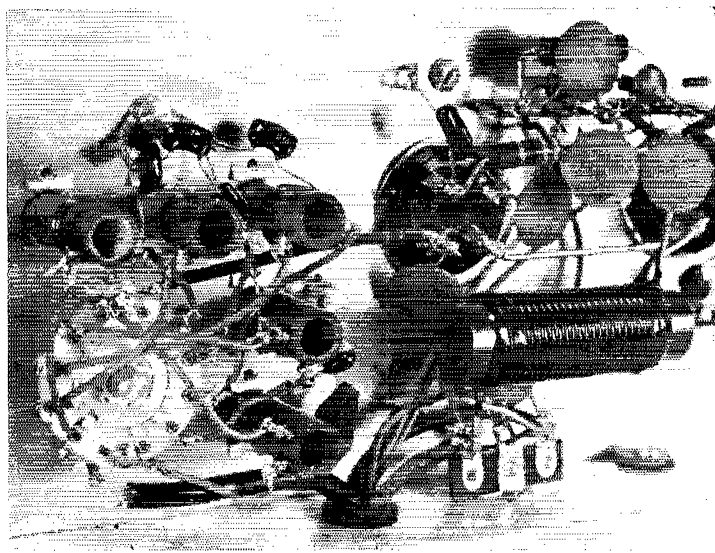
Many fellows would like to have modification instructions similar to those provided in the SB-200 manual. The instructions given below may be used to supplement the Heath manual and will be especially helpful when the kit is initially being assembled. All page references given are for Heath manual No. 595-682. The new instruction steps given replace only the specified step numbers in the manual. All other steps remain as originally written.

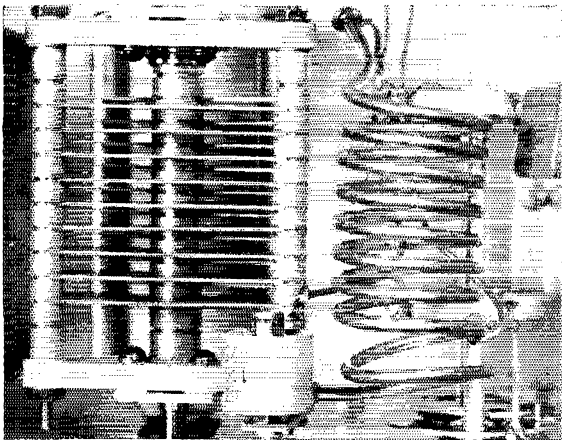
- 1) Prior to step 1, p. 18, insert a new step: Modify the plate tuning capacitor (26-96) as previously mentioned in this text.
- 2) Step 1, p. 23: Connect a 2-inch bare wire from lug 1 of coil AG (S-1) to lugs  $B_3$  of switch AK (NS).
- 3) Step 2, p. 23: Connect a 3-inch bare wire from lug 2 of coil AG (S-1) to lugs  $B_2$  of switch AK (S-1).
- 4) Eliminate step 3, p. 23.
- 5) Step 8, p. 23: Locate the 10-15-meter final tank coil (40-596). Pass the center wire of this coil through lugs  $B_4$  of switch AK (NS).



- 6) Step 10, p. 23: Position the end of the coil opposite the solder lug, between lugs  $B_3$  of switch AK (S-2).
- 7) Step 11, p. 23: Now solder lugs  $B_4$  of switch AK (S-1).
- 8) At this point insert a new step: Add a new tap at 1 turn from end of 10-15-meter coil (solder lug end) and connect to lugs  $B_5$  of switch AK (S-1). Use No. 14 bare wire.
- 9) Step 17, p. 36: Referring to detail 10A, install the (40-728) coil at  $CB$ . Press the coil until the retaining clips snap into place.
- 10) Step 18, p. 36: In like manner install the (40-727) coil at  $CC$ .
- 11) Step 19, p. 36: Install the (40-593) coil at  $CD$ .
- 12) Eliminate step 20, p. 36, and substitute: Install the 6-meter cathode coil at  $CA$ .
- 13) Step 22, p. 36: Connect a 68-pf. mica ca-

Modified input circuit. Cathode coils are positioned in an "L" around the band-switch wafer. The new 6-meter coil,  $L_6$ , positioned in location  $CA$  which is located in the upper left portion of the photograph. The relocation of the other coils is discussed in the text.





Modified plate circuit. Note that plates have been removed from the large tuning capacitor,  $C_{55}$ . The new tap on the coil,  $L_9$ , is for 6-meter operation.

capacitor from lug 2 of coil  $CB$  (NS) to lug 1 of solder lug  $AE$  (NS).

- 14) Insert a new step: Connect a 20-pf. mica capacitor,  $C_7$ , from lug 2 of coil  $CA$  (NS) to lug 1 of solder lug  $AE$  (S-2).
- 15) Step 23, p. 36: Connect a 75-pf. mica capacitor from lug 2 of coil  $CC$  (NS) to lug 2 of solder lug  $AE$  (NS).
- 16) Step 24, p. 36: Connect a 200-pf. mica capacitor from lug 2 of coil  $CD$  (NS) to lug 2 of solder lug  $AF$  (NS).
- 17) Eliminate step 25, p. 36.
- 18) Step 1, p. 38: Connect a 360-pf. mica capacitor from lug 1 of coil  $CD$  (NS) to lug 2

## NEW BOOKS

**Adventures With Electronics**, by Walter B. Ford. Published by The Bruce Publishing Co., 400 N. Broadway, Milwaukee, Wis. 53201. 184 pages, including index,  $6\frac{1}{4} + 9\frac{1}{2}$  inches, hard cover.

Here is indeed a fascinating book. While intended primarily for the Industrial Arts student who is presumed to have some knowledge of electronics and who is reasonably handy with shop tools, radio amateurs, whether Novice or old timer, will be surely tempted to undertake some of these projects.

In all there are thirty-six projects which may be undertaken. These range from a simple gold-leaf electroscope to a magnet which will attract non-ferrous metals. A "brass" magnet? Well, here it is and it is a very interesting thing. I'm afraid I'm going to have to build one myself!

All the projects are clearly illustrated with photos, a lucid description of how they work, detailed constructional drawings and instructions on how to adjust and operate the device. Each chapter, at the end, has a list of questions for the student.

One project is the construction of a Copper and Nickel Electroplater. This should appeal to many who enjoy a basement shop. In restoring antique radios, etc., sometimes the nickel plating on binding

of solder lug  $AE$  (S-2).

19) Eliminate step 2, p. 38.

This completes the additions to the instruction manual.

### Performance

The SB-200 is easily driven on 6 meters by a Heath SB-110A. The amplifier's indicated grid current is 60-70 ma. With this amount of drive, the amplifier can be loaded to at least 900 watts d.c. input. A Swan 250 or any other 6-meter exciter in this power class should also drive the amplifier adequately. All tuning procedures described by Heath apply to the modified amplifier. For approximate reference only, the dial readings on my SB-200 are: **LOAD**-6 $\frac{3}{4}$  and **TUNE**-about  $\frac{1}{8}$ -inch below the 10-meter white line toward the minimum capacitor setting. The indicated power output is 450 watts into a Heath Antenna, as measured on a Bird Wattmeter. On-the-air reports indicate that the quality of the Heath SB-110A is faithfully reproduced and adequately amplified by the SB-200.

This modification in no way affects the operation of the amplifier on the remaining low-frequency bands. While a little improvement may be obtained from a linear built for 6 meters alone, this unit makes a more than satisfactory compromise.

The author wishes to thank Frank Gaenger, W2PNQ, for his efforts and assistance in this conversion, and Link Cundall, W2QY, for his photography. Circuit diagrams and original manual-type instructions are courtesy of the Heath Company.

**QST**

posts is so thin that any attempt to polish them reveals the base metal beneath. Made to order for this job. The chemicals needed are easily obtained.

In the appendix is given a list of suppliers for some of the things needed which may not be available locally.

— W7AVA

### Feedback

The company listed in footnote 4 to Hayward's "Direct Conversion—A Neglected Technique," November 1968 *QST*, can no longer supply toroidal coil forms for  $T_1$  and  $T_2$ . However, a kit of two suitable toroids (type T-50-6) is available for \$1.00, postpaid, from Amidon Associates, 12033 Otsego Street, North Hollywood, California 91607. In addition, Amidon Associates can supply for \$1.00, postpaid, a kit of two suitable toroids (type T-68-2) for  $L_1L_2L_3$  and  $L_4L_5$ .

The calls W3FU and W5NV should have been included in the "C.W. Certificate Winners" list in the Armed Forces Day 1968 article in *QST* for November 1968.

Due to an unfortunate error, Stanley Walderman, WA6HWX, ex-W2AME, 2AME, was listed in the "Silent Keys" column in *QST* for September 1968. Stan is quite alive and active.



# The DX Gutter Getter

## Broadband Top-Loaded Vertical for 40

BY CHARLES L. GARDNER,\* K6DY/WJZWK

A VERTICAL antenna has several advantages over a horizontal antenna at the lower frequencies (7 MHz. and lower). It needs little space, it can be made so as to require no supporting structures, and it has good low-angle radiating properties compared to a horizontal antenna at a reasonable height above ground. Another attractive feature is that it can be constructed of large-diameter material, which contributes considerably toward broadband characteristics.

Convenient and inexpensive large-diameter material is corrugated galvanized rain pipe, sometimes known locally as "gutter leader," or "downspout." This material may be obtained in either round or rectangular cross section. While either type may be used, the rectangular type is somewhat more rigid. In joining sections of this pipe together to obtain sufficient antenna

length, it is necessary to use internal stiffening blocks at the joints, and these blocks can usually be more easily made if they are rectangular, rather than round.

The rain pipe normally comes in 10-foot lengths, but I found a bargain in 8-foot lengths. Three of these lengths were used, as shown in Fig. 1, to give a height of 23 feet 7 inches, allowing a 2½-inch overlap at each joint.

At 7 MHz., an antenna of this length, being shorter than ¼ wavelength, exhibits a relatively low radiation resistance (20 ohms or less), and a relatively high series capacitive reactance (150 ohms or more). Low radiation resistance is particularly undesirable in a grounded antenna system, because the transmitter output power is divided between useful power in the antenna and power lost in the ground-system resistance in proportion to their respective resistances. With a radiation resistance of 20 ohms, and a ground resistance of 10 ohms (a not uncommon value), one third of the transmitter output power is lost in the ground connection. Additionally, the combination of low radiation resistance and high series reactance makes efficient feeding difficult, since the coil that must be used to offset the series capacitive reactance, so that power can be readily coupled into the antenna, introduces additional resistance loss.

### Top Loading

It is not necessary to increase the physical length of the antenna to obtain an increase in radiation resistance and a reduction in series reactance. These objectives can be achieved through increasing the electrical length of the antenna by the addition of capacitive loading at the top of the antenna. In this instance, the capacitive "hat" consists of hardware cloth (coarse galvanized mesh) formed into a cylinder.

In this particular case, the addition of the "hat" resulted in an antenna resonance at 6907 kHz., indicating that the electrical length had been increased to slightly over ¼ wavelength at 7150 kHz. When this arrangement was fed with RG-8/U 50-ohm line, the s.w.r. was found to be slightly less than 2 to 1 over the entire 40-meter band, illustrating the value of the large conductor diameter, in respect to broadbanding.

The losses in RG-8/U at 7 MHz. are increased negligibly by a 2-to-1 mismatch. However, depending on the length of the line, there may be some trouble in loading transmitters that have

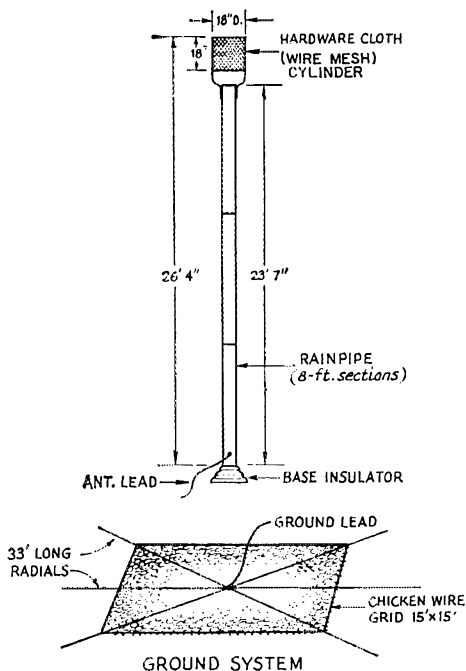


Fig. 1—Dimensions of the "Gutter Getter" antenna and ground system.

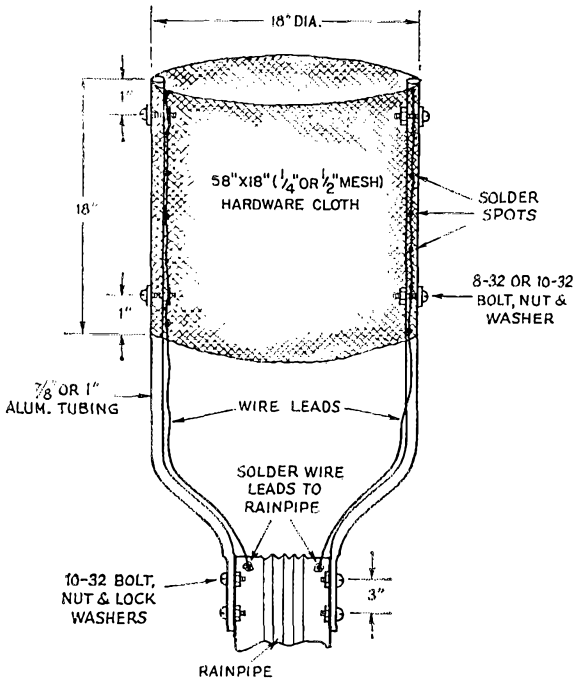


Fig. 2—Constructional details of the capacitive hat.

small tolerance for departures from a 50-ohm resistive load. In my case, I found that a series-tuned circuit between the base of the antenna and the center conductor of the line, to tune the antenna to resonance at 7150 kHz, and wash out the reactive component of the antenna load, was all that was required. This brought the s.w.r. down to 1.4 to 1 (a result of the remaining resistive mismatch). The largest variable capacitor available should be used in the series circuit, and the coil should have the minimum number of turns that will permit tuning the antenna to resonance at 7150 kHz. If a more accurate match is necessary to obtain proper loading, an L network can be used.<sup>1</sup>

If 10-foot rain-pipe sections are used, it should not be necessary to cut them to the shorter length, unless it is desired to limit the height for mechanical reasons. As a matter of fact, the radiation resistance increases, and the low-angle radiation improves as the electrical length approaches  $\frac{1}{2}$  wavelength.<sup>2</sup> A much longer electrical length, however, would make a matching network at the base mandatory.

### Construction

The rain-pipe sections cannot be telescoped sufficiently to provide adequate mechanical strength at the joints. To reinforce the joints,

<sup>1</sup>Gordon, "L Networks for Reactive Loads," *QST*, Sept., 1966.

<sup>2</sup>Nickle, Dome and Brown, "Control of Radiating Properties of Antennas," *I.R.E. Proceedings*, Dec., 1934. Dome, "Increased Radiating Efficiency for Short Antennas," *QST*, Sept., 1934.

18-inch lengths of 2 x 4 lumber were trimmed down to make a snug fit inside the pipe. At each joint, the stiffening block was inserted halfway into the top end of one section, and fastened in place with wood screws. The second section was then slid over the projecting end of the block, rammed tightly into the first section, and fastened with wood screws, after making sure that the sections were in alignment.

A good electrical connection between sections should be assured by bridging the joint with metal straps. I used lengths of tinned copper braid soldered to the pipe, one strap on each of the four sides of the rain pipe.

### The Capacitive Hat

Fig. 2 is a rough sketch of the capacitive-hat assembly. The cylinder can be made of  $\frac{1}{4}$ - or  $\frac{1}{2}$ -inch galvanized hardware cloth obtainable at most hardware stores. The cylinder is supported on a pair of 39-inch lengths of 1-inch aluminum tubing, bent to the required shape. The ends of the tubing are flattened and drilled for mounting bolts. To assure good electrical contact, No. 14 bare wire was threaded back and forth through the mesh for the entire length of the cylinder, and soldered at frequent intervals. The lead ends were then soldered to the rain pipe.

### Base Mounting

Fig. 3 shows the arrangement that I used for mounting the antenna. The insulator is a large deck insulator that was found in surplus. But any insulator of adequate mechanical strength may be used. Chipped, but otherwise satisfactory insulators can sometimes be picked up at power-company supply yards. Even a large heavy bottle can be made to serve by fitting a wood block several inches thick into the bottom end of the rain pipe, using a bolt through the upper end of the block to hold it in place, and reaming out a hole in the bottom end of the block that will allow the block to fit well down on the shoulder of the bottle. As an alternative, a heavy board, or a metal plate, supported on several smaller insulators, may be used as a mounting.

### Guying

The antenna is guyed at the junction of the second and third sections. The three guys must be insulated from the rain pipe, of course. The insulators are attached by means of loops of wire around the pipe. If the woodscrews used for fastening the stiffening block are backed out a turn or two, they will provide projections to keep the insulator tie loops from sliding down on the pipe.

### Ground System

With an antenna of this type, a good ground connection is essential. The ground system that I installed (see Fig. 1) consists of eight radials of bare wire of a length at least as long as the antenna, plus a 15-foot square screen of galvanized chicken wire. The screen and the base

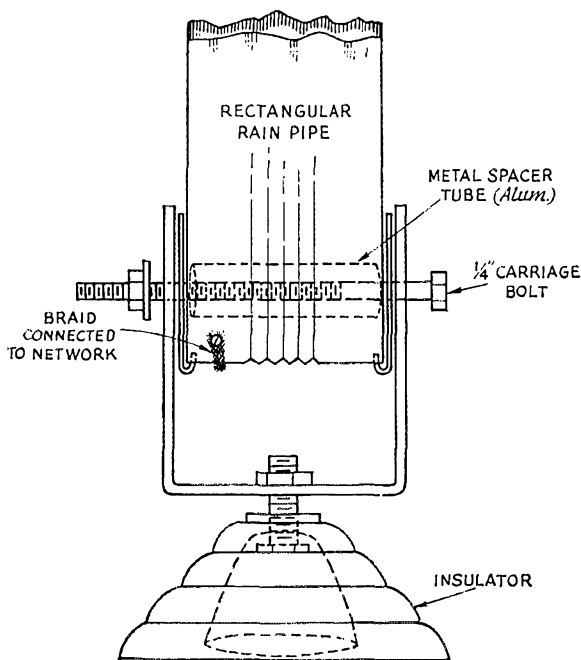


Fig. 3—Method of antenna mounting used by the author. The bolt holes in the rain pipe should be oversize, but those in the mounting bracket and the hooked hanger brackets should be reasonably snug. The distance between the hole and the hook in each hanger bracket should be such that the weight of the antenna is supported at the hooks, rather than at the bolt hole in the rain pipe. The main bracket should be of steel at least  $\frac{1}{8}$  inch thick, and 1 inch wide. The hanger brackets should be almost as wide as the rain pipe. The large internal cylindrical metal spacer prevents crushing of the rain pipe when the bolt is tightened. Other methods of mounting are suggested in the text.

of the antenna should be centered on the junction of the radials. The radials were buried by opening up slits in the earth with a spade, and tamping the slits closed after laying the radials.

The screen is made up of several strips of chicken wire laced together with wire, and soldered at frequent intervals. The chicken wire is most easily buried by laying the screen flat on the ground, and covering it with several inches of earth.

The radials should be soldered together and to the screen, and a heavy lead should be brought out for soldering to the outer conductor of the coaxial line.

### Raising the Antenna

The antenna should be erected in a spot that is as clear of surrounding objects as possible. If the base arrangement shown in Fig. 3 is used, and the insulator is sufficiently husky to stand the strain, the antenna can be hinged up, using two of the guy wires to assist in the raising. A helper should be ready to fasten the other guy as soon as the antenna reaches the vertical position. With other base arrangements, it may be necessary to chuck the bottom of the antenna while it is being raised, and then lift it onto the insu-

lator.

In several months of on-the-air tests with stations in U.S.S.R., Japan, New Zealand, Australia, Alaska, and South America, as well as with many stations across the States (apparently I'm asleep when the paths to Europe and Africa are open), the vertical antenna has consistently outperformed an inverted-V dipole used for comparison. The improvement has invariably been not less than one S point, and frequently as much as two or three S units.

### 80-Meter Operation

Although the efficiency will be lower, this antenna can be fed on 80 meters by inserting a loading coil between the base of the antenna and ground. A coil of 20 to 30  $\mu$ h. will be required. With the coil adjusted for antenna resonance, a match can be obtained by tapping the line on the coil.

**QST**

## Strays

### Teaching The Code Isn't Always Easy

Teaching someone to become an amateur radio operator isn't always easy, especially when that someone is my wife! Several months ago she became interested in amateur radio and requested that I help her toward obtaining a license. I told her that, first, it would be necessary to learn the code; then I would get her started on elementary theory and regulations. I gave her a copy of the code and access to my code oscillator. She gave it everything she had, so last week I decided to give her a code test,

on sending only, to determine what progress she was making. I had her send the familiar sentence. "Now is the time for all good men to come to the aid of their country." She went through this sentence very slowly, but every letter was quite distinct. Following the sentence she sent a series of dots and dashes. I inquired as to why she had sent them, and she replied, "Well, I had to go back and dot the Is and cross the Ts! Code practice was suspended until a later date. — Arrin C. Smith, W5UCZ, 2006 Houston St., El Dorado, Arkansas 71730.

# 25 years ago

January 1944

... K. B. Warner's editorial this month again takes up the matter of post-war planning, a subject which was broached a couple of issues ago. This time, he discusses the possibility of lowering the legal limit of power, say to 200 watts. Undoubtedly this will create somewhat of a furor among the high power boys, but nevertheless he is inviting correspondence on the subject. The case for and against is lengthily discussed.

... Louis H. Roth, W2DKH, has a little WERS rig which operates directly from 110 volts, either a.c. or d.c. A 70L7 and a 12J5 are the tubes. Some problems concerning hum were solved by carefully positioning some of the components.

... Some time ago, QST solicited authentic stories of hams in combat. It has taken quite a while to get some of these pieced together, but we have enough to start the publication of some. In this issue are presented three exciting true stories. Recommended reading these.

... More on light-beam communication, by James P. Saunders, W1BDV. Mostly he reviews the basic facts of optics and then shows how to use a camera

as part of the transmitting system whereby the angle of the light beam is greatly reduced and intensified at the same time.

... William R. Moody takes up the question of logarithms. These are not difficult at all and many computations are enormously simplified by their use. Main reason for having such a dissertation is the frequency with which logarithms are encountered in radio theory.

... Audio frequency generation by the use of motor-driven notched wheels or perforated disks is described by Paul J. Palmer, W8UGR. There are many uses for such audio frequencies around the shack. The tones can be varied and mixed together if desired. I used to use one of these for modulating a 5-meter rig. The harmonic content of the tones can be controlled by the shape of the notches or teeth.

... The problem of ignition noise on the v.h.f. and u.h.f. is quite elaborately covered by Charles M. Dean, ex-W1AMN. A number of oscillograms are shown to help the reader understand what is taking place. The elimination or reduction of this noise is thoroughly taken up.


... To find out what various companies have been doing to further the war effort, you can read a nice article describing the activities of many companies familiar to the radio amateur. A lot of photos show the presentation of the Army-Navy E award for outstanding production. Reminds me that the Maxim Silencer Company, founded by Hiram Percy Maxim, also received this award — with four stars! — W1ANA

## ARRL SOUTHEASTERN DIVISION CONVENTION TROPICAL HAMBOREE Miami, Florida January 18-19, 1969

The Southeastern Division Convention ninth annual Tropical Hamboree will be held Saturday and Sunday, January 18 & 19, at the Miami Bayfront Park Auditorium. Activities are many and varied to cover all phases of the amateur radio field. Forums, tech talks and meetings are scheduled for DX, VHF, FM, SSB, MARS, NTS, ARPSC, QCWA, OOTC and the ever young XYLS. The ARRL meeting will be led off by S.E. Div. Director Bolvin and Vice-Director Hamel. ARRL's Executive Committee members, meeting during the Convention, will also participate.

For the rag-chewers and bargain hunters there will be a station on the air manned by the Dade County ARPSC and a giant swap shop.

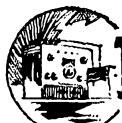
Festivities will include a banquet and dance Saturday evening at the headquarters hotel. By popular demand the banquet will be served "buffet style" with a varied menu selection to satisfy appetites of all convention goers. Following the dinner/dance, at midnight, the initiation of the Royal Order of the Wouff Hong will be presented by those terrifyin' QCWAers.

Headquarters hotel is The Everglades at 244 Biscayne Boulevard: special rates are \$10.00 single, \$14.00 double, no deposit required. Convention registration is \$1.50 and Dinner/Dance tickets are \$7.50. For tickets and hotel reservations write to Dade Radio Club, P.O. Box 73, Biscayne Annex, Miami, Fla. 33152. Requests for reservations should include arrival date. 

## Strays



ARRL prexy W0DX flashed a victory smile at the Roanoke Division Convention last September while holding aloft his plaque for top North American single-operator c.w. score in the 1968 ARRL International DX Competition (while operating VP2VL). Making the presentation (on the left) was ARRL General Manager W1LVQ, with approbation from (right) League Vice President W4MWH. (Photo by W4PED)



# Recent Equipment



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

## Heath HW-100 Transceiver



**T**HIS five-band s.s.b./c.w. transceiver bridges the gap between the popular HW-series single-band transceivers and the more sophisticated SB-101 package, i.e., five-band operation is offered, but at a price that is somewhat lower than that of the SB-101. Despite the attractive price tag of the HW-100, there is no evidence of mediocre quality in the design, or in the choice of the component parts. In fact, the constructor may scratch his head in wonderment as the assembly of the kit progresses, trying to rationalize how the manufacturer is able to offer such a versatile unit for so modest a price.

Because there is a great deal of similarity between the circuits of the HW-100, and the SB-100<sup>1</sup> described in an earlier issue of *QST*,

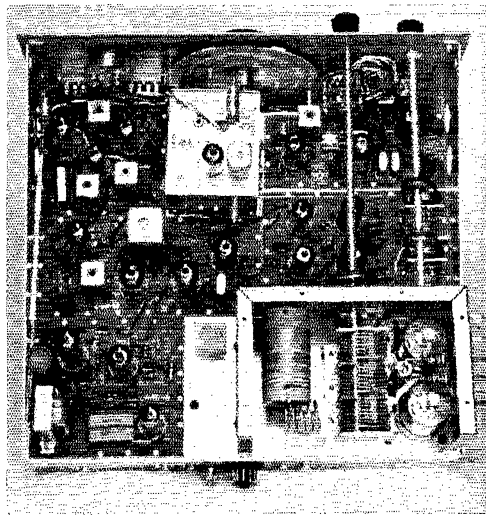
<sup>1</sup>"The Heathkit SB-100 Transceiver," *QST*, September 1966, page 45. The SB-100 was succeeded by the SB-101.

blow-by-blow circuit description will not be repeated here. The significant differences will be treated, and some additional features will be highlighted.

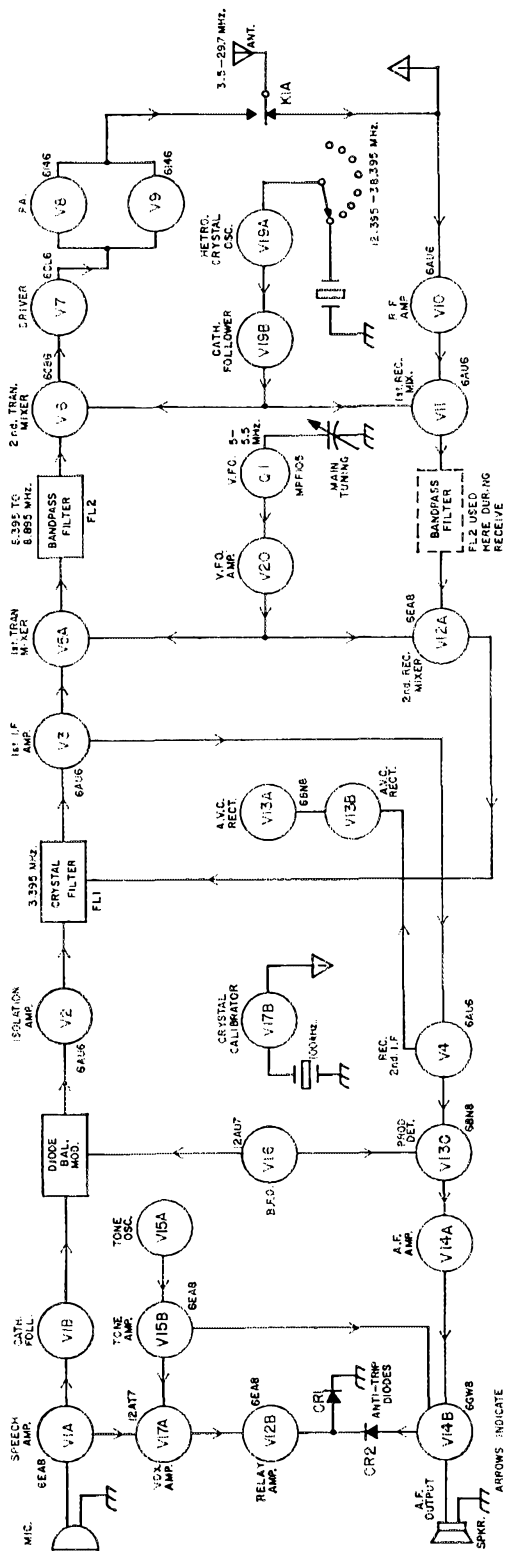
Each amateur band is tuned in 500-kHz. sections except for the 10-meter band which is tuned in four 500-kHz. steps. Each dial division is equal to 5 kHz. Calibration is made possible by a built-in 100-kHz. oscillator and a front-panel zero-set adjuster.

Referring to the block diagram, some component sharing can be observed between the transmitting and receiving channels. The 2.1-kHz. crystal filter has a center frequency of 3.395 MHz. and is used for both transmitting and receiving. A common i.f. amplifier,  $V_3$ , a bandpass filter,  $FL_2$ , and the v.f.o. and its amplifier are shared by the two channels. The driver plate and grid tuned circuits are shared by the receiver's r.f. stage,  $V_{10}$ , during receive, making peaking of the driver a simple task since it may need but slight touching up after peaking its tuned circuits during receive.

It was gratifying, indeed, to note the widespread use of tried and proven circuits in this transceiver. One example of hybridization can be seen in this unit — the v.f.o. It uses an MPF-105 junction FET as an oscillator, Fig. 1. The v.f.o. output is amplified by a 6AU6 buffer which operates class A. This combination results in a practical form of symbiosis since the v.f.o. transistor is powered by the voltage developed in the 6AU6 cathode circuit. This voltage is regulated by a 2N3393 which is connected to act as a Zener diode. The v.f.o. is extremely stable and meets the specifications set forth in the instruction manual. One distinct advantage to the use of a JFET in the oscillator is that there are no filaments to introduce 60-Hz. f.m. on the v.f.o. signal. That undesirable condition is frequently encountered in "hot-cathode" (Clapp and Colpitts) v.f.o.s when the oscillator tube has excessive heater-cathode leakage during a.c. filament operation. Since the HW-100 v.f.o. operates from d.c. only, its signal is pure. It is unlikely that hum modulation will ever be caused by the a.c.-operated buffer-stage filaments of  $V_{20}$ .



Viewing the top area of the chassis, the v.f.o. assembly is at the upper center of the photo. The p.a. compartment is at the lower right. There is plenty of room in the final-amplifier cage to allow the free flow of air, and to eliminate any need to locate the tuned-circuit inductors too close to the compartment walls. This arrangement contributes to better tuned-circuit Q.



Block diagram of the HW-100 five-band s.s.b./c.w. transmitter.

The kit designer has taken advantage of an old technique for obtaining a linear tuning range for the v.f.o. The main tuning capacitor has mechanical stops which prevent the rotor from traveling beyond preset limits. Only a portion of the tuning capacitor's range — center portion — is utilized, and that is the range over which the change in capacitance per degree of dial rotation is practically constant. A unique mechanical arrangement in the dial-drive/knob assembly uses plastic components with spline gears to obtain a tuning range of 500 kHz. for 28 revolutions of the tuning knob. This breaks down to 18 kHz. per revolution, offering excellent bandspread. The moving parts are coated with silicone lubricant and should have long life under normal use.

A choice between VOX or p.t.t. operation is given. Keying during c.w. is accomplished by triggering the VOX circuit with an audio tone. The closed relay in turn permits grid-block keying of V<sub>5A</sub>, V<sub>6</sub>, and V<sub>7</sub> (block diagram). Similarly, a choice between upper- or lower-sideband operation is available. A panel switch selects the proper crystal for the desired sideband while at the same time routes a control voltage to a switching diode in the v.f.o. The switching diode places a frequency-offset trimmer in the circuit, or removes it, so that the output frequency of the transmitter will remain the same when switching sidebands.

The transmitter winds up with a pair of reliable old 6146s in the p.a. compartment. They run at 180 watts p.e.p. input during s.s.b. operation, and operate at 170 watts input for a 50-percent duty cycle on c.w. Something should be said here about this choice of tubes. The 6146s are far less delicate than are most TV sweep tubes, making transmitter tuneup somewhat less precarious than it might otherwise be. Also, 6146s always seem to produce good results with respect to IMD (intermodulation distortion) when equipment using them is checked with the ARRL's spectrum analyzer. Physically, the Heath HW-100's p.a. compartment is well designed. This section is roomy, allowing plenty of air flow around the tubes—an aid to tube life. Also, the p.a. plate inductor is not crammed up against the compartment wall. This means that the circuit Q will not be seriously affected by the proximity of the walls. The main coil is wound on a rugged ceramic form. An air-wound inductor is used for the

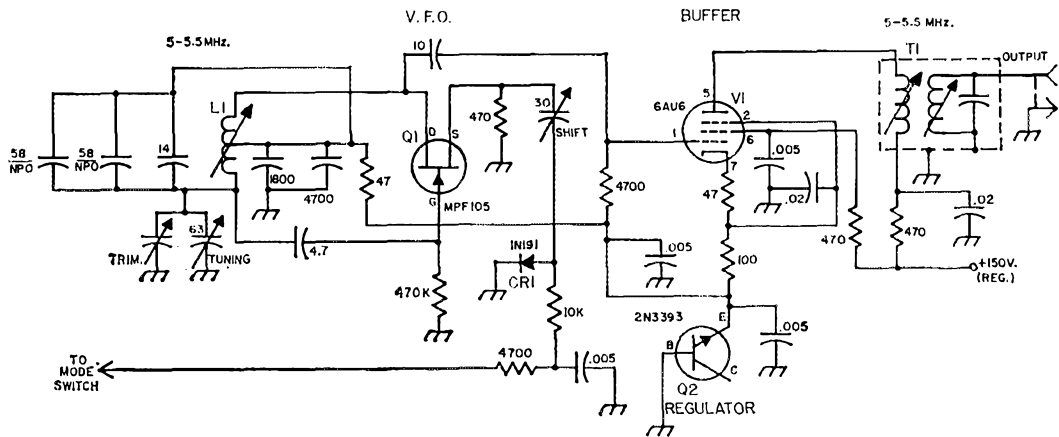


Fig. 1—Schematic diagram of the HW-100 hybrid v.f.o. An MPF105 JFET serves as the v.f.o. and is powered by voltage taken from the cathode circuit of the 6AU6 buffer stage. Q<sub>2</sub> is connected to act as a Zener-diode regulator. CR<sub>1</sub> performs as a switch when changing sidebands.

cient for all of the wiring. A 100-watt iron (or larger) will be needed for one step in the assembly—soldering two metal pulleys to a 1/4-inch diameter control shaft.

**Servicing**

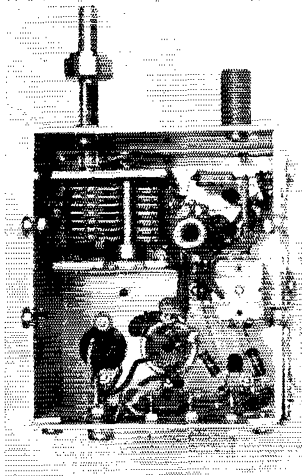
It should not be difficult to maintain the HW-100 if one has a general knowledge of how the circuit functions. There is a rather complete cause-and-effect section in the manual to help isolate any trouble area. Individual schematic diagrams are given for each important section of the transmitter and receiver. To aid in rapid identification of the circuit-board components, an X-ray view of each board is given, showing where each component connects to the foil element it is related to. The book has a complete

10-meter band, and has a suitable diameter-to-winding-length ratio for good Q. A.l.c. voltage is developed in the p.a. grid circuit and provides 10 db. or more of control at 0.1-ma. of p.a. grid current.

**Building the Kit**

It shouldn't take the average builder more than 40 hours to wire this transceiver. The more experienced ham should be able to wrap this project up in 28 or 30 hours, as was true in the writer's case. The use of circuit boards (9) and a wiring harness greatly speeds up the assembly of this kit.

Step-by-step instructions are given in clear language throughout the manual. These instructions are complemented by numerous layout drawings, all of which have good detail. Each circuit board is treated independently, and the parts which mount on a particular board are packaged separately and numbered accordingly. This means that only one set of parts need be unpacked at a time. A standard card table was large enough for use as an assembly bench for the entire project, mainly because only a few components were lying loose at one time. A minimum number of individual hookup wires and coaxial cables require preparation by the builder, making the wiring process a lot less boring than it might ordinarily be. Happily, everything went together well, indicating that care was given to the drilling of the holes and the machining of the various brackets and other metal parts. There were no shortages of parts in this kit. Though several packages of solder are furnished for the project, the amount needed is well calculated. This builder had exactly 6 inches of solder left after the last wire was in place! A 30-watt pencil-type soldering iron was suffi-



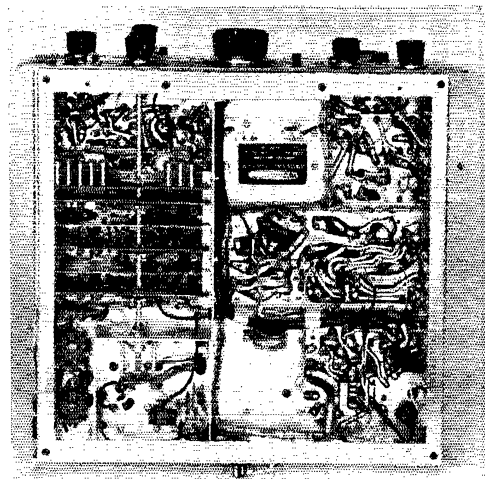
This inside view of the HW-100 v.f.o. box shows the variable capacitor at the upper left. Mechanical stops prevent the capacitor from tuning the upper and lower extremes of its range, thus utilizing only the linear portion of its available capacitance. The MPF105 transistor is attached to the terminal strip at the upper right. The box is made of heavy-gauge aluminum stock. This results in a rigid assembly and assures good mechanical stability.

list of the components used in the transceiver. Each part is numbered and is listed with its individual price at the end of the booklet. These parts can be purchased from Heath should they require replacement.

### Testing and Performance

The final moment of truth comes when the constructor connects the transceiver to its power supply and applies the operating voltages. In this instance a Heathkit HP-23 supply was built (approximately four hours construction and checkout time required) and used. With a certain amount of apprehension the "wick was lit" and, happily, no sparks flew, nor did any thin tendrils of smoke arise from the chassis. Following the step-by-step procedure outlined in the instruction manual, all tests went smoothly except for a slight problem which occurred during tuneup of the 40-meter heterodyne oscillator. It turned out that a defective coil (missing jumper) was supplied with the unit, preventing the heterodyne oscillator from receiving plate voltage on that band. Addition of the missing wire immediately cured the problem. A call to the manufacturer indicated that a few such coils had turned up during a quality-control check of material received from their supplier. Steps were immediately taken to correct the problem. This kit was apparently one of the few in which the defective part was supplied.

All other tests went smoothly except for two minor wiring errors caused by the tired eyes of the builder during a late-hour assembly session



Looking into the bottom half of the chassis, the p.a. grid compartment is at the lower left of the photo. Directly ahead of it are the four circuit boards (vertically mounted) which contain the band switches, heterodyne crystals, and the tuned circuits for the mixer and driver stages. The black box at the upper center of the photo is the crystal bandpass filter. The VOX controls are mounted on the aluminum strip which connects the front and rear aprons of the chassis (far right of photo).

### Heath HW-100 Transceiver

Height:  $6\frac{5}{16}$  inches.

Width:  $14\frac{13}{16}$  inches.

Depth:  $13\frac{3}{8}$  inches.

Weight:  $17\frac{1}{2}$  pounds.

Power Requirements: 700 to 850 volts d.c. at 250 ma., 300 volts d.c. at 150 ma., -115 volts d.c. at 10 ma., 12 volts a.c. or d.c. at 4.76 amperes.

Price Class: \$210.00

Manufacturer: Heath Company, Benton Harbor, Michigan.

one evening—a reversed diode and a shield jumper that didn't quite make it to chassis ground.

The transmitter turned out to be extremely stable on all bands and neither neutralizing capacitor required more than slight adjustment. Plenty of drive is available on all bands and the p.a. runs at full input power with drive to spare. A word of caution: One wafer of the band switch is installed differently than the rest (180 degrees rotation from the others), as stated in the instructions. This is the heterodyne oscillator plate circuit switch. A report from a ham who built the HW-100 indicated that he was unable to peak the receiver, and could not obtain any drive during transmit. It turned out that the switch wafer had been improperly installed. Watch for this step during assembly.

On-the-air tests of the receiver showed that it had good immunity to cross talk and overload on all bands, even though the ARRL lab is close to several strong a.m. broadcast stations. No i.f. leakthrough could be detected, and no images were noted during these tests. Receiver sensitivity is good on all bands: a 0.1- $\mu$ v. signal from a generator provided room-volume audio from the transceiver's outboard speaker. A 50- $\mu$ v. signal gave a reading of S9, -3 db., on all bands.

Final proof-of-performance tests came when the HW-100 was connected to the spectrum analyzer. The third- and fifth-order products were well within the manufacturer's specifications --36 db. down from p.e.p. output. This test was made at 100 watts p.e.p. output, though it was discovered that somewhat more power output was possible before objectionable distortion occurred. Carrier suppression was exactly what the book states, 45 db. down from single-tone output.

As far as appearance goes, this equipment has the traditional neat-looking Heath trapping. The cabinet is finished in dark green, and the panel has a contrasting light green paint job. This package should gladden the heart of any radio amateur who elects to use a five-band transceiver for mobile or fixed-station use. For mobile operation a Heath HP-13 d.c. supply can be used. — *WICER*.



# C.W. —

## An Art Form

BY ALBERT KAHN,\* K4FW ex-W8DUS

ANY dedicated c.w. enthusiast knows that c.w. is one of the arts. There are many players and a few true artists representing the several schools: Lake Erie Revival, Bug Traditionalist, and the Electronic Keyer Modern. Then, of course, there are the ultra-sophisticated avantgarde Squeezekeyers.

Each of these groups, in its own way, makes a symphony of the transmitted word. Certainly, it eclipses opera in its dramatic appeal and sheer beauty.

Hams know that in no other medium could "RST 579 Watseka Ill name Bill Rig Valiant dipole ant hw?" be thrilling. Not profound, perhaps, but exciting and spine tingling. A tremendous emotional impact.

The expressiveness of the straight key — the heightened emphasis of the last dash in a letter, when executed by a former car-ferry operator, is an experience long remembered. The crisp, almost metallic machine-gun sound of the bug is stirring. The breath-taking splendor of perfect sending on an electronic keyer could surely cause teen-age girls to scream.

It is really not right for the privileged few of us to keep this exciting Art Form from the public. How thrilling it would be for the serious music lover to sit through an evening of c.w.

Here is what could happen:

The tired business man arrives home from a rough day at the office. His XYL announces, "Good news, dear, I was finally able to get two seats to the c.w. concert tonight."

"Good, what's playing?"

"Oh, it's tremendous," she replies, "a new modern group with W9BUD conducting. He is the one, you know, who spaces his key paddle a hundred thousandths of an inch. You can't tell dots from dashes. The girls at the beauty parlor were talking about him."

"Gosh, what's next?"

"The real feature tonight is that famous quartet, W9IOP, W3BES, W4KFC and W5WZQ. They are sending 'Home on the Ranger', 'Duplicate Blues' and 'Where O Where is a VES?'"

"Sounds terrific. Are my tails back from the cleaner?"

"I have tickets for next week, too," she continues. "That will be another great evening. Just think, W1BII, KH6IJ and W2QHH will be here in person with W1YYM as the featured soloist. They will send ballads and have HK6AI



for the prologue. There is supposed to be a beautiful QRM cacaphony accompaniment done by a group of W6s who have been practicing for many years."

She added, "They are going to do 'The Open Open Wire Line' 'The Bug in the Rig' and the 'Smoking Transformer'."

"Fantastic program," he replied. "They are all lovely old favorites. I hope that they have W4OWE at the b.f.o. pitch again."

"Actually," he continues, "those numbers have a great deal of pathos and character. I like them so much better than the tragedy they did last year."

"Wasn't that awful?"

"Yes, especially the part when the Albanian came back with a QRZ? to W5EZE and then was lost forever in the pile-up."

"Don't talk about it. I wake up in the night thinking about it. Fortunately, we didn't take the children."

"Why spoil a magnificent program with a gruesome story. You would think that the classic beauty of c.w. would be enough."

QST

\*TEN-TEC, Inc. Sevierville, Tenn.

# The Good Old Wireless Days

BY JIM KIRK,\* W6DEG



"IF YOU DIDN'T RELEASE THE KEY IN TIME, ACID WOULD POUR ON THE FLOOR"

YOU wouldn't believe the amount of skepticism, and hostility, about "wireless telegraphy" when I came on the air in 1908.

A brief history: My father died when I was three and my mother, a school teacher, had her hands full with the young electrical experimenter, turned "radio ham," although the expression was unheard of in those days.

It started in De Kalb, Illinois. Our family had rented the top floor of a three story house. Using tennis shoes, I climbed the steep, shingled roof (I was much more daring in those days) to rope a pole to the brick chimney to support one end of my antenna.

I made so many changes in my antenna that I decided to eliminate the climbing. I tied a rope around the chimney and left it dangling where it could be easily reached from a back porch. I used that rope so much that it wore a path in the shingles, and an unsympathetic landlord complained to my mother. Wistfully, she inquired of me,

"How much money would it cost to erect a permanent aerial? Perhaps, I can supply the money, if it is not too much."

As my only income was a paper route, I quickly took her up on that offer.

Soon after, we moved to Decatur, Illinois, where I had an ideal QTH (although that expression was also unheard of in those ancient days). My mother had rented a whole house at the top of a hill. The landlord lived next door, but that was a mistake.

I had three 60-foot poles in my back yard. They were really only *successive* poles. The first two blew down, one after the other. The final pole was erected firmly, and consisted of heavy timber,

with three guys at each joint. When we had to move I could not get it down and had to chop it down.

You might ask me, "Where did you get the money to buy those poles?" The first two were made of lumber borrowed from a house under construction across the street. By "borrowed," I do not mean "stolen." Lumber was so cheap, that the friendly carpenters were glad to donate lumber to the cause. They even came over after work to help me erect the poles. They asked,

"Honestly, now, do you mean to claim that you *really* can communicate, without using connecting wires?"

Tourists were shown the pole and wires in that back yard on the hill with the explanation,

"That crazy Kirk kid thinks he can telegraph through the air, but any fool knows that can't be done!"

When the first, flimsy pole started to sway around in those blizzards we had in Decatur, my heart swayed with it. When it crashed, the landlord's chicken coop next door got in the way. From that time on, that unfeeling gent lost all enthusiasm for the scientific progress of young America.

Then when I put together a big transformer for my spark transmitter, and it took so much juice that it dimmed the lights (the landlord's, too, of course), he presented my mother with a bill for his electricity. I could not explain that the services were on different meters. His retort,

"I can see with my own eyes my electricity being sucked into your house. Seeing is believing!"

Wireless was, of course, only telegraphy and only a boy's hobby. I interested a few school chums and we learned the Morse code on the air. There was no radio law to prevent us. One of my friends was really terrible at learning. He had a big three by three foot telegraph code tacked on the wall of his shack, over the operating desk. When he got a letter, he searched all through that list to find out what it signified. *Slow* sending to him was a must.

Electrolytic interrupters were all the rage in those days. To make the device, you got a glass tube from the drug store, melted one end almost together in a gas flame, put a metal rod in the tube and mounted it in a jar of acid. An old wet battery was ideal for the purpose, with the prepared glass tube substituted for the zinc electrode. With the interrupter in series with the a.c. line and a transformer primary, you could produce high voltage for your spark. There was one disadvantage. When you pressed the key, the acid rose in the tube. If you did not release the

\* 1551 Church St., San Francisco, Cal. 94131.

key in time, acid would pour on the floor. Not good for rugs. Some bright boy took to using 3 foot tubes and sitting the jar on the floor. "L" in the Morse code is an extra long dash. The standard "L" of our slow sender was when the acid reached the top of the three-foot tube. I made a discovery and wrote it up for *Modern Electrics*. By heating the side of the tube, and blowing in the open end, a hole would result. The acid ran back into the jar again.

When I "carried papers" for the *Decatur Review*, I and my fellow employees were provided with hooks for "starts" and "stops", some of the boys pasted pictures of their hobbies alongside the hooks. For example, one boy was a budding taxidermist. I cut a headline from a wireless magazine and pasted it near my hook. The line was a startling "WIRELESS IS THE THING!" Everybody in the pressroom started to tease the life out of me. One would call, "Hey, Zeke, did you know that wireless is the thing?"

"Ah yes, indeed. Wireless is undoubtedly the thing!!"

About that time, I wrote a piece for the *Decatur Review*, titled.

#### "HOW TO BUILD A WIRELESS SENDING AND RECEIVING SET."

I timidly took it to the editor. He looked it over, and asked,

"Did you write this?"

I nodded.

"What is your name?"

Fearful that he was going to turn me over to the police, I nevertheless supplied my name. He said,

"We will run this in our Sunday feature section."

I got out of there in a hurry, for fear my youth would induce him to change his mind.

Next time, the boys started to kid me about wireless, Bill, the jolly circulation manager, put them in their place,

"When one of you bums writes a piece, and the Review prints it, you can talk. You'll probably be sweeping the streets in your old age."

My mother decided to convince a delegation of skeptical school teachers who were gathered in our home that her son really was communicating without wires. She brought them upstairs to my room and seated them in a circle. I handed the phones around. The local boys were busy with their spark transmitters. I was receiving them with my homebrew loose coupler and crystal detector. The pedagogues complained,

"All we can hear is short and long buzzes."

When I was in the eighth grade in the college town of De Kalb, Illinois, I interested the college professor of physics in my wireless experiments. He made arrangements for me to sit in on his college physics classes. There were times I could answer questions the other students couldn't answer. They were taking the course because it was obligatory. I was attending because I was interested.

I was teacher's pet in high school physics. My

teacher, Professor Hyslop, had been a land wire telegrapher, and I invited him to my station.

When I entered the University of Illinois, I found that Professor Hyslop had graduated, too, and to the same school! He had secured employment teaching physics at the University of Illinois. Military training was compulsory for the first two years. Professor Hyslop got me transferred to the Signal Corps. We had wire, wireless, semaphore and heliograph signalling. I rose to First Sergeant and was soon in charge of the mobile wireless outfit. We had a squad of cadets all trained to carry pieces of portable masts on their shoulders, like guns. At the command, "End Masts!" they would fit the pieces together. "Up masts!" and the poles would go up, the guys fastened. Soon, a portable antenna was ready.

On "Field Day" the "troops" would be all decked out in their pressed parade uniforms, white gloves and shined shoes. Inspection guaranteed this. The villagers would turn out to admire. A commercial photographer was on hand. His pictures were offered for sale in his street display window, next day. He took one picture showing me sitting cross-legged on the ground, with phones attached to an army wireless set, listening to messages coming from the armory two blocks away. FB DX! The Signal Corps cadets were grouped around me at attention. Townspeople were gaping in the background. The photographer evidently did not know about wireless, or if he did, probably disbelieved it, because he wrote in the negative, "FIRST AID CORPS"!! My mother kept that picture in her scrap book for years.

I could write a book about similar experiences!

QST



Nevada—The fourth SAROC will be held in Hotel Sahara's Space Convention Center in Las Vegas, Nevada on January 8, 9, 10, 11, and 12. For reservations and registration write SAROC, Hotel Sahara, Las Vegas, Nevada 89109.

#### COMING ARRL CONVENTIONS

January 18-19, 1969 — Southeastern Division, Miami, Florida.

May 9-10, 1969 — Michigan State, Grand Rapids.

May 24-25, 1969 — New England Division, Swampscott, Mass.

June 20-22, 1969 — NATIONAL, Des Moines, Iowa.

July 4-6, 1969 — Rocky Mountain Division, Salt Lake City, Utah.

August 16-17, 1969 — West Gulf Division, Amarillo, Texas.

NOTE: Sponsors of large ham gatherings should check with League headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL for up to two years in advance.

# AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,\* WINJM

## THE CASE FOR PREPARING

IN last month's "Diary" there appeared a sentence which, when analyzed, provoked the subject for this month's column. It said: "Less than an hour after the tornado first touched down, amateurs were being organized to furnish communications for the stricken city." This was a prideful statement. And yet, if you stop to analyze it, isn't an hour quite a long time to start getting organized? In any case, shouldn't the amateurs already have *been* organized?

Oh, we're sure that in this case it was just a way of saying that amateurs were in action in less than an hour after the tornado struck, and we're just as sure that a competent, systematic job was done. But it is unfortunately true that there *are* many places—*too* many places—where organization takes place *after* the emergency strikes. In fact, this is largely the story of amateur radio emergency communication throughout our history. Emergency strikes, ham tinkers offer their services, set up makeshift stations in temporary places, set up schedules and points of communications and as often as not, with their ingenuity and flair for improvising, save the day. The spontaneity of it all only adds to its glamor. The public press is often more impressed with this than thinking amateurs are with the fact that a little preparedness could result in a much better, more complete, more efficient and quicker-reacting service.

But how, you might well ask, can you prepare for an emergency when you never know when or where one is going to strike, or what kind of an emergency it will be? A good point. The extent of emergency preparedness is limited by these considerations, but not nullified. While you can't usually pinpoint when you are going to have a hurricane, or a snowstorm, or an earthquake or an industrial explosion or a riot, you can get your forces organized to the extent of knowing who is going to operate on what frequencies, how many mobiles or portables or hand-carrieds you have available, how the various groups will be alerted, whom each takes its orders from, what procedure will be used in conducting operations, what message format will be followed—and conduct drills and tests and simulated emergency exercises to assure yourself as well as you can that the organization can and will function under emergency conditions.

You can also make contacts around town to assure that officials of agencies or concerns apt to be affected by an emergency situation know of your availability and capability to be of assistance. There are *many* ways in which this can be done, but all of them require someone to make the contacts, to offer and provide the services and to make sure both your capabilities and limitations are understood and worked into any plans.

The case for preparedness is so obvious as almost not to require statement, and yet in emergency after emergency the amateur effort is spontaneous, unrehearsed, unorganized except on the spur of the moment. This is because (1) the number of amateurs unwilling to prepare but willing to participate when the real thing comes along is far greater than the number who do prepare and know how to participate effectively. The unprepared make all the noise, and noise is what attracts attention, while the minuscule prepared element is lost and unheeded in the clamor. This is all wrong, but what do you do about it?

Just one thing. Get more amateurs actively enrolled in the preparedness programs, so that unprepared zealots, regardless of their good intentions, will be a minority and may be kept in their place, while organizational leaders do the leading. Otherwise, you have the blind leading the blind, and no wonder there is confusion and chaos.

You might compare an emergency to a fire in the house. You never know when or where



Vic Paounoff, W1EOB, is widely known as a contest and DX man, but he also participates widely in traffic activity. For years he was a crack EAN NCS and now holds down a ICC post.

\*Communications Manager, ARRL.

a fire is going to break out, or specifically what kind of a fire it will be. When it happens you have to improvise—stomp it out, douse it with a bucket of water, and if it's too far out of control you have to call the fire department and they show up with fire hoses and axes. Now fire hoses are a good thing; they put out fires. But not nearly so effectively or efficiently as a sprinkler system based on the house's regular plumbing.

We need an AREC and an NTS that is based on our regular "plumbing." That is, that operates all the time and is ready to go into emergency action at a moment's notice, that is ready to sprinkle any fire that breaks out, no matter when, or where or what. Less spectacular, perhaps, but more effective. Ten per cent of the amateurs is not enough to do the job. How about another 50% or so getting in on amateur radio preparedness programs? — *WINJM*.

### National Traffic System

A number of short items, this month, to clean up the backlog of "tickler" notes in the NTS source material file.

*Item 1:* Might as well get this over with first. The piece on Vietnam traffic in Nov. *QST* got quite a reaction from some of the MARS people—principally Navy MARS. It seems there are three different MARSes, so we can't speak of MARS as an entity. The biggest bone of contention was the fourth paragraph, which proves that someone not only reads this column, but reads *all* (or almost all, anyway) of it. It seems that Navy MARS does *not* handle all its traffic through the Pentagon, that Vietnam traffic is collected at Naval District MARS stations on the west coast and relayed to Vietnam either direct or through a relay point in Hawaii. Air Force MARS, we are told, has a number of "gateway" stations on the west coast which provide the jumping-off point for Vietnam traffic.

Anyway, as a result of all this there is no change in the routing of Vietnam traffic through NTS. It still goes to RN6.

*Item 2:* Some months ago this column made mention of a recommendation made by the Eastern Area Staff of NTS to the effect that traffic should be listed by destination first, followed by the number of messages, to make it slightly easier for the NCS who keeps his NCS sheet in columns to know where to put the number the moment it is sent. For example, if a station reporting into ILN says "5 CHGO," the NCS has to wait until he hears Chicago before he can put the number in the Chicago column, and by that time the station is sending another number. But if the station says "CHGO 5," the NCS knows immediately in which column to put the 5. When a QNI involves mixed precedences, the beauty of this is even more apparent. Imagine the confusion of a poor NCS if someone should report into a net and give his traffic list as "1P 3P2 4R CHGO," meaning that he had one priority, three priority two and four routine for Chicago. If he puts the destination first, there would be no confusion.

Soooo—effective as of this reading, NTS policy is to list destination first, number of messages second. The Public Service Manual examples will be changed to comply, next printing.

*Item 3:* A cryptic note found in the NTS column source file says only "Why the slowdown? What's

happening?" We no longer remember exactly what the note refers to, but suspect it was upon receipt of a batch of messages, presumably handled on NTS, all of which were several days old. Anyway, it's a good topic. What *is* happening? With the system operating normally, traffic originating on the east coast should reach delivery point on the west coast the same night. In the opposite direction, there is a day's delay because the time difference makes it impossible to take full advantage of the cycle. What happens, when a message takes two or even three days to reach delivery point?

Well, obviously "somebody goofs." Somewhere along the line the system is not working as it should. A liaison is missed, a net session doesn't take place, a TCC schedule is washed out by conditions. Who knows? The fact remains that the traffic doesn't get cleared and is delayed.

In such cases, there are lessons to be learned. The first one is that the system is no better than the operators comprising it; if the operators don't perform, *no* system is going to work. The second is that we should observe our schedules, even leaving traffic "on the hook" if necessary to do so. Better to leave three or four messages on the hook than show up late for a TCC sked and maybe miss it as a result. The third is that if something doesn't click, we do make use of alternative facilities, even non-NTS. Better to take a message out of NTS than to let it gather dust.

*Item 4:* Let's not be quite so exclusive about denying "membership" peremptorily to any net which expresses an interest in becoming a part of the system. NTS is not exclusive. Any amateur can participate, and some nets can qualify for membership if they want to tailor themselves to serve a section purpose. And remember, the policy is to accept any traffic into the system but not to route traffic out of the system *unless* there is no NTS outlet available. — *WINJM*.

### October reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN.....	62	647	.398	10.4	90.8
2RN.....	61	574	.697	9.4	97.1
3RN.....	62	636	.434	10.3	99.2
4RN.....	59	690	.424	11.7	84.7
RN5.....	62	566	.342	9.1	87.8
RN6.....	62	990	.680	16.0	96.0
RN7.....	62	410	.319	6.6	42.5
8RN.....	59	515	.362	8.4	95.1
9RN.....	62	881	.679	14.2	95.6
TEN.....	60	416	.463	5.2	83.3
ECN.....	55	166	.202	3.0	69.3
TWN.....	46	166	.210	3.7	46.1
EAN.....	31	1836	1.280	60.2	97.8
CAN.....	30	1041	.966	34.7	100.0
PAN.....	31	1090	.964	35.2	98.9
Sections <sup>1</sup> .....	2126	10,669		5.0	
TCC Eastern.....	124 <sup>2</sup>	777			
TCC Central.....	93 <sup>2</sup>	506			
TCC Pacific.....	124 <sup>2</sup>	807			
Summary.....	2930	23,183	EAN	7.2	---
Record.....	2885	30,735	1,408	15.2	---

<sup>1</sup>Section and local nets reporting (85): NCNL, THEN (N.C.); OLS, SSZ (Okl.); MDCC (Md.-Del.-D.C.); CN, CPN (Conn.); RUN (Utah); M6MTN, QMN, WSSB (Mich.); ILN (Ill.); PTTN, EPA, EpaEPT (Pa.); FMTN, VEN, WFPN, QFN, FPN, GN, TPIN, FAST (Fla.); PVTEN, NJEPTN, NJN (N.J.); NYS (N.Y.); TTN, TEX (Texas); KTN, KYN (Ky.); WSSB, WSN (Wash.); HMN, CGN (Colo.); OZK (Ark.); PTN (Me.); OSN, OSSB, BN (Ohio); GSN (Ga.); QIN (Ind.); VSBN, VN, VSN (Va.); LAN (La.); WIN (Wis.); BCEN (B.C.); MON, MEN (Mo.); MDSD (Md.-D.C.); MSN, MJN (Minn.); AAM, AENB, AEND, AENH, AENMI, AENO, AENR, AENT (Ala.); VTNIH (Vt.-N.H.); APSN (Alta.); MEPN (Md.).

<sup>2</sup>TCC functions, not counted as net sessions.

W2FR reports 2RN certificates issued to WB2VEJ and K2KTK; one session missed because of band washout on Nov. 2. WA6ROF deploras low traffic; sez RN6 fully prepared for plenty of traffic; an RN6 certificate was awarded to W6LRU. RN7 welcomes four new NCB; traffic is down but manpower building up, so they are ready for the holiday deluge. W8CHT sends his 8RN report from Miami Beach. W9QLW has awarded 9RN certificates to WA9TUM and W4NLO. W9LGG says that TEN representation much improved, but not much traffic; W9CGZ earned a net certificate. VE3BZB says that when PY stations started to QNI ECN they took the hint and moved from 7040 back to 3540 kc. K7NLLL is having all kinds of difficulties keeping TWN going on a two-session basis, but is staying right in there and thinking of trying an "early early" session. WA9RAK submits his first CAN report, and it's a dandy; certificates have been awarded to W0ZHN, W0BV and W4NLO; an excellent new CAN Bulletin was mailed in early November. W6IPC has been designated assistant manager of PAN and a net certificate has been issued to W6BNX; Manager W6VNVQ says nothing wrong with PAN that more traffic won't cure.

*Transcontinental Corps.* W3EML says that perhaps since TCC-Eastern's record high for August didn't make QST, the record low for October will; station D giving most of the problems at present. Nevertheless, only six failures during the month. W6LCX reports four failures in TCC-Central, some irregularities but things normal in general. W7DZX sez traffic and 20 meters going to the dogs. TCC-PAN certificates to W6VZT, WA6LFA, W7KZ and K7LHR.

*October reports:*

Area	Func-tions	% Suc-cessful	Traffic	Out-of-Net Traffic
Eastern . . . .	124	95.2	2069	777
Central . . . .	93	95.6	1024	506
Pacific . . . .	124	96.0	1614	807
Summary . . . .	341	95.6	4707	2090

The TCC roster: Eastern Area (W3EML, Dir.) — W1s BJG EFW EMG NJM, W2s FR GKZ, K2RYH, W4s BHN BLV UWA, W7s OYE RKK, W3EML, K3MVO, W4s NLC UQ ZM, K4KNP, W8s AHZ CHT IXJ RYP UM, K8KMQ, W4s OCG POS ZGC. Central Area (W6LCX, Dir.) — W4OGG, K4s AT DZM, W4AVM, W4A1N/5, W5KRX, W8s CXY DND DYG VAY, W4s RAK YZM, W0s INH LCX, W40s IAW DOU MLE SDC, K0s AEM YBD. Pacific Area (W7DZX, Dir.) — W6s BGF BNK EOT IPC IPW EMS VNQ VZT, W4s ROF LFA, BRG, W7s KZ ZIV, K7HLR, WA7CLF, VE7ZK.

**Diary of the AREC and RACES**

On June 13 the Del Norte Traffic Net (Texas), on information received through K5DIT, was instrumental in locating a man in South America who had been bitten by a dog which, unbeknownst to him, turned out to be rabid. The man had left Colombia and was traveling in Peru and Ecuador. The net dispatched stations to try to make contact with officials in Colombia, Peru and Ecuador, in hopes of locating the missing man. K5VTE went to 15 meters to try to contact Quito. WA5GGS went to 20 meters and succeeded in contacting Lima. Then K5VTE succeeded in contacting HC1GI in Quito through K1KBO. The man in question, a member of the Peace Corps, was known to the American Embassy there, and they promised to see that he received treatment. Later, through the 20-meter YL Net a station in Quito (call unknown) called the American Embassy and was informed that the patient had received treatment. Others known to have participated in this operation were WA5-LHC, W5ALL and HC1GI. — *K5DIT*.

What started out to be a routine operation to assist with communications for a canoe race on the Bow River in Alberta, July 6-7-8, turned into an emergency when one of the canoists capsized and was drowned. The race was forthwith cancelled and the RCMP was summoned to assist in the search

for the body. Amateurs were on duty from 3 p.m. July 6 to 10 p.m. July 8 assisting in communications for the search, but the body was not found by that time and all search personnel were released. (The body was found July 21 by fishermen.) — *VECAFR, EC Calgary, Alta.*

Emergency assistance was obtained after a fatal accident between Gillette and Buffalo, Wyo., on Aug. 1, by W9KRV/mobile, who was talking with WA6KXO when the accident was discovered. The call for the Wyoming State Police and an ambulance was relayed to K7TAQ in Casper by WA6KXO and K7YDO, with W5LZS and W9TLU assisting. W9KRV/mobile remained at the accident scene for over an hour until help arrived. — *W9KRV*.

The West Coast Amateur Radio Service reports six emergencies handled and 12 highway accidents reported during the period Sept. 16 to Oct. 31, 1968.

On Sept. 28 XE2PH called requesting assistance in locating a family apparently lost in Baja California. K6DQA, WB6DQZ and WA6ZWL/7 went to work on the project, located the missing family's California address, and within an hour and 20 minutes were able to advise XE2PH that the family had returned safely home.

On Oct. 7, W6ZOM requested assistance in obtaining a drug not available in Mexico City for the very ill son of XE2SS. WB6YFT located the drug in Los Angeles and arranged to have it shipped.

On Oct. 9, W7YSO aeronautical mobile over Utah requested assistance in filing a flight plan because aircraft radio equipment was not functioning. K7SOT filed the flight plan, WA6WHP and WB6-IGU maintained communications during the flight and W7EM closed the flight plan when W7YSO arrived at his destination.

On Oct. 11 a MARS station participating in a search for a lost military aircraft called in requesting assistance in communicating with his base. W6KAJ succeeded in arranging a direct telephone contact with the commanding officer.

On Oct. 15 WA7JMH in Washington requested assistance in locating W7AWO, traveling in Southern California, whose mother was critically ill. By making inquiries along his route, he was located at 10 A.M. the following morning.

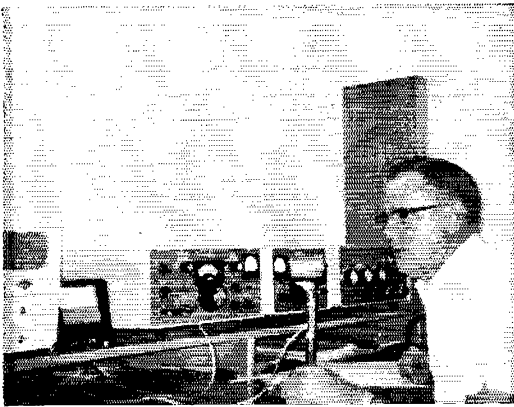
On Oct. 21 WB6ZUP requested help in locating a party deer hunting in Idaho, whose father had passed away. WB6IZF/7 in Twin Falls was designated to relay the information to Idaho authorities. WB6MDN, W6NS and W6JBA obtained the party's vehicle license number, while several other amateurs relayed and monitored in case further help was needed.

In the same period, 12 highway accidents involving injuries and 14 incidents involving traffic obstructions, motorists in distress, non-injury accidents and other priority incidents were handled. A total of 49 different stations were involved.

WCARS operates on 7255 kc., 24 hours per day. — *WB6IZF, Publicity Chairman, WCARS.*

On Oct. 3, Quebec SEC VE2ALE and VE2APT/mobile reported an overturned truck blocking the highway on the Transcanada Highway in Montreal. EC VE2ADE/mobile also assisted. The facilities of repeater station VE2RM were used. — *VE2ALE*.

On Oct. 4 VE2ALE/mobile was in round table via repeater VE2RM when he came upon a stalled car blocking traffic during the rush hour on the



Jack Gage, W5ICL, is EC for Orange County, Texas, shown here at the controls of the Orange American Red Cross station W5ND.

Transcanada Highway in Montreal. He relayed the information to VE2FK who telephoned the Quebec Provincial Police and a cruiser was dispatched to the scene. VE2DEK/mobile later passed this way and reported the blockage had been cleared. Meanwhile, VE2CK/mobile reported a severe blockage on the Bonaventure Expressway in downtown Montreal. Communications over repeater VE2RM made it possible for many of the amateur mobiles to take alternate routes on their way to work. — VE2ALB, SEC Quebec.

The disappearance of a missionary plane in the Republic of the Congo on Oct. 13 precipitated a widespread search by radio of the Congo jungle. Daily contact with the missionary headquarters station WA9VJY in Indianapolis provides information via amateur radio. Members of the Disciples Amateur Radio Fellowship amateurs who participated were 9Q5AF, 9Q5MO, WA9VJY, W9KRV, WA6KXO, WA0MYP, W9GHY, W3APO, K5BXE, W4PR and W9AI. — W9KRV.

On Oct. 28 a weak station signing WA3INC reported into the Clearing House Net with a "priority emergency" QNC. It seems a special blood type was needed to save the life of a RACES operator in Point Pleasant, N. J. The message was spread from the Clearing House Net to a number of other nets and on Oct. 30 WA2TEK advised that the hospital had been overwhelmed with volunteer donors. — WA3GPT.

On Nov. 2 Station K1JFI at the Roger Williams VHF Society in Providence was activated to assist with communications for the Red Cross concerning a gas explosion in East Providence, R. I. Mobiles, relay stations and extra operators were soon available. Amateur frequencies were used to supplement the special emergency "requencies which were affected by magnetic disturbances. Fifteen amateurs were active. — W1KPM, Communications Chairman, Providence Red Cross.

On Nov. 17 OA4FZ put out a plea for a special drug needed to save the life of a woman suffering from a massive stroke in Peru. The request was relayed through HK5OW in Colombia and received in New York by WB2KFY and WB2THL. The

latter contacted the Coast Guard, who arranged for shipment of the drug from Miami the following day. — WB2THL.

On Oct. 26 the Guam Emergency Net was alerted by EC KG6AQI with KG6AAY acting as net control, to get set up for possible action if Typhoon Judy hit the islands. KG6ALY provided information on the storm directly from the aircraft penetrating it. However, on Oct. 27 the typhoon passed 100 miles south of Guam and posed no threat, so the net was secured. — KG6AQI, EC Marianas Islands.

The King's County (N. Y.) Area Net was alerted on Nov. 11 at the request of the Jamaica Red Cross to provide communications in the event of flooding high tides or high winds. A total of 22 stations responded to the alert. — WA2UCP, EC Kings County, N. Y.

Forty-three SECs reported October activities, representing 15,517 AREC members. This is one more report and just about the same number of members as Oct. '67. Sections reporting: E. Mass., Okla., SCV, Md.-D.C., Nebr., Que., Wash., So. Dak., San Fran., Ga., Mont., San D., Alberta, Santa B., Ind., Orange, Mo., Tenn., S.N.J., Nevada, Mich., Ark., La., Colo., Conn., Kans., Ohio, B.C., Del., So. Tex., W. Va., E. Fla., Ala., N.C., Utah, Ky., W.N.Y., Va., N.M., Sask., N.H., Mar., N.N.J.

Independent Net Reports:

Net	Sessions	Check-ins	Traffic
North American Net	27	598	270
7290 Traffic Net	---	1939	1533
Clearing House Net	29	456	281
Central New England Net	---	1202	61
Interstate SSB Net	31	1063	424
QTC Net	---	309	116
ISSB 20 Meter Net	23	453	5214
Eastern U.S. Net	29	65	51
Mike Farad Net	27	391	358
Eastern Area Slow Net	28	165	177

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**Strays**



Here's a proud group from the Fremont High School Bandjammers Radio Club, WA6DVV. They have just earned this WAC certificate and are shooting for a DXCC certificate . . . if they can work it in with all their other club projects which include a radio telescope. Shown are (l. to r.) John Lewis; Sanford Lynch, WA6BXH; Gary Watson; Pacific Division Director Gmelin, W6ZRJ (who is also club advisor); and Dick Cappels.

## • For Public Service

# Announcing The 1969 ARRL Simulated Emergency Test January 25-26

**T**HE late January SET date seemed to work out all right last year; at least, we had a slight increase in some statistics and relatively few squawks about the severity of weather conditions. So again we are calling the annual Simulated Emergency Test for the last weekend in January, and hope you are all planning to be on deck.

The procedure will differ from that of previous years in only a few minor respects. One is that Red Cross participation at the national level will be strictly via the National Traffic System or other established amateur nets (no monitored frequencies). Another is that test official traffic will put more emphasis on "simulated delivery" to avoid getting disgruntled officials out of bed in the middle of the night to accept a test message and frustration on the part of dedicated amateurs at their inability to deliver a c.d. or Red Cross message during the weekend.

There is one additional difference. This year we would like to make a special plea that local tests be conducted during the designated weekend. With NTS invoking of its emergency operating procedure, it will be a better test all around if we can all turn out for a big weekend demonstration of the *real* meaning of amateur radio.

### *What Is the SET?*

We wouldn't want to have the casual reader casually flick this page because there is no explanation what it is all about. The SET is an annual exercise of our emergency preparedness organizations, particularly the ARRL-sponsored Amateur Radio Emergency Corps and National Traffic System but also including associated preparedness groups (e.g., RACES) and served agencies (e.g., Red Cross and civil defense). The AREC conducts tests and drills at local levels, passes its medium- and long-haul traffic to other points through the facilities of the National Traffic System, which operates extraordinary sessions during the designated weekend to keep abreast of the traffic flow. Other nets also assist in handling the traffic, most of which is simulated.

The test is intended to serve two principal objectives: first, and most important, to test our emergency preparedness facilities for our own information, so that strong and weak points can be pinpointed and steps taken to rectify the latter. Second, to provide a public demonstration of our ability to mobilize our organized forces

### **During the SET**

Monitor your local emergency net frequency.

Make contact with your local EC or RO.

Take immediate steps to follow any pre-arranged plans.

Stay off the air unless or until you are sure you can be of assistance.

In widespread emergencies, monitor W1AW for latest bulletins and news.

in the event an emergency, natural or man-made, should strike.

Important? *You bet it's important!* It's the most important thing we have to do. Such being the case, it's a pity that only about 10% of licensed amateurs take any interest whatever in it.

### *What Can I Do?*

It's a little late, actually, but thanks for asking. However, the event takes place the last week-end in January, and if you receive this copy of *QST* by the middle of the month your EC may still be able to use you. Of course, not all communities have ECs, in which case perhaps your RACES radio officer can use you. What, no RACES RO either? Golly, your town is really dead, isn't it? How about stirring something up? There may not be time to get an effective group together before this year's SET, but there will be another one next year, and meanwhile who knows what may happen to require your services?

On the facing page is a complete list of appointed Section Emergency Coordinators. These are officials appointed by your elected Section Communications Managers whose duty and function it is to take the leadership in formation of an effective emergency preparedness program in the section and to see that a local emergency coordinator is appointed for each place where a qualified amateur can be found. He is the man to talk to if you are interested in getting something started in your locality.

The important point is *not* simply to volunteer for the SET (you won't be much help, actually, without previous experience), but to become an

*(Continued on page 128)*



## Section Emergency Coordinators of the Amateur Radio Emergency Corps

The Section Emergency Coordinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coordinators for the various communities in his Section. Does your locality have an EC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

ATLANTIC DIVISION			
Delaware	W3DKX	Roger Cole	345 E. Roosevelt Ave. New Castle 19720
Eastern Pennsylvania	W3APF	Jonathan B. Balch	145 Third Ave. Newtown Square 19073
Maryland-D.C.	W3LFD	Walter Carr	841 2. Box 193 Havre De Grace, Md. 21078
Southern New Jersey	W2LVW	James Peck	810 Indiana Trail Rd. Dentford 08006
Western New York	W2RUF	Clara Reger	135 Best St. Buffalo 14208
Western Pennsylvania	W3KJF	Henry T. Schneider	1806 Water St. Westleyville 16510
CENTRAL DIVISION			
Illinois	W9RYU	Harry J. Studer	705 Hillcrest Rd. Millan 61264
Indiana	W9BUQ	William C. Johnson	2838 Hillside Ave. Indianapolis 46218
Wisconsin	W9NGT	Sherman C. Carr	756 W. Washington Ave. Hartford 53027
DAKOTA DIVISION			
Minnesota	WA0TEF	Gary G. Hanson	719 North 18th Ave., E. Duluth 55812
North Dakota	WA0AYL	David E. Beach	Apt. 7, 1116-19th Ave., S. Grand Forks 58201
South Dakota	WA0BPZ	Ed Gray	Rt. #1 Burke 57523
DELTA DIVISION			
Arkansas	W5PBF	Joe Bartelli	Route 1 Rogers 72756
Louisiana	W5BTK	John L. Robertson	2609 Halsey Ave. New Orleans 70114
Mississippi	W5JDT	Charles R. Hoone	1111 Mobley St. Columbia 39429
Tennessee	W4WJH	Mike Jaquish	200 Old Fort St. Tulahoma 37388
GREAT LAKES DIVISION			
Kentucky	W4VYS	William G. Willis	6302 Apex Dr. Louisville 40219
Michigan	W8MFD	Stanley J. Briggs	1885 Pinegrove Rd. Trenton 48183
Onto	W8OUU	James W. Benson	2463 Kingspath Dr. Cincinnati 45231
HUDSON DIVISION			
Eastern New York	W2KGC	William L. Stahl	Shirley Ave. Fishkill 12524
N.Y.C. & Long Island	K2OVN	John S. Brandau	1659 East 46th St. Brooklyn 11234
Northern New Jersey	WA2ASM	F. Douglas Rue	1209 Watchung Ave. Plainfield 07060
MIDWEST DIVISION			
Iowa	K0LYB	Gregg D. Miller	R.R. 4 Marshalltown 50158
Kansas	K0EALB	Norman Stackhouse	1409 Willow Rd. Newton 67114
Missouri	W0BUL	Charles O. Goshel	711 South Oakland Webb City 64870
Nebraska	K0ODF	Lynn Bilyeau	406 Henkens Dr. Chadron 69337
NEW ENGLAND DIVISION			
Connecticut	W1PRT	John R. Barber	19 Bidwell Parkway Bloomfield 06002
Eastern Massachusetts	W1AOG	Donald F. Gupthill	17 Park St. C'tl. Medford 02155
Maine*	K1CIE*	Allen E. Sehark	42 Maple St. Presque Isle 04769
New Hampshire	K1QJES	Donald W. Morgan	Bayview Avenue Lacota 03248
Rhode Island	K1LHJ	Chester P. Tanman*	119 Owen Ave. Pawtucket 02860
Vermont	W1VSA	Harry A. Preston, Jr.	RFD 1 Charlotte 05445
Western Massachusetts	W1STR	Norman P. Forest	36 Valley Rd. Springfield 01119
NORTHWESTERN DIVISION			
Alaska	K1LFX	William D. Crowl	Box 4407 Anchorage 99503
Idaho	K7TILX	Everett J. Jordan	1029 Airway Lewiston 8301
Montana	W7RZY	Harry Roylance	P.O. Box 621 Harlowton 59036
Oregon*	K7WWR	Dale T. Justice	1369 N.E. Sunrise Lane Hillsboro 97123
Washington	W7BQ	William R. Watson	100 S.E. 1st Ave. Ellensburg 98926
PACIFIC DIVISION			
East Bay*	K6LRN	Richard Wilson	629 Blue Ridge Dr. Martinez 94553
Hawaii	K1H6H	Meadie M. Padgett	1804 Holapa St. Honolulu, Oahu 96818
Nevada	WA7BEU	L. L. "Mike" Blain	3800 Cherry St. Boulder City 89005
Sacramento Valley	WA6JDT	John F. "Mike" Hill	6230 Rio Bonito Dr. Cambridge 95608
San Francisco*	W6WLV	Hal Littlefield	1319 Hearn Ave. Santa Rosa 95401
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave. Fresno 93702
Santa Clara Valley	W6VZE	Charles E. Glidden	1037 Capuchino Ave. Burlingame 94010
ROANOKE DIVISION			
North Carolina	WA4WE	Walter B. Thomas, Jr.	P.O. Box 608 Pilot Mountain 27041
South Carolina	W44ECJ	Richard H. Miller	403 Hancock St. Beaufort 29902
Virginia	K4LNB	Ethel M. Smith	2012 Rockingham St. Arlcan 22101
West Virginia	W8EV	Robert F. Johnston	Rt. 7, Box 525 S. Charleston 25303
ROCKY MOUNTAIN DIVISION			
Colorado	W0SN	Charles M. Lotterell	430 South Swadley St. Denver 80228
New Mexico	W5PNY	Harry McGavran Jr.	1931 40th St. Los Alamos 87544
Utah	W7WKF	McCarroll Peterson	4875 Forktown Drive Salt Lake City 84117
Wyoming	K7NQX	Glen R. Blackburn	P.O. Box 164 Cheyenne 82001
SOUTHEASTERN DIVISION			
Alabama	W1FPI	W. Taylor Benton	P.O. Box 14 Opp 36467
Canal Zone	KZ2JC	John S. Cabazero	Box 487 Balboa
Eastern Florida	W4YTP	Andrew C. Clark	41 Lenape Drive Miami Springs 33166
Georgia	W4WQU	Jack Garrison	2529 Blueberry Dr. Augusta 30906
West Indies (P.R.-V.I.)*	KP4DV	Albert R. Crumley, Jr.	P.O. Box 10073 Caparra Heights, San Juan, P.R. 00922
Western Florida	W4IKB	G. D. McKeenle	1000 N. Sixth St. Chipley 32428
SOUTHWESTERN DIVISION			
Arizona	W7CAF	Gary M. Hamman	2813 E. Campbell Ave. Phoenix 85016
Los Angeles	K6QPH	Alan A. Brubaker	1779 El Rey Road San Pedro 90732
Orange	WA6ROF	Jerry L. Verdutt	8872 Central St. Yuba Linda 92686
San Diego	W46KHN	Diane Walters	3360 Krenz Street San Diego 92123
Santa Barbara	K6GV	Frederic L. Patterson	P.O. Box 115 Sml 93065
WEST GULF DIVISION			
Northern Texas	W5PYI	James Al. Cotton	208 East Oak Weatherford 76086
Oklahoma	WA5AOB	Baxter W. Hogan	113 E. Morningside Dr. Mid West City 73110
Southern Texas	K5QQG	E. Wayne Smith	3118 Stanton Street Houston 77025
CANADIAN DIVISION			
Alberta	VE6FK	Don Sutherland	444-25th Ave. N.E. Calgary
British Columbia*	VE7FB	Harold E. Savage	4533 West 12th Ave. Vancouver 8
Manitoba	VE4JC	James Riddle	291 Marlton Cr. Charleswood 20, Winnpeg
Maritime	VE1HJ	F. R. Fraser	12 Albert St. Dartmouth, N.S.
Ontario	VE3OE	J. F. Jennings	48 Morgan Avenue West Hill
Quebec	VE2AE	Joseph Unsworth	98 Galt Dorion
Saskatchewan	VE5CV	W. H. Parker	1008-10th St. E. Saskatoon

# A Helping Hand — Present and Future

## Hams Urged to Teach Underprivileged Youngsters

BY W. W. WATTS,\* W4VI/2

**A** LOT of water has gone over the dam in the quarter century that the Quarter-Century Wireless Association symbolizes. Monumental changes have taken place in our lives and our activities in those 25 years.

In our own field of amateur radio, much has happened. In 1943 — 25 years ago — according to statistics of the American Radio Relay League, there were something less than 70,000 licensed hams in the United States. Today there are over 275,000 — about four times as many. Today we are using communications channels that weren't available back in the 1940s. And who would have thought, a quarter century ago, that amateurs — even teen-aged ones — would be talking to each other via satellites and bouncing their c.w. conversations off the moon? We've come a long way.

On a broader basis, on the national and international scenes and in our personal lives as well, the changes have been even more drastic. Twenty-five years ago we were in the midst of a war against dictatorship powers on both sides of the world — in Europe and in Asia. At that time we already could see a faint glimmer of the victory to come. But we could not foresee other things that were to happen that would seriously affect our lives. Among them, of course, were the cold wars and hot wars that have plagued us all over the world for the last 20 years.

Closer to home — more immediately related to our personal lives — we did not foresee (though we certainly should have) important changes that were to take place in the American way of living. Most specifically, I refer to the current problems of the cities, the unrest among the underprivileged segment of our population, and the steps we are now taking to achieve some sem-

\* 22 East 88th St., New York, N. Y. 10028.

*A ham since early boyhood, "Wally" Watts is now Senior Executive Vice President of RCA. At the 21st annual dinner meeting of the QCWA in New York, he urged the nation's amateurs to help underprivileged youngsters not only to acquire a constructive hobby, but also an introduction to electronics as a possible career. As further guidance, we hope later to carry a report on the current pilot project in Camden, N. J., through the South Jersey Radio Association.*



W. Walter Watts, W4VI/2

blance of the justice and equality that we have bragged about for some hundreds of years but never really established.

I bring this up for a very specific reason: I think that we, as a fairly dedicated group of people — ham operators have always been enthusiastic — can do something to contribute toward the solution, or at least the alleviation, of this problem. I should like to put forth an idea for your consideration.

### *Help the Youngsters*

If there is going to be any salvation for today's underprivileged people — the people of the ghettos — it lies not so much with the grownup generation, the men and women who have either made it or probably never will, but with the kids. Kids now 12 to 18 years old. Kids who can, and do, make trouble in the streets — but who could, if they were drawn into interesting fields of activity, be put on the path to constructive citizenship.

At this point, I imagine you are beginning to read me — to surmise what I am leading up to — and that is a program to interest the ghetto kids in ham radio. Such a program not only would provide them with a fascinating hobby to occupy their leisure hours constructively but also as a possible foot in the door of electronics toward a future occupation.

Before I spell out the details of my idea, I'd like to express one word of caution: Any program aimed at introducing kids to amateur radio,

should definitely *not* be billed as educational — and it should *not* include any formidable adjuncts such as scholarships. I've talked with many hams who have conducted such groups, and all of them warn that if you approach the project on an educational, or training, basis you lose 90 per cent of the appeal for the kids you're trying to recruit. The emphasis has to be on the fun, the excitement, the drama of the activity.

I need not tell *you* how fascinating amateur radio can be to a youngster. Many of you — like myself — were probably licensed operators before you were even in your teens. Furthermore, the fascination of radio, for most hams, sticks through the years.

Sometimes the demands of a man's business career divert him from his ham activities — the rig in his basement or den might gather dust, unused, for a period of years. But almost invariably he turns back to it, still a ham at heart as long as he lives. Your presence here tonight is ample proof of that.

A ham usually is also eager to introduce others — particularly young people — to the fun of amateur radio. And here is where these two elements — the fascination radio can have for a youngster and the willingness of a good many hams to take the time to introduce it to them — come together in a way that could, conceivably, accomplish a great deal in helping to put the ghetto youngster on a new path in life. A road not only to a consuming hobby but also possibly — through its basic introduction to electronics — to a constructive career.

How can we do this? Well, many of you, I'm sure, already are — or have been in the past — involved in some form of ham activity with kids. Maybe a club with a regular schedule of meetings, such as the Scouts or the "Y" — maybe an informal group that gets together once in a while — perhaps just one or two neighborhood youngsters who drop in occasionally.

### **Group Cooperation**

What I envision is something on a really organized basis — a group activity led by one of us hams under sponsorship of, perhaps, the local school system, or a civic organization like the YMCA or Jaycees, or even the local police department.

If the latter startles you, let me explain that one first: In the last few years, police departments in most big cities have instituted community relations programs mainly to improve relationships between police officers and the residents of the ghetto. Some very constructive programs have resulted, and it is quite feasible that amateur radio might be a healthy addition.

A good example is in Camden, New Jersey, with which I am particularly familiar because of the big RCA complex there. Its police community relations director — with rank of deputy police commissioner — is ex-heavyweight champion Jersey Joe Walcott. The department also has an internal organization known as BUP — Brother-

hood for Unity and Progress — made up of about fifty Negro officers. Some of our people helped BUP stage an all-day picnic one Saturday this summer for kids from the slums. It was a great success — nearly 3,000 showed up for hot dogs and soft drinks, sports activities and other entertainment — and it did a lot as a starter in getting the police on a more friendly basis with the people of those neighborhoods.

When we began considering ways to start an amateur radio club for kids from the poor section, one of our people suggested that we approach Jersey Joe and the BUP — the black policemen's organization — which has many contacts with youths in the neighborhood. Both reacted with enthusiasm, and I am happy to tell you tonight that we have a program under way — a sort of pilot project, you might say — to establish a radio club and ultimately an amateur station for some of the boys in the ghetto area of Camden, located in a YMCA that is in a predominantly black neighborhood.

The project is still in the planning stage at this time. But we're getting support from everybody. Some hams from the RCA s.s.b. net — among them Stan Wolfe (W2HIQ) and Ken Miller (W2KF) — are scouring our Camden plants for surplus receivers, unused test equipment and such.

Volunteer instructors from the ranks of the hams will be available but their time is not always their own. So, the local Citizens Advisory Council, which is Camden's version of an urban coalition, has promised to provide funds for a part-time instructor a couple of nights a week, as well as for purchase of some hand-keys and oscillators for Morse code practice. Herb Brooks (K2BG), president of the South Jersey Radio Association, about the oldest amateur club in the country and one of the largest, assures us his group will provide assistance. And ARRL, in the interests of getting a program like this launched, is providing some textbook material.

The BUP policemen themselves are enthusiastic — to the point that the young officer who is coordinating the project remarked the other day: "I'm gonna take the course myself. You've sold me . . . I want to be a ham."

Thus, hopefully within a few weeks, we'll have a pilot project going in the form of a club for kids from ghetto families.

School systems offer another excellent opportunity for such a program — though here the activity would, of course, have to be opened up to youngsters from all walks of life, not just the underprivileged. Here again we have explored the possibilities with the Camden superintendent of schools. He is enthusiastic about it and, if a project is launched, he will set aside classroom or laboratory space.

Similar programs, perhaps on a less formal basis, might be set up through the YMCA, the Knights of Columbus, the Lions, Rotary, Kiwanis and so on — with, of course, the volunteered services of hams to conduct the programs. Don't overlook the Jaycees. These Junior Chamber

people — a generation younger than we are — have the youth and enthusiasm to really put across a program of this sort. The Jaycees are paying more attention these days to the problems of the cities. The *Wall Street Journal* carried a Page One story a few weeks ago about how the Jaycees were turning from activities such as crowning beauty queens, organizing litter campaigns and growing beards for local centennials, to more productive drives to help cure the ills of the urban areas. Your local Jaycees may well be open to suggestion on sponsoring of a youth-oriented ham station and a program to support it. There may even be ham operators among the Jaycees themselves; if not, we certainly should be able to supply the talent.

### Financing

At this point, the obvious question arises: Who is going to pay for this?

Actually, the cost — as you know — need not be too high. Do-it-yourself kits start as low as \$50. For perhaps \$150, a small rig might be built using second-hand gear from a mail-order house, or a local radio shop — or, better yet, from surplus or used equipment that manufacturers or distributors might have on hand. For voice transmission, the cost would be greater — but only by a hundred or so dollars. One other point: We old timers have a lot of unused equipment hanging around that might be contributed and don't forget: anything we donate to such a program is tax-deductible.

Conceivably, the necessary capital could be raised by the sponsor — the police department, the school system, or the civic organization involved. That should not be too tough a problem. Also, much in the way of guidance and assistance can be expected through ARRL — including the elementary "Gateway" books to get beginners on their way.

Getting youngsters interested in ham operations is not difficult if it's done the right way — with the drama of the activity getting sufficient emphasis. As we told the black police unit in Camden, the biggest hurdle is to get them through the initial learning of the code. If some veteran hams can describe to them some of the dramatic aspects — the rescue operations, the MARS network, the disaster services, etc. — and if receivers are available on which they can hear ham conversations — their attention can be held. We plan to take the Camden kids at least once a month to an operating ham station — not an elaborate one, that might scare them off, but a simple one such as they might be able to afford some day.

Also, there are gimmicks that can be used to excite their interest. A good example is the experience that a colleague of mine in RCA — Wally Brown (W2TQ) — has had down in the South Jersey area. For years, Wally has conducted a program on the Cub Scout level to interest kids in ham radio. This is the way he works it — and it appears to me like an ideal format for a program aimed at underprivileged youngsters.

Wally would set up a small station in a meeting hall and arrange for a fellow ham, with a mobile rig in his auto, to be somewhere in the neighborhood. He'd start off with a talk about the fun and adventure of ham radio: he'd mention some of the big-name ham operators — Arthur Godfrey, General LeMay, Barry Goldwater etc. He'd talk about the fun you have making friends, from all walks of life, just by exploring the radio frequencies.

Then he would say: "For example, there's a friend of mine riding around somewhere in this area whom I'd like to talk to right now." And he'd put in a call to the ham driver — the call being heard, of course, on a p.a. system.

Once the connection was made — it was all a put-up job, of course — the driver would say: "Gosh, Wally, I think I'm lost. I don't know this neighborhood, and I don't know where I am."

Wally would reply: "Can you tell us what street you're on — give us some landmark?" And the mobile ham would mention some movie house he was near.

By this time, the kids were enthralled, and Wally would ask if one of them could come up on the stage and take the mike and give his friend directions. There were plenty of volunteers, and finally the voice would come over the p.a. system: "Thanks, fellows. I've finally located your meeting place. I'm right outside." And Wally would grab the mike and say, "Prove it, Jim. Blow your horn." And from outside — and over the p.a. — would come the blast of a horn. If that kind of sequence can't sell a kid on ham radio, nothing can.

It's that kind of introduction — fun, excitement, adventure — that can get kids interested in ham radio. Not the educational approach.

### Schools — and Careers

In Cherry Hill, New Jersey, a manual training teacher named Bart Mayo has been organizing radio clubs among high school and junior high school students for a number of years, with great success. In the last school year alone he saw 89 of his pupils get licenses — most of them novice licenses, of course, but nevertheless they were on the road to amateur operating.

Bart Mayo's area — Cherry Hill — is a suburb in the Philadelphia-Camden area, and one might suspect that its residents are a bit more affluent than average. In part, this is true. But it happens that 52 per cent of Camden County's poor — that is, families with incomes under \$3,000 — are, ironically, in the suburbs rather than the city. Thus a fair percentage of underprivileged — or under-advantaged — kids must have been among those 89 who qualified for amateur licenses.

I mentioned earlier that an introduction to radio might well provide an elementary introduction to the electronics industry and a possible career in it.

As all of you are well aware, electronics constitutes one of the five biggest industries in the

(Continued on page 126)

February 1 through February 16

# Announcing the Annual ARRL Novice Roundup

Here it is, Novices: a contest designed especially for you. It's an ideal chance to learn the ropes of contest operating, increase your code speed, work new states for WAS, build up your QSL-card collection, find out how well your station really performs — it's all these things and it's also just a whole lot of fun. You can read about the results of last year's Novice Roundup beginning on Page 48 of June 1968 *QST*.

Rules for the NR are simple. You may operate up to 40 hours during the contest period, exchanging a serial number and your section with other stations. Novices may work anybody; others may work only Novices. After the NR is over, send your contest log (along with comments and photos, if possible) to us here at ARRL Hq.; results of the Roundup will appear in *QST* soon afterwards. If you finish in first place in your section, you'll receive a handsome certificate award.

## How to Participate

Contest QSOs are much briefer than ordinary ragchews, and you should not repeat your information (call, number and section) umpteen times unless QRM is extremely bad. Here's the way a typical exchange might go:

ROUNDUP PERIOD			
Starts		Ends	
Feb. 1	0001 (12:01 A.M.)	Feb. 16	2359 (11:59 P.M.)
Greenwich Mean Time		Greenwich Mean Time	

CQ NR CQ NR CQ NR DE WN2CPQ WN2CPQ WN2CPQ NR K  
WN2CPQ WN2CPQ WN2CPQ DE WN7IYZ WN7IYZ WN7IYZ AR

WN7IYZ DE WN2CPQ GE HR NR 27 WNY BK  
WN2CPQ DE WN7IYZ R TNX HR NR 5 WASH BK  
WN7IYZ DE WN2CPQ R TNX 73 SK DE WN2CPQ NR K

Begin your serial numbers (remember that NR means "number" as well as "Novice Roundup") with NR 1. If you don't know your ARRL section even after referring to Page 6 of *QST*, drop us a card and we'll help you out. Generals: don't call CQ NR; answer Novice CQ NRs.

Note that time is expressed in Greenwich Mean Time (GMT). If you're unfamiliar with GMT, remember that it's 5 hours ahead of EST, 6 ahead of CST, 7 ahead of MST and 8 ahead of PST. Better yet, send for our handy Operating Aid #14, which contains, among other goodies, a time conversion chart.

## Scoring

Count one point for each contact (you may work a station only once, regardless of band); add your ARRL Code Proficiency credit, then multiply by the total number of sections you worked. If you get 84 QSOs in 31 sections and have a CPC of 10 w.p.m. from W1AW or W6OWP, then your score is 84-plus-10 times 31, or 2914 points. For details on the Code Proficiency program, see Page 94 of this issue. By the way, you may work DX stations for contest credit, too, although there's no multiplier involved.

## Go To It!

Read the rules carefully. Keep a check-sheet of stations worked (we have Operating Aid #6 available free) so that you don't have duplicate QSOs. Send a stamped envelope now for your Roundup log forms, and be sure your entry is postmarked no later than March 1, 1969. Have a swell time — but don't forget that homework!

## Rules

- Eligibility:** The contest is open to all radio amateurs in the ARRL sections listed on page 6 of this *QST*.
- Time:** All contacts must be made during the contest time indicated elsewhere in this announcement. Time may be divided as desired but must not exceed 40 hours total.

(Continued on page 130)

## Novice Roundup

Call WNSRWU Section OKLAHMA (See page 6 QST)

DATE ON OFF TIME	GHT TIME	SR	NO	SEC	NR	CALL	SEC*	SR	NO	DATE ON OFF TIME	GHT TIME	SR	NR	SEC	NO	CALL	SEC*	
																		SR
15	2051	1	06A	44	WASZCZ	OKLA	115	2226	27	16	WAMEUS	WASH	14					
	2054	2		37	WASZCZ	NUM 2		2231	27	36	W24WVS	SKJ	17					
	2101	3		37	WNSZSN	NUM 2		2234	28	26	WABEYL	WVA						
	2105	4		70	W1AW	SPN 4		2238	29	58	WABEYL	EMMS						
	2117	5		43	WASZSD	HD 5		2242	30	40	WNTIUC	ARIZ						
	2114	6		1	W3OH	WM 1	on 2150	2244	31	4	WNSVAV	OHIO						
	2123	7		39	WNSLAP	MD	on 2330	2333	32	30	WNSZFP	NJ						
	2127	8		42	WEDIE	OUT 7		2337	33	12	WNSJUM	WVA						
	2128	9		42	WNIHET	SWA 8		2345	34	2	WNSGLP	LA	12					
	2135	10		62	KZGGE	MI 9		2347	35	4	WAZLZ	VA						
	1952	67		1	WNSGCR	KI		2310	36	24	WASZSL	TEX	67					
	2010	68		4	WNSZSC	TEAN		2314	37	172	WNSZSG	MISS						
	2013	69		57	WNSZUL	ILL		2316	38	132	WNSZUL	MG						
	2015	70		174	KAFPP	SC		2324	39	14	HPAC	(Phon)						
	2019	71		30	WNSZSN	NUM		2326	40	162	WNSWV	ILL						
	2024	72		7	WNSZTI	OUT	OFF 2110											
	2027	73		46	WNSZSN	NUM												
	2041	74		36	WNSZUL	ILL												
	2048	75		14	WNSZSN	NUM												

Summary: (Enter below on last sheet used.) \*Number each section worked

Bands used: 15, 40, 80 ; Nr. different stations worked: 346 ; Nr. sections: 67 ;  
 Total hours of operation: 35:20 ; ARRL Code Proficiency award credit: 10 w.p.m.  
 Type transmitter (tube line-up if none-built): 6XK4KE 2-N1T  
 Receiver: 6XK4KE K-4A ; Antenna: 8E4T (5), 200LGS (40-10)

Scoring:  
346 stations plus 10 w.p.m. points times 67 sections = 27,902 claimed score.

I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is true and correct to the best of my knowledge.

Call Sign: WNSRWU Box 16163, Oklahoma City, Okla. 73116  
 Signature: \_\_\_\_\_ Call: \_\_\_\_\_ Call mailing address: \_\_\_\_\_

# Happenings of the Month

## Director Election Results

## Prison Sentences for Obscene Language

## FCC Disciplinary Actions

### ARRL ELECTION RESULTS

Mail balloting in seven divisions has resulted in the reelection of five incumbent directors and two vice directors; one new director and four new vice directors were chosen.

**Philip E. Haller, W9HPG**, scored 2943 votes to 1019 for Robert C. Erwood, K9AAU, thus winning a fourth term as director from the Central Division. A very close race in the Hudson Division resulted in a third term for **Harry J. Dannels, W2TUK**, who got 2250 votes to 2217 for Dr. James L. Lawson, W2PV. Out in the Northwestern Division, **Robert B. Thurston, W7PGY** chalked up 846 votes to 731 for William R. Watson, W7BQ and 512 for Raleigh A. Munkres, W7HAZ, securing a third term. **Carl L. Smith, W0BWJ**, director from the Rocky Mountain Division since 1961, was reelected with 702 votes to 483 for Bois R. Council, K0ATZ. **John R. Griggs, W6KW**, who has served eight years as Southwestern Division director, defeated former director Ray E. Meyers, W6MLZ, 2318 to 1405 votes.

In the West Gulf Division, **Roy L. Albright, W5EYB**, defeated director Ray K. Bryan, W5IQ, 1148 to 1076. The new director is 61 years old, and resides in San Antonio, Texas. He retired from active service as a lieutenant colonel in the Signal Corps in 1961. He's a former president of the San Antonio Radio Club, and is active on phone and c.w., 10 through 80 meters.

In the Central Division contest for vice director, incumbent **Edmond A. Metzger, W9PRN** secured a third term by scoring 2547 votes to 1410 for Sidonius M. Pokorny, W9NRP. **Bigelow Green, W1EAB**, who has been vice director from the New England Division since 1961, garnered 1539 votes to 1268 for Walter S. Rogers, W1DFS.

**David O. Bennett, W7QLE**, of St. Helens, Oregon, unseated Northwestern Division vice director R. Rex Roberts, W7CPY, who has been either vice director or director since 1941. The vote was 767 for W7QLE, 662 for W7CPY and 639 for Laverne W. Van Dyke, K7CTP. The new vice director has his own law firm and holds a Doctor of Jurisprudence degree from Willamette University. He's a member of the Willamette

Valley DX Club, the Western Washington DX Club and Air Force MARS. In addition to hamming, he enjoys bridge, fishing, camping and photography.

In the Rocky Mountain Division, **Thomas G. Banks, W5HJJ**, won a close race against incumbent vice director Col. John H. Sampson, Jr., W7OCX, 603 to 576 votes. W5HJJ lives in Albuquerque, New Mexico, and is a research and development engineer for the Sandia Corporation. He's past president of the Sandia Base Radio Club and trustee of W5MPZ; net manager for Kirtland Air Force Base Support Nets on f.m., a.m., and RTTY; holds ORS appointment and is a member of DXCC. Since 1923 he's operated 5YE, W5HJ, W6HJ, W9HK, W9HJ, W0HJ, W3ICR, K6SMP (prewar in Hawaii), W6SMP and W5BFW. He still holds KJ6CD and KZ5GX.

**Arnold Dahlman, W6UEI**, of Van Nuys, California, nosed out Gary A. Stilwell, W6NJU, by 1918 votes to 1765, thereby becoming vice



At the Amateur Radio Historical Conference held at the Smithsonian Institution in October, George Grammer, W1DF (ARRL Technical Director), was presented with the Amateur of the Year Award by the Antique Wireless Association. Ed Redington, W4ZM (right), makes the presentation.

director from the Southwestern Division. (Incumbent Thomas Cunningham, W6PIF, withdrew from the race.) W6UR1 is a customer serviceman for the Southern California Gas Company. He's been an assistant director from the Southwestern Division since 1965, and is a past president and past secretary of the San Fernando Valley Radio Club, Inc. He's m.e.s. of an Army MARS net, and is director of the MARS technical library. A past chairman of the Los Angeles Area Council of Radio Clubs, he was also general chairman of the joint Southwestern-Pacific Division ARRL Convention in 1967.

West Gulf members chose **Lester L. Harbin, W5BNG**, as vice director with 1110 votes to \$26 for Favian M. Adair, W5FKE and 275 for Eric B. Hjerpe, W5FCD. The new vice director lives in Fort Worth, Texas and works as a telegraph repeaterman for Southwestern Bell Telephone Co. He's been an assistant director of the West Gulf Division since 1960, and was SCM for North Texas from 1958 to 1968. W5BNG serves on the advisory committee for Texas RACES; is a member of Army MARS; and belongs to the A-1 Operator Club.

The other four offices open to election this fall were filled without membership balloting, since only one candidate was nominated and eligible for each: New England Division director **Robert York Chapman, W1QV**, Roanoke director **Victor C. Clark, W4KFC**, Hudson vice director **Stan Zak, K2SJO** and Roanoke vice director **L. Phil Wicker, W4ACY**. All are elected for two-year terms beginning at noon January 1, 1969.

### OBSCENITY EARNS JAIL TERM

Larry Dodson McCreary, K4KHE, of Franklin Kentucky, was convicted in the United States District Court at Bowling Green Kentucky, on November 11, 1968, of transmitting obscene, indecent and profane language on amateur frequencies in violation of Federal law.

McCreary had entered a plea of guilty to Federal indictments containing seven counts charging violation of Title 18, United States Code, Section 1464. He was sentenced to six months' imprisonment on each of the seven counts, the terms to run concurrently. He was also fined \$100 on each count for a total fine of \$700.

The case had been presented to the Federal Grand Jury on May 20, 1968, on the basis of information developed by the Federal Bureau of Investigation and field investigative and monitoring engineers of the Federal Communications Commission.

The U.S. District Court at Paducah, Kentucky has found two other amateurs guilty of transmitting obscene, indecent and profane language on amateur frequencies in violation of Federal law.

On October 21, 1968, Walton B. Berkley, WB4AOE, of Hickory, Kentucky and Conrad H. Bridges, W4EBG, Paducah, Kentucky en-



Former FCC Commissioner George Sterling, W1AE, and OOTC/Goldcoasters president Ray Guy W4AZ take the mike at pioneer broadcast station WDM during the Amateur Radio Historical Conference.

tered pleas of *nolo contendere* to Federal indictments charging them with violations of Title 18, United States Code, Section 1464. The indictments contained six counts against Berkley and two counts against Bridges. Each was sentenced to three months imprisonment and fined \$100. The sentences of imprisonment were suspended and the defendants were placed on probation for a period of two years. The fines have been paid. (Taken from FCC Public Notices dated November 14 and November 5, respectively.)

### LICENSE DENIED

The Federal Communications Commission has denied General Class operator and amateur station licenses to Joseph P. Oliveira, ex-WN6PNZ, of Hollywood, California, after a hearing held in Los Angeles on April 5, 1968.

Hearing examiner Jay A. Kyle said in his initial decision, "The record is replete with evidence through Oliveira's own admissions and stipulations that he has followed a course of consistent violations of the Commission's Rules, despite promises of reform . . . Beginning on October 21, 1962 and as late as August 9, 1967, Oliveira had pursued a pattern of not adhering to the Commission's Rules. His own admissions to the Commission clearly demonstrate that he was aware that his conduct was violative of Commission Rules. . . ."

Violations included operating without licenses in both the Citizens Radio Service and the Amateur Radio Service; transmitting obscene, indecent and profane language; transmitting music; malicious interference; failure to identify;



Roy Pinkham, W6BPT, past section communications manager of Santa Clara Valley and now an assistant director of the Pacific Division, suffered a couple of strokes which left him partially paralyzed. Through sheer hard work Pinky overcame his handicap, retrained his fist, and—on the third try—passed his Extra Class license. FCC Engineer Ney R. Landry, W6UDU (right) presents the "wallpaper" certificate for the top grade.

operation in the citizens band for hobby or diversion and failure to restrict communications to the minimum time necessary, also in the citizens band.

### SUSPENSIONS AND REVOCATIONS

The station license of Douglas B. Shackelford, WA4VBZ of Richmond, Virginia was revoked effective July 8, 1968. The amateur had failed to respond to violation notices concerning spurious emissions, and to later follow-ups by the Commission.

The station license of Donald J. Reichl, W5ANT, of Houston, Texas, was revoked effective July 30, 1968 for failure to reply to Commission correspondence, and failure to notify FCC of a change of mail address as required by sections 97.13 (f) and 97.47 (c) of the amateur rules.

Similarly, the station license of Edward M. Clavin, W5BOG, of Houston was revoked effective September 16 for failure to reply to official communications.

The operator license of Eric E. Palmer, WA3ECN was suspended for the remainder of the license term (i.e., until July 28, 1970) and the station license revoked effective August 26, 1968 by the Commission, who found the licensee to have retransmitted police signals and noise signals on 26.62 MHz., thereby causing malicious interference; and to have falsely stated in a reply to citations that he had no knowledge of the identity of the person who caused his radio equipment to be operated as stated. The incident had taken place on June 7, 1967.

The operator license of Sam A. Johnson, Jr., WA4MVY of Muscle Shoals, Alabama, was sus-

pending for six months effective August 30, 1968. He was found to have wilfully or maliciously interfered with communications between other amateur radio stations on the frequency 3857 kHz., in violation of Section 97.125 of the Commission's rules.

The operator license of Harvey Z. Ghesser, WB6ITF, of Los Angeles, California was suspended for six months effective September 11, 1968. The operator was found to have caused willful or malicious interference to other radio stations on February 7, 1968.

Other cases are pending, and will be reported here after time for appeal has passed.

### SS HOPE TRAFFIC OKAY

K6KA passes along the following letter from FCC: "Last February Ceylon advised us of its intent to permit third party traffic between an amateur radio station aboard the vessel *SS Hope* while located within its jurisdiction and amateur radio stations in the United States. Apparently, the ARRL was not advised of Ceylon's action . . . In February of this year, the Commission advised Ceylon that it had no objections to the exchange of third party traffic between an amateur radio station aboard the vessel *SS Hope* and amateur stations in the United States . . ." — James E. Barr, Chief, Safety and Special Radio Services Bureau, FCC.

Accordingly, messages may be exchanged with W7EOC/mobile Region 3. The *Hope* will return to the States about February 15 before heading out again.

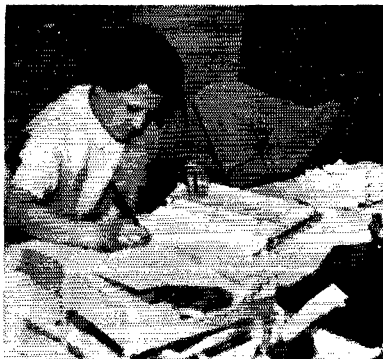


At the Greater Bay Area Hamfest in Milbrae, California, Pacific Division amateurs honored two of their number for exceptional service: Ney R. Landry, W6UDU, for his many years of close cooperation with the amateurs as an engineer in FCC's San Francisco office (now engineer-in-charge) and Forrest A. Bartlett, W6OWP, who has transmitted the ARRL code proficiency tests for the West Coast each month for more than twenty years, strictly as a volunteer using his own equipment. In the photo, W6UDU receives the ARRL Certificate of Merit from Pacific Division director J. A. Doc Gmelin, W6ZRJ (right). W6OWP couldn't be present, but received his Certificate later from vice director Don Eberlein, W6YHM.



## Behind the Diamond

Number 11 of a Series



In our Diamond showcase this month is a gem of a gal, Lillian M. Salter, W1ZJE, assistant communications manager for administration at League headquarters. Originally hired as a stenographer on May 12, 1930, Lil soon branched out into other administrative chores — recording of official station appointments made by section communications managers, issuance of supplies to the field organization, production and distribution of a bewildering array of forms and operating aids, handling of affiliated club records, supervision of SCM elections, and so on and on. Every month she faces the gigantic task of editing the Station Activities reports for *QST*, juggling a few lines over on one SCM with a few lines short somewhere

else, last minute arrivals or a sudden change in space available notwithstanding.

For more than twenty years, Lil was of amateur radio but not *in* it — until she joined W1YYM's lunchtime class and received her Novice license in 1953, and before long was a General. Landlord troubles and poor locations have kept her amateur activity at a minimum, but one of these days . . . !

Lil has both a tremendous recall of detail and a well-developed yet subtle sense of humor. The two have combined into a minor side hobby — her collection of office goofs, like letters which told of "Grandma's Rig" (should have been Grammer's, of course), the "conquered (Concord!) brass pounders," and "carrying out the duties of the Communications Department."

W1ZJE is a pianist, works in ceramics, does needlework, teaches Sunday School, draws and paints, and collects dolls. Every December the Communications Department is most attractively decorated for the holidays, thanks to Lil. Ham radio, of course, like any other job, has its headaches — and in a drawer labeled simply "Miscellaneous" Lil has the remedies for us — Excedrin, Empirin, Alka-Seltzer, Fizin and aspirin. Every November, when staff members get paper cuts counting ballots in director elections, Lil furnishes the bandages.

But even our gem has her limitations — one letter asked her to "send one each of your forms" — Lil threw up her hands on that one!

### VISITORS HAVE FULL BANDS

While no formal ruling has been issued, FCC does not intend to require any special license class of visitors operating here under reciprocal licensing arrangements. It would be nearly impossible to set up a table of equivalent licenses which would compare foreign licenses to those of the U.S. The question has been raised by holders of reciprocal permits concerned about the November 22, 1968, implementation of incentive licensing.

### "HERE COMES THE JUDGE"

We are pleased to report that Goodwin L. Dosland, W0TSN, past president of ARRL, has been appointed probate and juvenile judge for Clay County, Minnesota. Our hearty congratulations and best wishes to Judge Dosland!

### EXECUTIVE COMMITTEE MINUTES

No. 324 November 23, 1968

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at

the headquarters office of the League in Newington, Conn., at 9:40 a.m. November 23, 1968. Present: President Robert W. Denniston, W0DX, in the chair; First Vice President Wayland M. Groves, W5NW; Directors Charles G. Compton, W0BUO, Harry J. Dannals, W2TUK, Noel B. Eaton, VE3CJ, and Carl L. Smith, W4BVJ; and General Manager John Huntoon, W1LVQ. Also present were Directors Robert York Chapman, W1QV, and Gilbert L. Crossley, W3YA.

On motion of Mr. Groves, affiliation was unanimously GRANTED to the following societies: Airborne Instruments Laboratory Amateur Radio Club, Deer Park, N. Y.; Comstat Amateur Radio Club, Washington, D. C.; Goldfield Radio Club, Goldfield, Iowa; The John F. Kennedy Senior High School Electronics Club, Sacramento, Calif.; Morris Area Amateur Radio Club, Morris, Ill.; Science Explorer Post 288 Radio League of Chaminade Preparatory (H. S.), Canoga Park, Calif.; Texas Southmost Amateur Radio Club, Inc., Brownsville, Texas; Vandalia-Butler MARS Amateur Radio Club, Dayton, Ohio; Wekearny Ham Operators Club, Jersey City, N. J.

On motion of Mr. Dannals, unanimously VOTED to approve the holding of a New England Division



Bruce Kelley, W2ICE, of the Antique Wireless Association receives a special citation for his outstanding work in preserving and recording the physical history of amateur radio; ARRL Atlantic Director Gilbert L. Crossley, W3YA, (left) "does the honors."

Convention in Swampscott, Mass., on May 24-25, 1969.

On motion of Mr. Compton, the following applicants were unanimously GRANTED Life Membership:

Wayne E. Brenner, K3UON, Arthur F. DeBruycker, W2YGW, Michael J. Dienes, WA3BNII, Monte O. George, W6CIL, Kenneth V. Hardman, W2DV, Vincent Hook, W7JAN, Lloyd G. Hustler, VE3DNZ, William C. Johnson, W9BUQ, David W. Langley,

W4YDY/K4IWJ, John C. Magly, K8PQZ, Norman L. Parker, W8NKK, Richard E. Peterson, W1WAJ, Raymond C. Petit, W7GHM, Leonard A. Petrus, K5GMG, William D. Rourke, III, W7ERH.

On motion of Mr. Eaton, unanimously VOTED to cast the League's vote in favor of admission to IARU membership of the Vereniging van Radio-amateurs in Suriname and the Mauritius Amateur Radio Society.

The President reported receipt at IARU Hq. of an invitation from the Region I IARU Executive Committee to send observers to the conference in Brussels next May 5-9, and his acceptance as IARU President.

The Committee discussed areas of activity where amateurs perform outstanding public service but which might be affected by potential commercial overtones, and requested the General Manager and General Counsel to confer with the Federal Communications Commission staff on this subject.

On motion of Mr. Huntoon, unanimously VOTED to provide a supplementary allotment of \$500 for projected additional expenses of the Public Relations Committee.

The President announced the appointment of Directors Eaton and Crossley as a committee to undertake the study tasks of Minutes 22 and 25 of the 1968 Board meeting, relating to the field organization and the affiliation of nets. He also announced the appointment of Board and staff liaison members for the new advisory committees — Director John Griggs, W6KW, and VHF Editor Edward P. Tilton, W1HDQ, for the VHF Advisory Committee; and Director Victor C. Clark, W4KFC, and Deputy Communications Manager Ellen White, W1YYM, for the Contest Advisory Committee.

Without formal action, the Committee also discussed "commercial" traffic in the amateur bands, DXCC, advisory committees, election campaign procedures, and QST advertising policy, during the course of which there was a recess for luncheon from 11:40 a.m. to 12:15 p.m.

There being no further business, the Committee adjourned, at 3:45 p.m.

JOHN HUNTOON, W1VQ  
Secretary

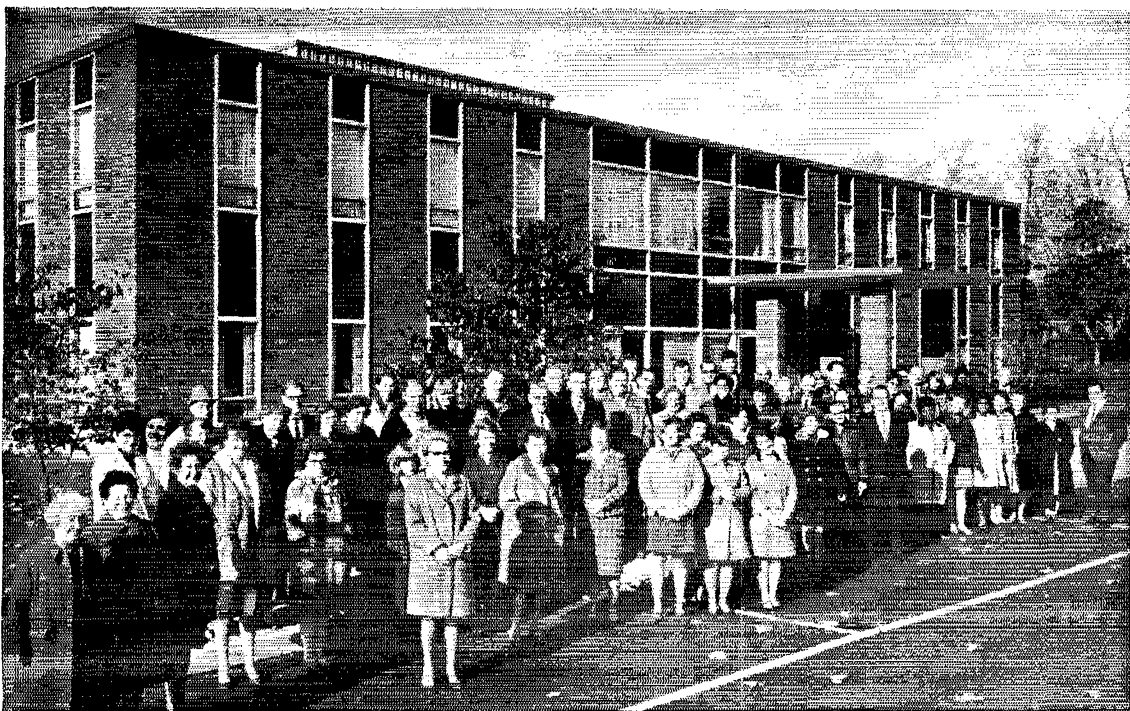
## WHO THE DEVIL IS WHO?

*Ninth in a Series of Call Conversion Charts*

Here are additional calls of amateurs taking advantage of new rules which allow Extra Class licensees licensed 25 years ago or longer to acquire two-letter calls. If you should be listed here, let us know by post card right away.

<i>Now</i>	<i>Was</i>	<i>Now</i>	<i>Was</i>	<i>Now</i>	<i>Was</i>	<i>Now</i>	<i>Was</i>
W1KL	W1JNM	K4JC	W4RBZ	W6FW	K6HZU	W9BV	K9HBX
W2BT	W2VFP	K4JE	K4RAP	K6IV	W6ZER	W9CJ	W9ALV
W2BU	W2SHZ	K4JH	W4RVL	W6JT	W6GQP	W9DU	W9SEM
W2KX	W2CZQ	K4JM	W4BZE	K6KH	W6GTR	W9EQ	W9DJE
W2OS	K2IWN	W4MV	K4MOD	W6WD	W6BGX	W9EW	W4DRV
W2VT	W2TFH	W4RV	W4DAK	W7HT	K7KLP	W9EY	W9JN
W3DD	W3DOE	W5DR	W5AIUJ	W7IK	W7NRI	W9OU	W9SFM
W3OE	K3VIM	W5GP	W5FRE	W7KD	KH6KS	W9BT	W9CWR
W3RH	W3RVX	W5HN	W5AJG	W8CT	W8QNW	W9CK	W9BSZ
W3SN	W3KNQ	W5HT	W5DMR	W8FB	W8HSW	W9GP	W9JUT
W3TV	K3VZP	W5IN	W5DWR	W8FF	W8BUM	W9GY	W9NLH
W3TV	W3VKD	K6AH	W6DHY	W8GL	W8FCV	W9ID	W9OAO
W3UC	W3DHG	K6CH	W6SRF	W8HN	W8FKK	W9IQ	W9PEV
W3UD	W4JFI	K6EL	W6AHC	W9BA	W9SJP		
K4LY	W4JSS	W6FG	W6YRT	W9BS	W9APJ		

# Best Wishes of the Season . . .



. . . from the ARRL/QST Hq. Crew

## ARRL QSL Bureau

The function of the ARRL QSL Bureau System is to facilitate delivery to amateurs in the United States, its possessions and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below:

W1, K1, WA1, WN1<sup>1</sup>—Hampden County Radio Association, Box 216 Forest Park Station, Springfield, Massachusetts 01108.  
W2, K2, WA2, WB2, WN2—North Jersey DX Assn., P.O. Box 505 Ridgewood, New Jersey 07451.  
W3, K3, WA3, WN3—Jesse Bieberman, W3KT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.  
W4, K4—H. L. Farrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.  
WA4, WB4, WN4<sup>1</sup>—J. R. Baker, W4LR, 1402 Orange St., Melbourne Beach, Florida 32951.  
W5, K5, WA5, WN5—Hurley O. Saxon, K5QVH, P.O. Box 9915, El Paso, Texas 79989.  
W6, K6, WA6, WB6, WN6—San Diego DX Club, Box 6029, San Diego, California 92106.  
W7, K7, WA7, WN7—Willamette Valley DX Club, Inc., P.P. Box 555, Portland, Oregon 97207.  
W8, K8, WA8, WN8—Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.  
W9, K9, WA9, WN9—Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60216.

W0, K0, WA0, WN0—Alva Smith, W0DMA, 238 East Main St., Caledonia, Minnesota 55921.  
KP4—Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, P.R. 00902.  
KZ5—Gloria M. Spears, KZ5GS, Box 407, Balboa, Canal Zone.  
KH6, WH6—John H. Oka, KH6DQ, P.O. Box 101, Alea, Oahu, Hawaii 96701.  
KL7, WL7—Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.  
VE1—L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.  
VE2—John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.  
VE3—R. H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.  
VE4—D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.  
VE5—A. Lloyd Jones, VE5JI, 2328 Grant Rd., Regina, Saskatchewan.  
VE6—Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.  
VE7—H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.  
VE8—George T. Kondo, VE8 ARRL QSL Bureau of Department of Transport, Norman Wells, N.W.T.  
VO1—Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.  
VO2—Goose Bay Amateur Radio Club, P.O. Box 232 Goose Bay, Labrador.  
SWL—Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

<sup>1</sup> These bureaus prefer 5 X 8 inch or #50 manila envelopes.

# I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

## FREQUENCY MANAGEMENT SEMINAR

Biennially the International Frequency Registration Board of the International Telecommunication Union<sup>1</sup> holds a frequency management seminar at its headquarters in Geneva, Switzerland. This seminar is aimed at assisting administrations, particularly in the developing countries, to more efficiently manage their use of the radio frequency spectrum. The seminars last for two weeks, and include lectures by members of the ITU staff and by distinguished experts from other countries. Traditionally, two evening receptions are held, in order to permit the delegates to become better acquainted on a personal basis. One of these receptions is sponsored by the Secretary General of the ITU, the other by the International Amateur Radio Club (IARU).

The Frequency Management Seminar provides a good opportunity for representatives of the amateur radio service to meet with telecommunications delegates from other countries and extol the virtues of amateur radio. Thus, again this year, WIIKE of ARRL Hq., representing the International Amateur Radio Union, was present at the seminar, "selling" amateur radio to those delegates who might not have had much prior knowledge of the subject.

Some 70 delegates from 28 countries were present, including seven amateurs: EA5EJ, HK3HQ, LA5TA, PZ1AH, WIIKE, W3TGF, and 9G1DX.

<sup>1</sup> Specialized United Nations agency dealing with frequency allocations.

## INDONESIA — BAN LIFTED

As reported by a special WIAW bulletin during November, the ban on radiocommunications by its amateurs with other amateurs throughout the world was lifted by the Indonesian government during the early part of November. The subject had been under discussion for several months, without a suitable notice having been filed with the International Telecommunication Union. During a visit to ITU headquarters in November, WIIKE of ARRL Headquarters was able to assist a representative of the Indonesian government prepare a communication which was acceptable to both the Indonesian government and the ITU, and which resulted in immediate notification by the ITU to member administrations that Indonesia no longer objected to communications between its amateurs and those of other countries. Actually, the first official notification of the lifting of the ban was contained in a letter from ITU to IARU headquarters.

## RECIPROCAL NOTES

Canada and Norway have entered into a reciprocal operating agreement. Canada now has 12 such agreements with other countries.

The *Deutscher Amateur Radio Club* indicates that special short term licenses are available to foreign radio amateurs for journeys, holidays or visits. They are available only for a three-month period to nationals of countries with which Germany has reciprocal operating agreements. Application should be sent at least six weeks in advance to *DARC*, Muehlenweg 27, 5601 Doenberg, Germany and must include the following information: (1) Nationality of applicant, (2) christian name and surname, (3) date and place of birth, (4) home address, (5) home call sign, (6) name of applicant's radio society, (7) copy of home license indicating class, date of issue, and term, (8) three-month period for which license is requested, (9) address to which license should be sent, (10) residence in Germany or type of vehicle or registration number in case of mobile operation, and (11) declaration that DM 14 fee has been sent by post-cheque to *DARC*. Further details are available from IARU headquarters.

These seven amateurs were participants in the 1968 Frequency Management Seminar at International Telecommunications Union headquarters: (l. to r.) PZ1AH, 9G1DX, W3TGF, EA5EJ, LA5TA, HK3HQ, and WIIKE.



## WORKED ALL ALLIANCE NATIONS

A new award for working all member nations of the Alliance for Progress has been announced by the Organization of American States Association, a private non-profit group which promotes support of the Organization of American States.

The certificate, called the "WAAN" (Worked All Alliance Nations) award will be granted for two-way contacts since March 17, 1961 with Argentina, Bolivia, Brazil, Chile, Columbia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, United States, Uruguay, and Venezuela, and since March 17, 1967 with Trinidad and Tobago, and November 15, 1967 with Barbados.

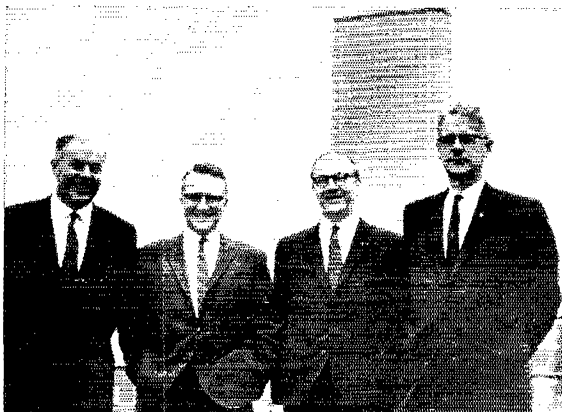
To qualify, amateurs must send a list of stations worked, including name of Alliance nation, call, date, band, mode and time to the OAS Association headquarters, 19th and Constitution Avenues, N.W., Washington, D.C. 20006. **QST**



In early November the *Deutscher Amateur Radio Club*, (German IARU society) held one of its two annual meetings, this one at the Bundespost training school in Kleinheubach near Frankfurt. Left to right are DL1JH, elected moderator of the meeting; DL3NE, first chairman of DARC; DL1QK (standing), president of DARC; and (back to the camera) DL1JB, office manager of DARC. WI1KE of ARRL/IARU Hq. was a guest and gave a short talk on ARRL's DARE program. This meeting was also an excellent opportunity for WI1KE and DARC officers to share viewpoints on many of our common problems. Photo by DJ7GS.



At the *Deutscher Amateur Radio Club* fall meeting in Kleinheubach we see DL1FL and DJ1BZ well armed with documents as they prepare for another all-day session.



This rooftop has been the locale for many a photograph, but no more. It's on top of former RSGB headquarters at 28 Little Russell St., London. The headquarters of the *Radio Society of Great Britain* is now located at 35 Doughty Street, London, WC1 — the move having taken place Nov. 2, 1968. Gathered here, in the customary left to right, are Roy Stevens, G2BVN, RSGB Council member; Dick Baldwin, WI1KE, ARRL Assistant General Manager; Eric Dowdeswell, G4AR, RSGB General Manager; and Noel Eaton, VE3CJ, ARRL Canadian Division Director.

### ARE YOU LICENSED?

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



# Correspondence From Members -

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

## NOVEMBER *QST* PAGE 64A

☐ Many thanks for the "tear-out" page of the November *QST* which has the amateur band allocations. I have spoken to several others on the bands who like this "page tear-out" business, and suggest that you go all out for this in future issues of *QST*. Such things as DXCC lists could be published this way and you wouldn't have to spend the extra postage sending them when requested. — *Norm Penney, W4EMP, Langley AFB, Va.*

## VISITORS WELCOME

☐ A grand thank you for the splendid welcome and hospitality on our visit to the ARRL last week end. It was a 625 mile drive — one way, but worth every mile of it. I was not at all surprised when I found a bunch of young, vigorous, dedicated folks representing and fighting for all of hamdom, members or not. If one doubts the sincerity of ARRL, just go down and look it over. Anyone would be surprised and I for one am proud to have such an organization representing me and I am now more convinced than ever before that without ARRL there would be no amateur radio today. — *James L. Russell, W8BU, Cleveland, Ohio.*

## MINIMUM POWER

☐ I would like to suggest that *QST* and the ARRL (which I regard highly and hold membership in) initiate a campaign of a subtle and positive nature to encourage the use of the minimum power necessary for communications. Hopefully, too, a campaign to encourage maximum courtesy and to de-emphasize the current "closed shop" attitude which seems to be so prevalent these days. No one really has exclusive use of certain frequencies though it seems that many seem to hold that idea. — *Kodney C. Smith, WB4JGY, Pensacola, Fla.*

☐ Now that you have created another class in the ham bands with incentive licensing we have now two classes — the incentive class, and the snob class with their kilowatts. While the incentive class is at least fair because it depends on knowledge and skill, the snob class depends on dollars.

So I will propose soon to the FCC to do away with the snob class by limiting power to 25 watts e.w. and 50 watts a.m. — *Arthur Mobbs, K2KDS, Dumont, N.J.*

## BUILDING OR EXPERIMENTING?

☐ The picture and description of events on page 99 Nov. '68 is as insulting to the dedicated v.h.f./u.h.f. experimenters, as those gorgeous h.f. installations of Whoosis Line and rotating rhombics that were bought with dollars rather than sweat are to their counterparts.

Here is where the distinction between amateur radio and professionally engineered communications systems begins. — *James H. Grigg, W2BK, Chicago, Ill.*

## CHALLENGE

☐ After over 20 years in amateur radio, and with the idea firmly entrenched in my mind that "I knew it all," I was deeply humiliated at the idea of the incentive licensing program, and that I would have to take two steps up the ladder, as I didn't need it. Knowing that it was either do or don't, I went for my examination 30 days ago. Guess what? I suddenly found out just how little I really knew. I failed the Extra Class code examination and the Advanced Class theory examination. This proved to me without a shadow of a doubt that the ARRL was right and there is a definite need for upgrading amateur radio as a whole. I was stuck in a rut and didn't know it. Thirty days later I again went for my Extra Class license after some intensive study. I am proud to say that I passed both the Advanced Class and the Extra Class exams at one sitting. This gave me a real lift and I am now studying for my first class commercial license.

I am truly grateful to the ARRL for promoting this idea. I encourage all amateurs, young and old, to dig in and get that Extra Class ticket. — *R. K. Wildman, W6MOG, San Diego, Calif.*

☐ I am glad to send my annual \$6.50 membership dues to ARRL. The League's help has meant much to me in making enjoyment of amateur radio possible. I was a member for two years before getting my WN5FFII Novice ticket in 1962 with the encouragement of K5MDT and K7ICV. In 1964, I passed my Technician examination and was issued my present call. By using WIAW code practice regularly after deciding to raise my performance, the General examination was passed in 1967 with a compliment from the examiner on the good code sending for a Technician licensee. Continued study, experimentation, and League publications made Advanced Class possible in 1968. Next? It will not be easy, but I intend to try!

Incentive licensing in amateur radio is good for the ham ranks and for our national preparedness. I cannot agree with those who would reduce requirements while electronic technology is increasing so greatly. — *Alan E. Van Antwerp, W1SLKV, Big Rapids, Mich.*

☐ Much has been said about the problem of apathy among hams and several solutions have been proposed. I would like to suggest another: Get yourself a higher class license.

This is what preparing for and passing the Extra Class exam did for me:

It stimulated my desire to obtain a code proficiency certificate for 25 w.p.m. or higher.

It reawakened my interest in learning more theory, particularly solid-state techniques, which I had let pass me by.

It got me on the air more often. One byproduct of that is that I'm now ready to apply for another DXCC endorsement, something I hadn't done for several years.

There's a good word to describe all of this—*serendipity*, meaning “the gift of finding valuable or agreeable things not sought for.” So not only are there very worthwhile advantages attached to the higher class license itself, but the fringe benefits aren't bad either! — *Theodore M. Hannah, K3CUI, Silver Spring, Md.*

### STOLEN SWAN RECOVERED

☞ Thank you for publishing a notice about my stolen Swan 350 transceiver serial number 685559.

On October 29, a pawn shop operator in Bridgeport, Connecticut notified the police that the above described transceiver had come into his shop. The thief was apprehended and the rig was recovered.

Thank you very much for your cooperation in listing this piece of equipment. — *F. F. Willingham, W4AEWC, Winston-Salem, N.C.*

### OPINION POLLS

☞ Our organization may have its faults and problems. However, I would like to say that recent opinion polls taken by the League concerning ARRL station appointments and policies indicate our League is not a stagnant, backward fraternity as some people may think. On the contrary, to me it indicates the staff at headquarters is tapping the members for new ideas and policies. I believe this to be a sign of progressiveness and a desire to change to meet the demands of the times. This will make the ARRL even better. Keep up the commendable work. — *John Williamson, W47IFD, Scottsdale, Ariz.*

### RM 1287

☞ Being an active dyed-in-the-wool Technician Class amateur with no great prospects of moving up, I was most heartened by your submission of RM 1287 to the FCC for reconsideration of 6-meter band restrictions. Whether yea or nay comes of it, your arguments show a very lucid understanding of the situation. Let's hope that the FCC gets the message. — *Ed Lar, K5MUH, Dallas, Texas.*

☞ Congratulations on at least giving the Technician grade ham a fighting chance. Just read your petition to the FCC for 6 meters. As a Technician who just hasn't found the time to obtain a higher class license, may I say that the few hours a month that I can operate I have met some of the country's greatest people. I read with shock in your letters column we Technicians are called a glorified CB lot. Please keep up the request to the FCC for a place on 6 that can still be used for the betterment of ham radio. — *Louis Van Roy, W2B2QJQ, Lebanon, N.J.*

[EDITOR'S NOTE: For details see November 1968 *QST*, page 64.]

### NEW WIAW FREQUENCIES

☞ Establishing WIAW bulletin and code practice frequencies 20 kHz. inside sub-bands is a step in the right direction. However, I think it would be better to use the exact frequencies dividing Extra from General on c.w. and Advanced from General on phone, e.g. 3525 kHz. and 3850 kHz. It is likely that there will be the least amount of operating by the facing classes on these exact frequencies and WIAW, with reasonable frequency tolerance, could serve as a benchmark for sub-band division. — *James A. Gundry, W8BW, Dearborn Heights, Mich.*

☞ I feel that the frequency change was a logical move in that it provides an easy way to locate WIAW regardless of which band you are on. Hats off to whoever came up with the idea! — *Chuck Hewitt, W4TPA, Indianapolis, Ind.*

☞ It is my opinion that by this arbitrary move to the new frequencies in the c.w. bands, you have placed many of us who hold the Extra Class license in a most uncomfortable position. There will no doubt be a rash of correspondence directed to the League protesting against the lack of courtesy displayed by the Extra Class operators in causing unnecessary interference to the code-practice sessions, when in fact the interference will be largely the fault of the receivers at the point of reception in lack of selectivity, etc. One solution would be for all Extra Class operators to forego operation within 5 kHz. either side of WIAW during its transmissions, but this would severely infringe on the privileges and nominal rights granted to the amateur who has attained his Extra status. Naturally, restricting (even by “gentleman's agreement”) the Extra Class segment to the first 15 kHz. of the band during WIAW transmissions is ridiculous, even for the sake of uncluttered code practice for some persons; but I think it is no more ridiculous than some of the letters of protest that are sure to be directed to the League complaining of the aforementioned “discourtesy/unnecessary QRM” on the part of the Extra Class operators when 22 November has rolled around and the restricted segments are officially implemented.

In view of the foregoing; does it seem quite fair for those of us who have made efforts to keep in step with the “state of the art” and have secured our Extra Class licenses to be exposed to undeserved scorn and ridicule under the above circumstances? Doesn't a situation of this sort make for an illogical and one-sided turn of events that can only cause more heated feeling of a “class-distinction” beyond that which is implicit in the fact that an amateur operator must necessarily prove an advanced knowledgeability of modern techniques and code proficiency in order to attain his standing as an Extra Class operator? — *Robert L. Shea, W1HV, New Haven, Conn.*

☞ What of the poor fellows with broad-selectivity receivers — say 6 to 10 kHz. bandpass — who are trying to copy WIAW through the many QSOs on either side? Extra-Class operators generally have rather sophisticated gear, with the know-how to use it. We got our Extra Class licenses in order to have a segment free of inexperienced operators and other unnecessary operations. We have learned to operate with other stations very close by. Why, then, should we give up 6 to 10 kHz. of a 25-kHz. segment so that others can copy 5-w.p.m. code practice? This just doesn't make sense! Yet, when WIAW is QRMD by the closely operating Extra Class, who will be the villains to the fellow trying to copy WIAW? — *P. H. Martin, W3DI, Tallmadge, Ohio.*

### '68 HANDBOOKS — GONE

☞ Boy, you guys really take the cake. Force us to take a new exam and then don't print enough copies of the *Handbook*. — *B. E. Crumrine, Jr., K3JFV, Media, Pa.*

[EDITOR'S NOTE: *Handbooks* have been available up until the last few weeks; sorry, we can't always guess closely as to how many we should print. Even with a larger press run in 1968, the copies moved faster than expected.] QST

# The World Above 50 Mc.

30-M 144-148 220-225 310-315  
 1215-1500 2300-2450 3300-3700 5650-5925 10,000-10,500 21,000-22,000 50,000-9

CONDUCTED BY BILL SMITH,\* WB4HIP

## 1296 E.m.e. Notes

I HAVE a suspicion that 1969 will be a banner year for accomplishment. The exotic means of communication are headed toward further exploration, with moonbounce (e.m.e.) leading the field. The number of successful e.m.e. operators on 144-MHz. is mounting, and I know of several others working quietly on the West Coast. They will make their first e.m.e. contact this year. 432 will receive some attention, but the pioneering will come on 1296 and 2300 MHz. There are several working 1296-MHz. e.m.e. systems in this country, including K4QIF, K6HCP, and WB6IOM, and two or three in Europe. 2300 MHz. is another story, but I know of at least two fellows who are making advances towards the first-ever 2300-MHz. e.m.e. contact. I'm betting on them before the end of '69.

Obviously, equipment parameters present more complex problems on these u.h.f. bands than on 144 or 432. Certainly higher gain can be realized with dishes of smaller over-all physical size, but r.f. losses and other problems overcome the apparent advantages.

Peter Laakmann, WB6IOM, has done considerable work refining his 1296 system. He receives echoes with a 10-foot dish and has worked W2NFA. WB6IOM, who authored articles on 1296-MHz. amplifiers in January, 1968, *QST* and August, 1968, *Ham Radio*, offers some suggestions to the would-be 1296 moonbouncer.

He receives his echoes, both on a paper recorder and integrator, and by ear through a 2-kHz. maximally-flat mechanical filter and earphones. The audible echoes peak about 6 db. above audible threshold, using a 10-foot dish having a gain of approximately 29 db. WB6IOM says power output, a low-noise receiver, a good feed system and an accurate dish are the important ingredients. Peter says he is quite satisfied with an *el-az* (elevation and azimuth) mount and computer tracking information for aiming his dish. The antenna's beamwidth is only 5 degrees, and being only 1 degree off can cost almost 2 db. over the e.m.e. path. He says it is difficult to achieve aiming accuracy with a motor driven polar mount.

From the work WB6IOM has done on 1296 he finds the following to be the most common pitfalls:

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

**Dish Accuracy:** An often-heard number is plus or minus 1/10 wavelength. This refers to keeping the wavefront in phase over the aperture, not to insignificant gain loss. Dish gain with that much error, if it extends over large portions of the dish, may be down 3 db. If the dish is accurate to plus or minus 1/20 wavelength you may still be one db. down, depending on the type of error. A dish that is down 3 db. in gain acts like one of half the area, and causes a 6 db. reduction in echo strength.

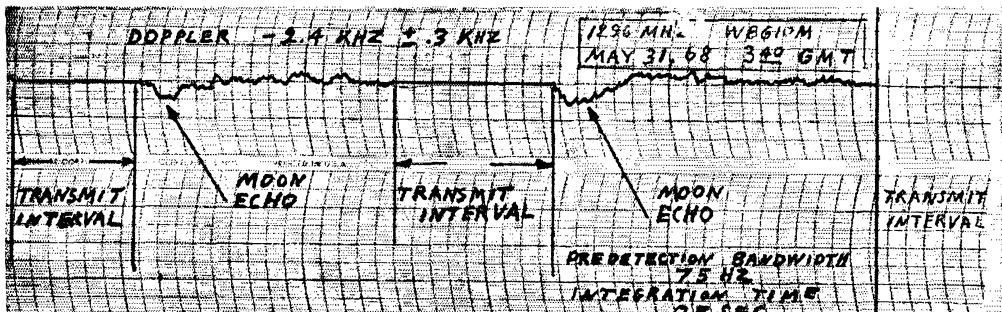
**Dish F/D Ratio:** A good ratio is between 0.35 and 0.60 for simple feeds. Dishes of 0.25 F/D are quite common on the surplus market (focal point in the plane of the dish). There is no way of feeding these dishes for aperture efficiencies of more than 30%, which means they perform like a dish of half the area.

**Feeds:** A feed should have a symmetrical pattern, and provide about a 10-db. edge taper (reduction in edge illumination) for maximum gain with simple feeds. If it is a circularly-polarized feed, the axial ratio must be as near unity as



Peter Laakmann, WB6IOM, and his 1296-MHz. final, capable of 500 watts output. Note the parametric amplifier on top the rack.





This stripchart recording clearly shows 1296-MHz. moon echoes received by WB6IOM using linear polarization, 500 watts into a 29-db. 10-foot dish and parametric amplifier for receiving.

possible at any point of the dish. Dipoles, crossed dipoles or helix antennas do not meet these requirements. The best feed is a circular waveguide made from a 6-inch coffee can. For linear polarization a monopole 4 inches from the back surface will give a good match. For circular polarization use two at 90 degrees with a  $\frac{3}{4}$  wavelength (electrical) coax between them on the inside of the can. Both monopoles can be supported on N fittings. The length of the monopoles should be trimmed for good match and good axial ratio.

**Power:** Don't trust any power meter; most read too high. For a quick check, 500 watts output will melt RG-8 and 9 quickly. The same size Teflon cable will handle the power and after 10 minutes will be so hot you can not touch it. 10 watts will feel warm in RG-8 and will melt RG-58. Teflon cable of the same size will be too hot to touch. For better accuracy, use a water load with cable as a heater and a thermometer. The only way to get power on 1296 is with plenty drive and a lot of d.c. Most tubes have less than 6 db. power gain at full output.

**Receivers:** A parametric amplifier is best if the pump frequency is at X-band, and you have a diode good to at least 100 GHz. An isolator is very desirable for stability and bandwidth. I have seen parametric amplifiers with good noise figures, but with a 20-kHz. bandwidth they broaden radar pulses to the point where the noise clipper can not work. There are some good circulators on the market for under \$100 such as the MELABS. However, some of the better transistor r.f. amplifiers may perform as well at the feed as a paramp in the shack.

**Feedline:** Feedline loss is very difficult to reduce, and it degrades a system in three ways: (1) reduces the transmitted power, (2) reduces the received power by the same amount, and (3) increases the antenna noise temperature. One db. of feedline loss may cause a 4-db. reduction in echo S/N ratio, depending on the noise temperature of the antenna and paramp. I found that the  $\frac{3}{8}$ -inch air line, pressurized with dry nitrogen, is superior to  $1\frac{1}{4}$  inch Heliax. With all the flexible jumpers, connectors, t.r. switches and 20 feet of air line, I have a 1-db. loss. The best

way to measure this loss is with a dual directional coupler, bolometer, or by simply opening the far end and measuring the ratio of forward to reflected power. Since the wave travels both ways, loss is half of the measured amount.

Thanks to WB6IOM for sharing his observations.

For further e.m.e. system requirements, read the three-part series by K6MYC in the January, February, and March, 1968 column.

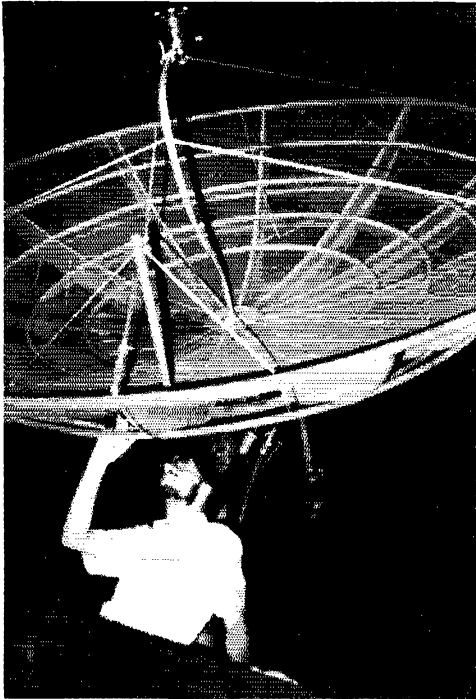
#### These Boxes

Here again this month are the states-worked boxes because there have been so many additions. There are a few stations who have incomplete listings such as the mileage of the best DX worked. When you request a listing, I'd appreciate your complete totals including a contact list. Remember *only* U.S. states count for states worked, but distance is independent of the country. Please check your listing, and if it is inaccurate let me know. Anyone not listed who wishes to be?

#### OVS and Operating News

50-MHz. band conditions have disappointed DXers since early November. On the first, a solar flare erupted, and by late in the month conditions had yet to recover. Several days in late October the east-west m.u.f. neared 50 MHz. causing optimism that the path would open, but the magnetic disturbance interfered. Not only is that path now nil, but KV4FU reported in late November that TE to South America was on a slow but steady decline. The one bright spot in November was the 3rd when KV4FU worked three continents in 75 minutes: PY7CN, Brazil, at 1505 GMT, ZB2BO, Gibraltar, at 1530, and ZS3E, Southwest Africa, at 1620. The contact with ZB2BO came during a series of schedules the two stations had been keeping for several weeks. W3KWH reports K9HMB, Chicago, worked CX1AAX, Uruguay, on November 4th.

These contacts, immediately following a major magnetic storm, are normal, but the failure of the m.u.f. to rebound supports the belief of some that Cycle 20 peaked in mid-summer, 1968.



WB6IOM visually aiming his 10-foot dish at the moon through a boresight. The dish is el-az mounted, and computer readouts are used for aiming on cloudy days.

Close watch was kept in late November for the possible 27-day cycle recurrence of the November 1 solar activity and associated *F-layer* surge, but nothing was noted. The solar flare also caused widespread aurora the first several evenings of November. One-thousand mile paths were covered between the midwest and east coast on 50 MHz. At Sitka, Alaska, KL7GLL reports aurora the night of November 1 allowed him to work VE6OH, and an even dozen stations in Washington.

Even though conditions do not appear encouraging at this writing, there is still the possibility of a few openings such as on New Year's Day, 1969. North-south *TE* paths should improve during the spring. Don't give up yet! Solar cycles have had secondary peaks as long as three years after the initial high surge.

Now for DX notes. VE3EVW is vacationing on Montserrat, in the Caribbean, southeast of Puerto Rico, signing VP2MJ. He says he'll be there until sometime in April, running s.s.b. and c.w. near 50.10. Another new one is ZD8NK, Ascension Island who worked W2UTH, Victor, N.Y., at 1015 EST Dec. 1. ZD8NK has a SB-110, s.s.b. and c.w. near 50.10. And there is now a station in the Dominican Republic active, also s.s.b. and c.w. HI8XDS has a 5894 feeding 6 elements and says he is building a kw. amplifier. HI8XDS reports working several South Americans on *TE* including CX7AG and LU7EN. He caught his first *E<sub>s</sub>* Nov. 27, working several

stations in the Miami area. It is a shame that more Caribbean stations can not be encouraged to try 50 MHz. Propagation conditions to and from that area are generally excellent.

In the Pacific, KH6EQF operates a 24-hour beacon on 50.098 beamed toward the mainland. ZK1AA, Cook Island, remains active just above 52 MHz., but tunes 50 MHz., and 5W1AR is reported active on Samoa. VK4RO, Australia, tells W3KWH of excellent summer (Southern Hemisphere) *Es*, but little in the way of *F-layer* DX. ZB2BO says he and ZB2BC, both active near 50.10, have worked Rhodesians ZE1AN, ZE1JJ and ZE7JX, and ZS3E. ZB2BC says ZS3B, ZS4SA, ZS4UH, ZS6NM and a number of ZS1s are active, as well as beacon stations ZS1VHF, 50.10 and ZE1AZI, 50.04.

Sporadic *E* openings were infrequent during this reporting period. There was, however, one excellent three-hour opening November 22nd along the Atlantic seaboard and as far inland as Pittsburgh.

A fine Northeast to Middle-West opening came the night of Dec. 1. Surely there will have been several good *Es* openings in late December and extending into January, during the peak of the annual minor *Es* season. This period might offer South American DX to stations in the northern states through the not-too-common *Es* to *TE* link. Evening *Es* openings over more-or-less north-south paths would bear close attention, for South American signals.

144-MHz. meteor scatter fans found the November Leonids once again very productive, but a little late in arriving. The shower peaked the morning of the 17th between 8 and 11 a.m., EST. While not as good as the 1966 Leonids, this year's

### 220-and 420-MHz. STANDINGS

<i>220 MHz.</i>			K9YCO... 8	6	550
W1HDQ... 13	5	450	W2SEU... 6	4	220
K1JX... 11	4	600	W3RUE... 14	7	585
K1BFA... 8	3	225	W3UJG... 9	4	400
			K3IUV... 9	4	310
K2CBA... 17	5	1090	W4FJ... 17	7	940
W2SEU... 12	5	325	K4GIF... 14	6	1065
K2RTH... 11	3	300	K4EJQ... 12	5	550
W2CRS... 8	3	200	K4NTD... 8	2	835
K2DNR... 7	3	175	W4VHH... 4	—	450
W3UJG... 14	5	460	W5RCL... 19	6	880
W3RUE... 10	5	480	W5ORH... 11	4	700
K3IUV... 10	4	310	W5AJG... 7	3	1010
K4IXC... 3	2	1090	W5UKQ... 6	2	590
W5RCL... 9	4	700	W5AWK... 3	2	222
W5AJG... 3	2	1050	W6DQJ... 4	2	360
W6WSQ... 4	4	945	K7ICW... 4	2	225
K7ICW... 4	2	250	W7JRG... 2	2	420
W8PT... 11	6	660	W8PT... 13	7	715
W8EYE... 6	2	825	W8MNT... 13	7	600
VE3AIB... 7	4	450	K8DEO... 12	6	450
			W8HVX... 11	6	495
			W8RQI... 10	6	425
			W8PWF... 7	4	450
			W8VHG... 6	4	290
<i>420 MHz.</i>			W9HUV... 16	7	780
K1BFA... 10	4	470	W9AAG... 12	4	600
W1QVF... 10	5	400	K9AAJ... 12	5	425
K1JX... 10	4	385	W9NKT... 9	3	400
W1HDQ... 10	3	250	W9JY... 7	4	300
K9UYH... 13	6	718	W0DRL... 17	5	1065
W2BLV... 13	5	500	W0EYE... 5	2	425
K2ACQ... 12	8	880	VE2HW... 3	3	750
K2CBA... 12	6	2670	VE3ZC... 7	5	510
W2CLL... 12	6	693	VE3AIB... 5	4	450
K2YCO... 9	6	525			
W2ZEUS... 9	4	260			

shower was better than last year and produced numerous loud, long bursts and few pings. K0GJX, South Dakota, worked K2HLA, New York, on the 16th, making the contact on a full one-minute burst during the last minute of their hour-long schedule. On the 17th, K0GJX worked K1HTV, Connecticut, while K2HLA was working K0AWU at Grand Forks, North Dakota. By working both Dakotas, K2HLA brought his states worked total to 36.

W0LER, who is very active on 144 and 432 from Minneapolis, worked his 33rd, K1BKK in Vermont. And another Twin City station, W0LCN, worked W5RCI in Mississippi. K4IXC, Florida's primary m.s. representative, found the Leonids good enough to make two contacts by calling CQ. John worked W9VWY, Illinois, and W5UGO, Oklahoma, on CQs during the shower's peak. K4IXC also worked WA9UHB and K9QKB in Illinois, and W8IDT and W8IDU, both Michigan, on schedules the same morning. John says Technicians are missing a good opportunity for 2-meter DX by not trying meteor scatter. I'm sure John is right. Why not contact stations listed in the states worked boxes, and arrange schedules? M.s. will work as well at 145 MHz. as at 144. K4IXC suggests some of the old hands at m.s. are looking for new stations to work. John offers schedules to all comers, and has the patience to encourage would be m.s. buffs.

Orionid m.s. successes include K4GL, South Carolina, working W1AZK, New Hampshire, on a 90-second burst, Oct. 20. The same day K4GL heard a 30-second burst from W0DRL, Kansas, who was scheduling W6WSQ! K4GL now has an 80-element collinear 92 feet high. K2HLA worked Minnesota W0RLI on a loud 35-second burst, and K0GJX made his first m.s. contact by working VE3BPR, Ontario. W3KWH didn't make any contacts during the Orionids, but then he was scheduling such DX as K7VTM, Wyoming, and K7NII, Arizona. Gary heard the Wyoming station, and pings and two letters from K7NII, over an 1800-mile path! K7ICW kept schedules during the Orionids with VE7BQH at Vancouver, B.C. No contact was made, but they both noted under dense bursts which were unreadable. K7ICW says the bursts sounded like the background signal common to ionospheric scatter on 50 MHz. Such signals have previously been noted by W2AZL and others.

The November 1 aurora reported in the 50-MHz. section also produced outstanding 144-MHz. aurora signals. W3KWH, Pittsburgh, worked stations in all call areas except the sixth and seventh. His best DX was a 1006-mile contact with W5ORH in Oklahoma. Gary also worked from Iowa to Massachusetts on aurora the following night. W3BDP, Delaware, worked Indiana's W9BRN, plus numerous W1s and 2s. In Barrington, Illinois, WA9QZE noted the aurora with his SR-42A transceiver and S-element Yagi. He copied stations in seven states, and VE3ASO in Ontario.

## 2-METER STANDINGS

W1JSM...35	8	1400	K5TQP...27	7	1254
K1ABR...34	8	1478	W5MCC...23	8	1430
W1AZK...34	8	1412	K5PTK...17	5	1330
K1WHT...31	8	1300	W6DGO...17	4	1326
K1WHS...29	8	1300	W6WSQ...16	4	1390
K1HGG...29	8	1280	W6NILZ...15	5	2540
K1HTV...29	8	1301	W6HMS...11	4	1258
K1BKK...26	7	1275	K6JYO...11	4	1240
W1HDQ...24	7	1040	W7JRG...27	6	1320
W1VTV...22	8	1296	K7NII...24	5	1290
K1MTJ...20	7	1225	K7ICW...16	4	1246
K1JFX...18	6	800	W8P'T...41	9	1260
K1RJH...17	7	1450	W8IDU...27	8	1150
W2NLY...37	8	1390	W8TUF...24	8	1000
W2CXY...37	8	1360	KZBBS...22	8	675
W2ORI...37	8	1320	W8NOH...17	7	—
K2LLA...36	8	1305	WARVHG...13	6	465
W2BLV...36	8	1150	K9SGD...42	9	1300
W2AZL...36	8	1380	WA9DOT...41	9	1303
WA2FGK...33	8	1340	K9TUF...41	9	1150
K2RTH...31	8	1215	R9AAJ...40	9	1300
W2CRS...26	8	1270	W9AAG...37	9	1200
K2VCO...20	7	750	W9EYF...32	8	1050
W2FNB...20	6	915	W9PBP...32	8	820
K2DNR...19	6	1010	W9IFA...32	8	—
WA2PAW...19	6	1000	W0BFB...45	10	1350
W3RUE...36	8	1100	K0MGS...43	10	1590
W3KWH...35	8	1335	W0NKF...42	10	1326
W3GFP...32	8	1108	W0DQY...41	9	1300
K3CFA...25	8	1200	W0LFE...38	9	1040
W3BDP...23	8	1100	W0EYE...35	9	1380
K3OBU...21	7	930	W0ENC...33	9	1334
W3BH...20	8	1310	W0LER...33	9	1250
W3LHF...19	6	700	W0DRL...25	9	1295
W3TFA...17	7	1342	W0LCN...23	6	1000
W4HJQ...39	9	1150	FRDO...1	1	5100
W4WNI...38	9	1350	K1HUK...2	2	2540
W4HHC...38	9	1280	OHNL...1	1	5850
K4IXC...38	8	1403	YE1AUC...7	2	500
K4EJQ...37	8	1125	VE2HW...11	5	800
W4CKB...34	8	1325	VE2BGJ...9	4	600
W4EJ...34	8	1150	VE2FD...9	4	600
K4QIP...33	8	1225	VE2EJC...39	8	1285
W4VHL...33	8	1100	VE3AIR...29	8	1340
K4GL...31	8	—	VE3EVB...25	8	1100
W4AWS...29	8	1350	VE3ASO...21	7	850
W5CGO...42	10	1398	VE7BQH...3	2	1248
W5RCL...42	9	1289	VK3ATN...3	3	10417
K5WYZ...36	10	1450			
W5AJG...33	9	1360			
W5TKQ...29	8	1150			
W5EYV...27	10	1285			

The figures after each call refer to states, call areas and mileage of best DX. Revised May, 1968.

On the 2nd, VE3EVW worked his 25th state, W1DEO in Maine.

Two meters certainly dished out much interesting DX via tropo, m.s., aurora and moon-bounce during 1968.

220-MHz. m.s. worked during the November Leonids. W6WSQ, Covina, Calif., worked K5TQP, Albuquerque, N. Mex., W0EYE, Ward, Colo. (second m.s. QSO over this path on 220) and W7JRG, Billings, Mont., between 1300 and 1600 GMT, keeping one-hour skeds with each station. Signals peaked as high as 30 db. over the noise. Bursts from the latter two stations were up to 30 seconds duration, and K5TQP was heard for over a minute, at one time. Mel had not heard 220-MHz. bursts longer than 15 seconds previously. He feels that the Leonids may be the best bet for anyone interested in the bands above 144, because of the higher velocity of meteors in this November event.

W7JRG now has two states and two call areas on 220 — but no Montana and no W7! Ken had been using a 7-element Yagi, and it was with this antenna that he worked W0EYE initially, and had some results with W6WSQ. This has now been replaced with a 16-element collinear, with much-improved results. He worked W0EYE on the Nov. 1 aurora, and has now worked this path via aurora on 50, 144, 220 and 432.

K4IXC, Melbourne, Fla., is keeping 220 skeds with K1AGB, and is open for skeds with any well-equipped 220-MHz. station.

At Cambridge, Mass., K4GGI, operator at W1MX, caught good tropo conditions Oct. 14, 15 and 22. He added W3ARW, Pa., and W2JKI, N.Y., to their 220-MHz. list, now totalling 6 states.

430-MHz. DXers continue adding to their states totals. W0DRL, Kansas, reached 16 states when he worked W0EYE/0, Colorado, over a 330-mile path. And then Al added number 17 by working W0IT (formerly W0BJV) at Watertown, South Dakota. W0DRL made a relatively-rare 432 aurora contact during the excellent November 1 display, working W9WCD, Illinois, with S5 signals both ways. W0DRL also heard W0IT. In Illinois, WA9HUV climbed to 16 states by working WA2EMB, New York. There is a new leader in states worked from the 2nd call area: K2UYH has reached 13 states, 6 call areas, and a best DX of 718 miles, in just *two months*, from his new Cedar Grove, N.J. location! Al's 13th state was WA9HUV, worked the night of November 4, along with K9CNN, Illinois, and W8HVX, Michigan. The opening began after midnight and lasted until at least 3 a.m. Al got W2CLL out of bed in time for Bob to work the same stations, bringing his totals to 12 states. W2CLL may be better known to some as W7PUA. He may be contacted at RFD 1, Box 28R, Flanders, New Jersey 07836.

In Michigan, W8HVX's contact with K2UYH on November 11th accounted for his 11th state. W8HVX runs one kw. and uses a 32-element collinear. Also in Michigan, W8MNT has boosted his total to 13 states. He reports that W4VQA is active in Kentucky. He runs 50 watts, and accepts weekend schedules.

Tropo conditions in October and November proved the best of the year throughout the U.S.

In the Far West, K7ICW, Nevada, continues schedules with W6DQJ. On the opposite coast, K4IXC has an 88-element Tilton Yagi array completed and wants tropo and m.s. schedules.

1215 and Up. Activity reports aren't numerous, but there *are* some. W4HHK, Collierville, Tenn., is hard at work improving his 2300-MHz. system. After he installed Heliac in the flexible section of the line to his dish he started hearing solar noise on 2300. Reception has been consistently around 6 db above the receiver noise. The receiver has a crystal mixer with 144-MHz. output and a parametric amplifier with circulator. Tests have been made regularly with WA4HGN, just over 100 miles distant.

WA4HGN has a 2C51 oscillator-tripler, 64 to 192 MHz., 2C39 tripler, 2C39 doubler, 2C39 doubler and 2C39 amplifier, running straight-through on 2304 MHz., feeding a 30-inch dish with juice-can feed and 2-inch Heliac. In one-way tests (75-meter s.s.b. the other way) this produced no signals at W4HHK, so on Nov. 22, Billy took the whole works up to Pilot Knob, near Camden, Tenn. The 2304-Mc. signal came over the 115-mile path immediately, but was too

chirpy at first to be read in Paul's 3-kHz. pass-band. Adjustments stabilized the oscillator enough to make the signal readable, and tests were continued for nearly three hours, with the signal peaking some 10 db. above the noise.

The juice-can feed used by WA4HGN and the 2300-MHz. converter at W4HHK are slated for appearance in *QST*.

Some more fine work on 2300, with crystal control, is being done by K2GRI, near Saratoga Springs, N.Y., and W1AJR, Newport, R.I. They have yet to work two-way, but K2GRI's 15-watt signal runs 6 to 10 db. above the noise at W1AJR. This is a 170-mile path, over which signals on 144 and 432 are relatively weak, except when good tropo conditions prevail. Two-way work can be expected when W1AJR is able to feed his 4-foot dish with something more than his present two watts. QST

### Seasons Greetings From the Hams of the ARRL/QST Staff

Roland B. Bourne	W1ANA
Bob Hill	W1ARR
F. E. Handy	W1BDI
Doug DeMaw	W1CER
Jean DeMaw	W1CKK
Bob Rinaldi	W1CNY
Laird Campbell	W1CUT
R. L. White	W1CW
George Grammer	W1DF
Carl E. Smith	W1ETU
Bob Myers	W1FBY
E. P. Tilton	W1HDQ
Lewis G. McCoy	W1ICP
R. L. Baldwin	W1IKE
J. A. Moskey	W1JMY
John Huntoon	W1LVQ
George Hart	W1NJM
A. M. Wilson	W1NPG
Murray Powell	W1QIS
Chuck Dean	K1QQX
Don Mix	W1TS
R. E. Anderson	K1TVF
Perry F. Williams	W1UED
C. R. Bender	W1WPR
Walter Lange	W1YDS
Ellen White	W1YYM
Miriam Y. Knapp	W1ZIM
Lillian M. Salter	W1ZJE
Bill Dunkerley	WA2INB
Bill Smith	WB4HIP
Louise Moreau	WB6BBO
John Troster	W6ISQ
Al Noone	WB6SAZ
Rod Newkirk	W9BRD
Bill Reichert	WA9HHH
Maxim Memorial Station	W1AW
ARRL Headquarters	W1INF
Operators Club	

# How's DX?

CONDUCTED BY ROD NEWKIRK,\* W9BRD

## Who?

Fabulastic! A new whopper of a DX contest to run hour after hour, day upon day, year in and year out on every DX band. Who'll be No. 1 across the globe?

The new year hollers "Go!" for your League's new Five-Band DX Century Club Award, detailed on page 110, October '68 QST. Old-time DX hounds lamenting lack of new worlds to conquer have their work cut out for them with this one. They'll be taking on the rough and ready new DX breed, too, because this is a start-from-scratch deal.

We've decorated our pages this month with some background QSL music for 5B-DXCC's launching. If W/K/VE/VO DX hunters have work cut out for themselves, so do our rarer DX friends and their QSL managers. Take AP2HB for example. Hamid's QSL obligations will multiply by the number of bands he works. He usually sticks to 20 sideband. Would AP2HB dare try 15 or 40 in a reckless moment? Later on considerable salesmanship may be required to coax rarities into such vulnerable QSYs.

Then there are the regular multibanders and the contest gang, guys like GC8HT, KV4-AA, OY7ML, YN1AA, *et al.* Can they handle the soaring pasteboard pressures? Contest and DXpeditionary QSLing, with a little organization, can be systemized down to single cards confirming QSOs on several bands. But the more usual scattered one-shot contacts on various bands will mean greatly accelerated QSL traffic all along the line. Our poor bureaus!

Other 5B-DXCC angles come to mind. We've got five highly productive DX bands going right now, 10 through 80 meters. Make your multiband DX hay while the sunspots shine! In a few short seasons, except for intermittent north-south propagation, 28 MHz. will become a DX desert once more. Looks as though persistent schedules using high power and impressive arrays will be required to eke out the necessary 5th-band hundred in years ahead. Even band No. 4 will be a problem; for 21 MHz. goes high and dry at times. Can 160 meters eventually produce enough DX to help fill the void? W1BB and friends think it can, and they have plenty of confirmed countries to prove it. Under crushing competitive forces to come, nighttime 160 may never be quite the same old short-haul band again.

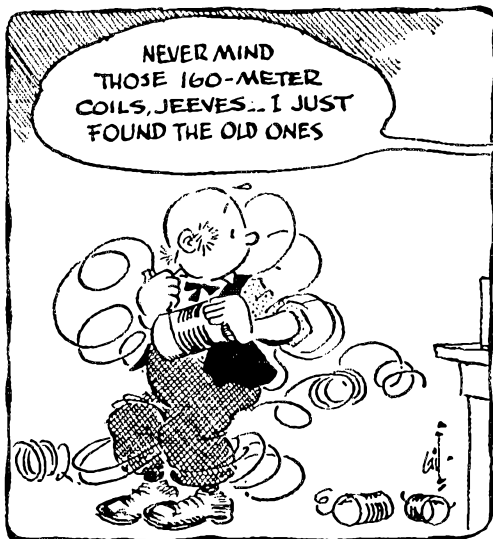
But the most immediately obvious and interesting aspect of 5B-DXCC is its hand-in-

glove relationship to FCC's new incentive-licensing program. Because most DX stations lie in or off the low edges of our h.f. bands and subbands, the W/K DXer without at least Advanced status is practically out of the picture. No wonder on a still night you can hear code practice oscillators beepin' and ARRL *License Manual* pages rustlin' all across the land. Stick with it, OMs—see you on the low ends!

## What:

We planned to hit all c.w. bands except 20 this time, but 15 has been so delicious lately that it's bound to chew up all available space. In southerly latitudes 21-MHz. DX pours through nearly 'round the clock. So let's stick to

15 c.w. chorus by "How's" informants Ws 1DAL 3HMR 3HNK 4YOK 7BE 8YGR 9GXR 9LNO, Ks 4FCB 8BCJK, WAs 1CJE 1CKO 1DJG 1FHU 1HDP 2APG 3GVP 3HRV 3JLD 3KOS 5MIN 5PPZ 8SOX 8MCO 8VBY 9MQJ 9SOY 9TFM 9URY, WBs 2BCI 2D-ZZ 4GSS 6VVS, KP4DBJ, IIs DFE and ER: A2CAQ (21.075 kHz.) 1800 GMT, aloof BY1PK (50) 15, CEs 3LB (20) 3, 3ZK 4LQ, CMIs AQ (11), AR (14) 22, CNs 2AQ (62) 8, 8CO (62) 16, 8MH 8, 8MI (62), COs 2BB (45) 18, 2BM (38) 19, 2DR (37) 21, 6AH 22, CP2BH, CRs 3KD (95) 13, 6AI (5) 8, 6AL (90) 21, 6HX 17, 6CK (27) 15, 6EI (75) 14, 6GO (40) 12, 7RN (25) 18, 7HC (74) 17, 7IZ (20) 18, 7ZN, CTs 1BH 1HX 1LN (115) 21, 1MO 15, 2AV 3AS (32) 10, CxS 1JM (71) 19-1, 3BH (87) 15-16, 3DN (30), 4CO (55) 18, 4JK (14) 22, 7AP (88) 23, 8AAV (24) 0, DMs 2AHA (67) 17, 2APE (5) 17, 2BPE 2BYM (22), 2CDL 19, 2DGO (46), 30ML (26) 17, 3WSO (23), EAs 6AR (50) 15-16, 6BD (42) 17, 6BH (35) 20, 8RI (40) 22-23, 8FT 19, 8FB (52) 13, 8FF 8FJ (58) 8, 8FO (17) 1, 8GA 13, 9AQ (55) 13-14, 9EO (10) 14, EIs 3BF 5AJ 9AR (30) 18, 9J (27) 22, ELs 2BE (22), 2E 2J 2NJ (17) 16, 2Y (54) 18, 9C, EP2KB (21) 11, ET3s FMA USA (40) 7-18, FB8s WW (90) 14, XX (76) 13, FG7s



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

—Reprinted from March 1953 QST.





**Where:**

**AFRICA**—Kagnew Station Amateur Radio Club secretary W4EJQ comments, "ET3USA is the station of our small club, mostly military personnel, with a very limited treasury. At present we can barely afford the printing of QSLs, the mailing of logs to our QSL manager, and the other expenses of keeping the club going. We regret we must ask for self-addressed stamped envelopes or International Reply Coupons from all hams desiring our QSLs. Please do not QSL direct to ET3USA; VE3IG holds all logs and QSLs. Mailing to our address only delays cards and results in extra expense." ----- FR7ZG promises 100-percent QSL in response to cards received direct or via REF (France), affirming that there is no recognized Reunion QSL bureau. By the way, W1CW of ARLR's DXCC Desk hears that Dr. J.H.L. Mulhen, 7 one Km. St. Francois, St. Denis, Reunion, is keen to contact Yank philatelists ----- "I have accepted duties as QSL manager for 9J2XZ-9I4XZ as of October 25, 1968," announces D. McCarthy, WA9PRE/2, 5 Pennypacker Dr., Willingboro, N.J., 08046. "All cards received without s.a.s.e., or s.a.e. with IRC, eventually will be answered via bureaus. Don sincerely desires that stations working him receive their QSLs as quickly as possible." Those 9I4 calls, incidentally, were 9J2s celebrating Zambia's fourth anniversary in October, suffixes unchanged ----- "Stateside QSLs for me should go to W8WRP with s.a.s.e.," confirms ELSB. "EL9C can be reached via Box 8101, Spokane, Wash., s.a.s.e. a must." ----- "CR6CA mails logs on the first of each month," says QSL aide VESGNM, reminding us that Canadian QSL managers cannot use U.S. postage ----- WA4-FJ still invites QSL requests for his 3V8FJ action of October 7-9, 1968 ----- EL2BE QSL tender W8ABN remarks, "Already have 500 QSLs to deliver but only three claimants so far." Nobody needs Liberia anymore? ----- "9Q5EB has decided to handle his own QSLs," informs WA3PWZ, discontinuing as that station's QSL distributor as of November 1, 1968.

**ASIA**—"Peter needs the help and I'm glad to pitch in," writes WA4GQM, taking up QSL chores for 487PE. "Cards and logs should be on hand by press time." By the way, 487s WA and YL are reported to hold a pair of new-style Maldives calls, 8QAWA and 8QAYL, with VU2OLK licensed as 8QALK. These first 8QA jobs are for Male isle, VS9MB remaining temporarily active on Gan ----- K6UMV understands that VU2AJ confirms initial contacts 100 per cent ----- "I prefer direct QSLs," states AP2EB, "and inclusion of International Reply Coupons is appreciated." Neighbor AP5HQ feels about the same: "I do my own QSLing and like them direct with IRCS. No need to send Pakistan postage." ----- DX News-Sheet notes that G3-HSR, moving to Singapore soon, no longer can handle QSLs for MF4s MBC and TCE.

**OCEANIA**—"No QSL replies till I get back to the mainland in March," says VK7KJ, due for a tour as VK7KJ/VK0 or VK0KJ on Macquarie isle. "A manager may be arranged but my time is very short before departure. QSLs to my VK7KJ address will be okay. Cards for VK0IA, due for QRT in December, also will have to wait until March for replies if they reached VK7KJ after November 26, 1968." ----- West Coast DX Bulletin affirms that KH6GLU holds Kure logs for June 8-15, 1968, no others ----- WB6KKB handles 5WIAS QSLs for QSOs dating from July 1, 1968 ----- WA6-NFI withdraws as ZL1TU QSL rep ----- WB6SJS replaces WB6THT as KX6DR's pasteboard pusher.

ZL2s ATK and ATL are better known around Parsippany, N. J., as WA2s NAY and NAZ. Encouraged by ZL2s CU JI and other Down Under friends, Letti and Craig endured a five-year wait before their New Zealand operating credentials finally came through. Now they enjoy working Stateside from Gisborne with their Galaxy and all-band doublet. "Quite a change from all the local Jersey QRM," declares Craig. "To hear the States rolling through down here is always a thrill."

January 1969

**HEREABOUTS**—Word is around that prefixes PJ2 1J3 PJ4 PJ5 PJ6 and PJ7 will be reserved for residents of Curacao, Aruba, Bonaire, St. Eustatius, Saba and Sint Maarten isles respectively ----- Your "QSLers of the Month" this month are AP3HQ, CE7DW, CR4AJ, CT0F, CX3AF, DUFH, EA8 GAR 6BJ 8FO, FB8WW, KN6GD, LA7KK, OY2EL, PJ2MI, T31QQ, TU2BB, UA9NW, UJ8s AMJ P.F., UL7GW, VS5RCS, XW8BP ZD7GO, ZE1BP, 4A2EEL, 7Q7AM, 9J2XZ, 9K2s CB CC and 9U5HT, plus QSL agents Ws 2CTN 2SNM 4DQS 4MYE, K9s BNF CSM and VE3EUU, all applauded in dispatches from "How's" correspondents Ws ISWX 4UF 5YGR, K1HDO, Ws 2HIU and 9URV. Any quickies worth commendation over your way? ----- *Help!* The following italicized brethren hunt hints on running down QSLs from holdouts listed: W4-GRG, KW6DS; W6YKS, BV2A '85, FP8AD '64, KH6-CMM/KB8 '65, VP6LN '64, 5WIAZ '65; WA2BHJ, YA1-CW; WA4SPC, IS1RUA, OX44N '67, VP8JG '67, VRI1, ZB2F '67 6W8DQ '67; WA9MQL GD3FL, VP2RS, ZE1-AE/p, ZP5ML, 9Q5LJ, all '66 contacts. Any 'slp? ----- Ws THGD 8PWZ and 9MQI volunteer to perform as QSL aides to DX ops in need of clerical services ----- Time to restate that we normally have insufficient space available to duplicate data already available in the *Callbook*. Info may reappear here in six months or so if evidence to hand indicates it still valid.

**EUROPE**—"QSLs for 9H1AS operation on September 11-19-25, 1968, should go to me," advises WA4EJL who did the operating ----- W1SWX indicates DL7FT is rapidly becoming the W2CTN of Europe with such QSL clients as EA6s AF BG BH, HB3LL, KL7EBK, TG9-EP, TU2s AY AZ CF, XE2YP, W4UAF/KH6. 3As 2ON 0CU and 8V8BZ ----- "I've been receiving QSLs for c.w. contacts from all over the world," acknowledges TF2WKI, a voice-only DXer. Scratch one ----- EK-YO2BO, now living in New York City, is helping the *Callbook* update its YO listings. George says the next edition will show about 200.

**SOUTH AMERICA**—"Please delete my name and call O as QSL manager for Guyana," pens 8R1Y/W4, now residing in Florida. "I suggest that cards be sent directly to 8R addresses listed in the *Callbook* or to their personal managers." Desmond, also formerly very active as 9P3YG, invites QSL inquiries for all his past Guyana and British Guiana work. Include s.a.s.e., or s.a.e. plus IRCS, to the QTH in the listings to follow ----- West Coast DX Bulletin quotes CE3ZN, CE9AT's QSL tender, as reporting late February logs "unavailable". If your unconfirmed CE9AT QSO is of this period, try for another contact. The same organ carries PY4BK's disclaimer of PY0BLR confirmational connections; try PY4BLR direct ----- DX News-Sheet lists active VP8s HO on S. Georgia; JH, S. Orkney; FL HS JM JH KD KE KF KL, Port Stanley; HZ IA JB JC KI, Saunders; DJ JP JX, Antarctica proper; JN JS JT JU, Argentine island; JG JJ and JW, Stonington ----- Let's see what the lads recommend specifically, keeping in mind that each suggestion is necessarily neither "official", complete nor accurate. ....

EP2BO, Dr. H. McQuillan, c/o Dept. of Geology, Pahlavi University, Shiraz, Iran  
 FG7TI/FS (via VE3EUU)





**FL8DG**, G. Danancher, Hospital Peltier, Djibouti, T.F.A.L.  
**HB9ET/EA0** (to HB9ET)  
**HK9BRW**, P.O. Box 86, Leticia, Amazonas, Colombia  
**HK0BDG**, Box 354, San Andres, Colombia  
**HL9TS**, Kumsan A.R.C., APO, San Francisco, Calif., 96264

**KR6US**, 4252nd Strategic Wing, SAC (FMS), APO, San Francisco, Calif., 96239  
**KV4FT**, E. Dearing, jr., Box 310, St. Croix, V.I.  
**KW6GS**, USCG Lorain Stn., Box 7, Wake Is. Mill, Ivo Grandoni, San Marino  
**PZ1AV**, Box 2250, Paramaribo, Surinam  
**PZ1DD**, Box 2205, Paramaribo, Surinam  
**PZ1DE**, Box 1810, Paramaribo, Surinam  
**TA2EM**, Box 699, Karakoy, Istanbul, Turkey  
**TA3s AR X** (via WA7GQA)  
**TF2WLJ**, FIBS, Box 115, APO, New York, N.Y., 09571  
**TG5WF**, Box 13, Huehuetenango, Guatemala  
**TU2CC**, Box 2604, Abidjan, I.C.  
**VF3RUP/5H3**, P.O. Box 717, Stn. Q, Toronto 7, Canada  
**VE7AZT/KL7**, R. Ferguson, 3026 W. 31st Av., Vancouver, B.C., Canada  
**VP2GBR**, D. G. Smith, Presentation College, St. Georges, Grenada, W.I. (or via WA5LEV)  
**VP2VW**, G.P.O., British V.I.; or L/Cpl. J. Irwin, Royal Signals, 53 FD Sqdn, RE, BFPO 14, England  
**ex-VP3VG** (to 8R1Y/W4)  
**VP8s DJ JR** (via CX2AA)  
**VP9GG**, P. Evans (G3DLH), Flatts P.O., Smiths Parish, Bermuda

**VQ8CL**, J. Soobaral, 47 Labourdonnais Av., Quatre Bornes, Mauritius  
**VR4EZ**, Box A-176, Hóniara, Solomon Islands  
**VU2AJ**, B.S. Dutt, Overseas Comm. Svc., Industrial Assurance Bldg, Churchgate, Bombay 1, India  
**WB1LH/VE6**, J. Cochrane, 1113 Laval Ave. SW, Calgary 6, Alta., Canada  
**YB0AR**, Gunung Sari 51, Djakarta, Indonesia  
**ex-YO2BO**, G. Pataki, 450 W. 58th St., Apt. 5F, New York, N.Y., 10019  
**YU0M**, V. Petrovic, Rendgenova 11, Nis, Yugoslavia  
**5A3JT**, M. Gamar, P.O. Box 2325, Tripoli, Libya  
**7P8AB**, Box 359, Maseru, Lesotho  
**8R1S**, P.O. Box 739, Georgetown, Guyana  
**8R1V/W4**, D. Yong, 4509 Le Moyne Ln., Pensacola, Fla., 32505  
**9K2BJ**, Box 8419, Kuwait  
**9Q5JR**, Box 949, Likasa, R.C.  
**9X5MF/EA0** (via HB9MQ)  
**9V1PC**, Box 37, Singapore

**APs 2HB 5HQ** (see text)  
**CR6CA** (via VE3GNM)  
**EL2BE** (via WB8ABN)  
**EL9s B C** (see text)  
**ET3USA** (see text)  
**F3CC/FC** (via DL9PPF)  
**F9IE/6W8** (to I9IE)  
**FG7TH** (via I2VX)  
**FP0DM** (to VE3FEC)  
**HL9WK** (via K7CHT)  
**KR6NR** (via OARC)  
**KX6DR** (see text)  
**LX9LS** (via LX1DC)  
**MP4TCF** (via G3WET)  
**OA2BH** (via WA5BNG)  
**OE1ZQA** (to KR8CFU)  
**OR4ES** (via UBA)

**PJ5MN** (to W9ZRX)  
**PJ9CO** (to WB4EHX)  
**PX1AK** (to F3AK)  
**VK0KJ** (to VK7KJ)  
**VP7NA** (via K9GZK)  
**VR1P** (via VE6AO)  
**VSSIR** (via MARTS)  
**VU2GGB** (via AIRSI)  
**WC4GSC** (to W4DQD)  
**XE1PJ/4A4** (to XE1J)  
**ZD8AB** (to W8BMS)  
**ZF1EP** (to W4PJG)  
**ZL1TU** (see text)  
**ex-Z59L** (to VE7BEM)  
**3A2EM** (via REF)  
**3A0AV** (to I1ZRS)  
**3V8FJ** (to WA4FIJ)

**4S7DA** (via W6FJ)  
**4S7PE** (via WA4GQM)  
**4X4VL** (via VE1AS)  
**5N2NAS** (via G3VIS)  
**5W1AS** (see text)  
**ex-6W8AA** (to FL8DG)

**9H1AS** (see text)  
**9Js 2XZ 4XZ** (see text)  
**9M2BH** (via MARTS)  
**ex-9M2NF** (to G3PNF)  
**9Q5EB** (see text)  
**9Y4TU** (via 9Y4LT)

Donors of the preceding selection include **Ws 1ARR** ICW 1SXW 1YXW 2DY 2SDW 4GRG 4UF 6YKS 8IBX/2 8YGR 9ZRX 0DAK, Ks 4TWJ 6UMV 9CSM, WAs 1FHU 4F1J 8MCO 9MQI 9UGF, WBs 8KBK 6THT, DJ6-QJ, VK7KJ, ex-YO2BO, Canadian DX Association Long Skip (VE3HJ), Columbus Amateur Radio Association CARAScope (W8ZCQ), DARC's DX-MB (DL3RK), DX News-Sheet (G. Watts, 62 Belmore Rd., Norwich, Nor. 72.T., England), Far East Auxiliary Radio League (M) News (KA2LL), Florida DX Club DX Report (W4BRB), International Short Wave League Monitor (A. Miller, 62 Wardlaw Ln., Selly Oak, Birmingham 20, England), Japan DX Radio Club Bulletin (JA1DM), Long Island DX Association DX Bulletin (W2GKZ), Newark News Radio Club Bulletin (L. Waite, 39 Hannum St., Ballston Spa, N.Y., 12020), Northern California DX Club DXer (Box 608, Mueno Park, Calif., 94025), Southern California DX Club Bulletin (WA6GLD), Utah DX Association Bulletin (W7LEB), VERON's DXpress (PAGs FX LOU TO VDV WWP) and West Coast DX Bulletin (WA6AUD). Got a QTH or two for the stew?

**Whence:**

**ASIA**—Pakistan perspective, first from AP2IB: "I'm on 20 s.s.b. with an HW-32A and ground-plane. The transceiver is modified to operate 14.100-14.250 kHz, but I usually use 14.200." Hamid mentions the scarcity of amateur radio literature out his way, welcoming shipments of unneeded magazines, handbooks, etc. Neighbor AP5HQ writes, "I'm now operating 7 MHz. from 1100 to 1230 GMT, looking for the U.S.A. especially on Sundays." Africa will complete Fida's WAC-YL. . . . W3HKN hears that EP2KB is due to knock off for Uncle Sugar. . . . "I'm newly active from Korea as HL9WK," notifies W7YBX. "My assignment as chief, programs division, USAF communications/electronics, keeps me quite busy but I expect to pass out ILL QSOs till about June. Signing HL9WK brings back memories of being KA7FH and KA0IJ in the early '50s." HL9WK's QSL manager is listed in "Where" but he welcomes sked requests direct to Capt. Rod Linkous, CMR Box 3173, APO, San Francisco, Calif., 96570. Rod employs c.w., and s.s.b. on 10 through 80 meters. . . . "There are more than seventy HSS active at this time," estimates HS3AL (WB5ZR, ex-H8XAL). "We are allowed phone on 7 through 144 MHz—no c.w. and no 80 and 160 meters. I expect to be in HS3-land for two years, then possibly in Bangkok for two years with an IIS1 call." . . . Asian addenda courtesy the clubs press: G3ISR (ex-V81BQ) and XYL (ex-V51YL) return to old Singapore haunts and new 9V1 calls. . . . TA3AR-TA3X (K7-SAD) may terminate emissions on 10, 15 and 20 meters next month. . . . On the Hong Kong scene VS6s AL CO and DR like s.s.b. on 10, 15 and 20 meters. AA DL DO and FX enjoy multiband c.w. work, and AB is due for return to Europe. VS6s AB AL CO DL and DR are VS9AKC, G8ARZ, ZL3ACV, G3TRU and W5UHK respectively. . . . "After leaving Malaysia in December I'll be on leave in England as G3PNF through March," notifies 9M2NF. "Then I expect to be a DL5 for three years." Dennis previously signed DL2AB in those parts.

**AFRICA**—"9J2X is active on 10 meters at present with a KV-2000 and quad," reports WA9PRE/2. "Don anticipates adding a quad for 15 and 20 in the near future, as well as skywires for 40, 80 and 160 meters. He



These fellows want to work you as much as you'd like to work them, but the International Telecommunications Union has contrary wishes on file from the Thai government. Kneeling, l. to r., are HS3s HM (W0FLB) and WC (WA4-EPB); standing, HS3s BA (W4SQO), MJ (WB4HJJ), WT (W1UUQ), RF (WA5NQA), and DR (K7CBZ). The occasion was a summer hamfest at Udorn, northeast Thailand.





operates code and phone, and often can be found around 28,200 kHz, after schedules with England. 9J2XZ expects to be workable from Chingola for the next three years or more. I'll be glad to help arrange skeds." ----- FR7-ZG keeps Reunion hunters happy with a homespun 6146s eighty-watter, ground-plane radiator and Halli-crafters interceptor ----- "We are trying to keep ET3USA on the air as much as possible despite difficulties," assures Kagnev Station A.R.C. secretary YL W4EJQ. "All equipment is privately owned, so we'll probably lose the beam we're using when its owner returns to the States in '69." ----- "EL9A left Liberia for good," says EL9B, still stationed at Mano River Mine. Wim also notes that near-by 9G1GJ closed down for return to ZS-land ----- Africa tidbits via club newshawks: OR4ES, 21,150-kHz, s.s.b., is said to be on a four-month DXcursion in the Libyan desert with an NCX-200 and minibeam. . . . Check with VE2DCY concerning a 7Q7 certification based on three Malawi QSOs during 1967-'68. . . . SUIIM breaks Egyptian silence on 15 and 20 c.w. at 2100-2200 GMT. . . . 5U7AN is said to be leaving Niger this month. . . . Ex-6W8AA tries his luck as FL8DG on 14,260 kHz, around 0400 and 1800 GMT. . . . 9X5MF/EAØ hopes to keep his quad spinning in Fernando Poo for a couple of months.

**OCEANIA**—"For the first time ever there will be two stations active on Macquarie during December-March," comments VK7KJ, due to operate one of them. "I will use a Galaxy V. The other station, call unknown at present, will use a.m. and c.w. My program as a biologist will be quite heavy but I'll be active as much as my spare time allows." W1BYP added confirming notes to Greg's data ----- Among the many VKs WA1FHU worked lately is VK4ZB on 15 c.w. Les reminisces, "As Hungarian HAF3KL I QSO'd him on 40 meters with two watts in the winter of '32. He was VK3ZB then, my first real DX." ----- "Our QTH, Gisborne, is a beautiful city of some 25,000 on the east coast of North Island," write ZL2s ATK and ATL (WA2s NAY and NAZ). "There are about 35 hams in the area." ----- Pacific patter via aforementioned periodicals of clubs and groups: W6BPO may join VK9RH's Norfolk Isle campaign this month or next. . . . VS5IR is roving VE7IR. . . . VK3CH formerly signed VK9AG. . . . W7ZFV may call at Heard island aboard USCG's *South Wind* in March, land-based operation possible. . . . Roaming VE6s AJT and APV cleaned up on 10 through 20 meters in October as VR1P, other rare stops imminent. "Was the first British Phoenix radiation in a decade.

**EUROPE**—From rarer British Isles: "GC2LU wants around 1500 QSOs to know he's on 10, 15 and 20 regularly around 1500 GMT," relays WA9URY. . . . "GC5AET (DJ1QP) made about 3700 QSOs from Jersey in August and September," reports DJ6QT. . . . Les Bard of Forest Hotel, Guernsey, invites amateurs passing through to vacation at his home "gratis, providing it is for operating purposes. My antenna system is complete with a 160-meter long-wire, a 40/80-meter doublet, TA-33 jr. rotary on a 50-ft. tower, with a three-element Telrex beam a-building." . . . G3s SVK TTN, GW3s KNZ and LDH pooled resources and vacation time to hit Alderney, Guernsey, Jersey and Sark isles last fall. "Most operation was on 160 meters and we enjoyed many QSOs with W/K stations." ----- W4UF encountered Boy Scout Jamboree station LX9LS on 15 sideband in October ----- "Most interesting to hear the boys back home rolling through," says W2QM, recounting his summer visit at SVs 1BV and ØWAA ----- W2SDW records, "11ZBS sometimes operates as 3AØAV with an SB-34, kilowatt linear and cube quad on 10 through 80 meters." ----- Ex-YO2BO, living in New York the past three years, has two more long years to wait before he returns to the air as a U.S. citizen. "I was chief operator of YO2KAC in '57." ----- WA4FIJ suggests, "The man to contact in Malta for permission to operate there is Mr. Joseph V. Galea, 9HIAG, Office of the Prime Minister, Wireless Telegraphy Branch, St. Andrews Bastion, Valletta." ----- W4GRG reminds us that those 28-MHz. HGs are Hungarian equivalents to our Technician licensees. Ten is the lowest band they work. . . . JXs 1CM 3XK on 14-MHz. sideband, 4EJ on 21- and 28-MHz. s.s.b., and 5CI on 14-MHz. c.w. keep sprayin' from Jan Mayen.

**SOUTH AMERICA**—"In six September days we made 3700 QSOs from Fernando de Noronha island," tallies PY7APS, "2200 as PYØAPS, 1500 as PYØARM." ----- LU4ECO, a 21-MHz. c.w. fan, is former HA2G of the '30s, according to fellow ex-Hungarian WA1FHU ----- Certification hounds can check with LU1DNQ for scoop on *Semana de Pergamino* sheepskins available for sufficient October '68 contacts with hams in Argentina's Pergamino province. ----- Abrolhos isle is a freshly publicized target for PY1CK and DXpeditionary colleagues.

**HEREABOUTS**—All dials and beams point toward the Hacienda Motel, Fresno, for the annual joint meeting of Northern and Southern California DX Clubs on the 25th-26th of this month. Chairman K6SSJ of NCDXC describes preparation of a potent program for the rumpus, including the planned appearance of the Boondocks Marauder, W4BFD, who may use the forum to announce his forthcoming DXpeditionary itinerary ----- Guest VP5AA was presented with an honorary membership plaque at an Arkansas DX Association dinner in September, according to president WA5EFL. K5-QHS ran off with first prize for the meeting's DX quiz ----- VE3ABG writes, "My change in jobs means extensive traveling throughout Canada now, so I hope to provide 160-meter activity from VE1 through VE8, and possibly VO." ----- Ws ISWX and 9NN should be well warmed up for 5B-DXCC pursuit. The former has 150 countries confirmed on 3.5 MHz., the latter 239 verified on 7 MHz. ----- WB4BFX, visiting PJ2CQ, signed PJ9CQ in late October ----- "Back to my old pet, 160-meter DX," declares K1KSEI, now a landlubber after sea voyages far and wide. "My dipole hangs 175 feet high between two broadcast towers, WØVXO/KV4 and DL9KRA are among best 1.8-MHz. DX worked so far." ----- W2HCW, inactive for 14 years, returns from work in Japan with serious DX intentions and an elaborate New York multiband antenna farm in the works ----- "Recently got on RTTY with a Model 15 and W2PAT demodulator," says WA9MQI. "Great fun working DX in this different way. Not much competition and consequently the DX will more readily rag-chew. Hadn't realized there were so many stations on radio-teletype until I tried it myself." Dave lists QSOs with G8LT, HC1MF and LU7EBB on 20 meters, DJ8GT, DL4RY and ON4CK on 15 ----- Long-time "How's" helper W8YGR holds his breath at 299 confirmed ----- WC4GSC displayed a new prefix at the Ogechee (Ga.) Fair ----- XE1PJJ/4A4 managed brief Revillagigedo output on 15 and 20 in October. XE2YP's XE4 effort still pend. ----- VP2GBR offers Grenada with 50 watts on 1822.5 and 1981 kHz. ----- W4s KET PJG WYJ, K4CAH and WA4WIP got together for ZF1K:P sport in October, while K4s HSB and 11F teamed up for a vigorous VP7NA disturbance ----- Here's to a swift and solid recovery for W1DQF, NYL of Mr. 160, W1BB, recuperating from heart troubles. The top-band gang's 88s, Alice! [QST]



HASUU has a host of world-wide c.w. friends. Imre runs a homespun 100-watter and 12-tube receiver at Keskemet in Hungary's wine country. (Photo via ex-YO2BO)

# YL news and Views

CONDUCTED BY LOUISE RAMSEY MOREAU,\* WB6BBO

## Seventeen

IN 1910, there were two YL operators. Their calls were recorded in the Gernsbach *Blue Book*. By 1916, the U.S. Government *Call Book*, listed six YL operators, and there was at least one YL in England. That was before the feminine membership of ARRL got their own column in *QST*. Forty-two years after those first two gals watched the blue spark jump across the electrodes as they made their contacts the Board of Directors of the ARRL approved the addition of a column for YLs in *QST*, and "YL News and Views" made its debut in January 1952. To paraphrase an advertising slogan: "We'd come a long way, baby," before this column appeared.

"When I was one, I had just begun," says the nursery rhyme, and Eleanor Wilson, W1QON, was the YL selected to handle the work of beginning this department. For eleven years she did just that. Remember her first column?

"The introduction of a new department in *QST* cannot fail to arouse interest and comment. And when the new department involves YL amateurs it's virtually assured that a wide reading audience will be on hand — YLs, XYLs, OMs, just about everybody. With this assumption in mind a new department is launched."

Under Eleanor we had news of YLRL, the announcement of newly introduced YL club certificates, remember "Keeping Up With The Girls," ATAWAR, "YLs You May Have Worked?" It was Eleanor who first faced the continuing complaint from wives of amateurs who considered "XYL" an insult and submitted just about everything in the language to replace it. She appealed for "suggestions, pet themes, complaints, and news," and the women operators cooperated so that from just beginning, it became a thriving department.

Because of increasing demands of her family, and civic duties, W1QON retired from her editorial duties in 1963, and Jean Peacor, K1IJV, assumed the challenging job of maintaining the devotion and enthusiasm to the activities of women in amateur radio. Jean kept the same high standards with particular focus on the many different facets of amateur radio in which YLs were participating. She covered the field from plain rag chewing, through the difficulties of chasing those elusive DX stations, and contest

\*YL Editor, *QST*. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001.



Eleanor Wilson, W1QON. First editor of "YL News and Views."

operation. Field Day-YL style, high level operating procedures, club activities, reviews of conventions. Remember her c.w., traffic, and her helping hand to the novice, YL columns? All of this was a part of the K1IJV "touch" with emphasis on personalities as she reported the increasing numbers of what has been called "the distaff side" of the amateur fraternity.

Now we are beginning our seventeenth year. The term might well connote "teenager," and we literally are in comparison with *QST* itself, and the many other departments. But we, as amateur radio operators have been around a long time for some of us remember the brute force spark days, so it is only the column that is young.

Eleanor wrote in her first column:

"Numerically YLs constitute but a small portion of the whole amateur body. We then accept a challenge and a responsibility with the inauguration of our department; it's up to us to continue exemplifying the old adage that 'it's the quality not the quantity that counts.'

"YL amateurs have proved, and are constantly proving their worth. Their accomplishments are notable. Their numerous and outstanding contributions to the hobby speak for themselves."

We have indeed come a long way, gals, but whether we are full members of QCWA, OOTC, or eager novices just beginning this exciting adventure in the Amateur Service, we are all just seventeen in YL News and Views. Happy Birthday to you all who have made it successful.

## 1968 Howdy Days Results

Howdy Days is as informal as they come. Even the submission of logs is an informal affair. From the number of contacts made at least 71 participated, but only 8 gals bothered to submit a log to W4TVT. Possibly in 1969 more of the contestants who entered this friendliest of contests will submit their logs. Claire Bardon, W4TVT reminds everyone that it is one place that could be a great factor on getting new members for YLRL.

Following were the scores:

Verda Siebenthaler, K7UBC.....	71
Marte Wessel, KØEPE.....	70
Ruth Garrison WA8FSX/ WA8FSX/8.....	39
Rose Angel, WAØKER.....	35
Ruth Siegelman, W2OWL.....	31
Gretna Longware, WA2WHIE.....	23
Maxine Hanberry, WA6AOE.....	14
Irene Akers, W3RXJ.....	10

### Plan Ahead

"Across the Line in '69" is the slogan for the 1969 Midwest YL Convention. For the first time this affair will be held outside the United States, and Doris, VE3BBO, has promised that it will be one that we will not forget. It isn't too early to start planning because there are several things that must be attended to ahead of time. We are advised that while U.S. currency can be exchanged almost anywhere, personal checks will not be accepted the way they are here. So, it is advisable to make sure that you have either travelers checks, or recognized credit cards. As the Boy Scouts say "Be Prepared."

Another vital item of preparation will be for the gals who plan to operate radio in Canada. If this is your plan don't delay sending a request to the Department of Transport, Radio Regulations, 55 Clair Avenue East, Toronto 7, Ontario, Canada. Don't put it off gals, it does take time to process you know.

The Convention will be May 16, 17, 18, 1969 and don't forget to start planning those "Swaps."

### Meet the Club—Portland Roses

The Portland Roses held their first meeting in July 1955, chose their name in September, and in November the constitution was approved. The first officers were Helen Wise, W7RVM, President, Donna Gettman, W7QKU, Vice president and Treasurer, and Phyllis Bowers, W7ZMN was the



Beverly Wilcox, WB2UHZ, named "Miss Amateur Radio" for the Hudson Division, ARRL, Convention, October 1968. With Beverly, and making the presentation, are Harry Dannals, W2TUK, Director, Hudson Division, ARRL (left) and Stan Zak, K2SJO, Vice-Director (right).

first Secretary. All three gals are still active members.

Membership is open to any woman who is a licensed operator, and is 18 years of age, or over. There are two classes of membership: Full Members, are those who live in the vicinity and can get to club meetings, and Associate Members are those who live elsewhere, and do not attend the meetings. Associate members do not hold office, nor voting privileges.

Meetings are held on the first Monday of the month at the homes of the members at 8 P.M. Any visiting YL is cordially invited to attend, and can find the location of the meeting by calling any of the members. An annual picnic is held in August at which members, OMs, and families get together. Another event is the annual YL-OM dinner, in March.

The Portland Roses have worked in at least three Field Day events using the club call K7UER. They have sponsored DX YLs under the YLRL adoptee plan for a number of years. The current one is Josephine de Rusea, OA4GR, of Lima, Peru. Also these YLs have been hostesses at numerous state amateur radio conventions, and the national ARRL convention in 1962.

The Club Certificate has been issued since November 1958. Original requirements were that eight members had to be contacted to earn it, but, in February 1968 the rules were relaxed to six member contacts. Contacts with any member of the Portland Roses since September 1955 count as one full contact. Contact with the club call K7UER counts as two contacts. Helen Wise, W7RVM is certificate custodian.

Present officers are President, Helen Wise, W7RVM, Vice president, Bettie Mayer K7BED, Secretary, Beverly Walker, W7HPT and Pat Ziegler, W7NOK, Treasurer.

QST



Portland Roses Certificate.

## Silent Keys

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

K1DQE, Philius Boudreau, Woonsocket, R. I.  
 W1HW, Henry Munroe, Suncook, New Hampshire  
 W1JGA, Joseph Cordingley Jr., East Sullivan, New Hampshire  
 K10OK, Alden Finley, Kittery Point, Maine  
 K1RSM, Lawrence Banek, Cumberland, Rhode Island  
 W1PZA, Gordon Huggard, Danbury, N.H.  
 W1SYL, Mary Hanscom, Melrose, Massachusetts  
 WA2CVA, John Knox, Bellville, New Jersey  
 WA2JIV, Fred Engel, Flushing, New York, N.Y.  
 WB2VPS, ex-9BM4, Philip Zuriau, Roslyn Heights, New York  
 W3KUI, Dent Shields, New Castle, Pennsylvania  
 W3RIS, Walter Wendelken, Export, Pennsylvania  
 W3VTT, Samuel Hunter, Glen Mills, Pennsylvania  
 W4AAU, Henry Sponz, Concord, North Carolina  
 W4AUS, Charles Moore, Phenix City, Alabama  
 WB4BKJ, Richard Griffiths, Louisville, Kentucky  
 W4BOC, Richard Alford, Atlanta, Georgia  
 WB4BZU, Cloyd Derey, Fairfax, Virginia  
 K4DNX, Sidney Usdan, Memphis, Tenn.  
 W4DUE, Vernon Cox, Tampa, Florida  
 K4IYX, James Payne, Kannapolis, No. Carolina  
 K4NQL, Richard Thompson, Tampa, Florida  
 W4PFM, Bernard Crain, Arlington, Virginia  
 W4ZJ, James Kellow, Jacksonville, Florida  
 W5ARQ, Charles Besancon, No. Little Rock, Ark.  
 WA5DFO, Tito Fernandez, San Antonio, Texas  
 WA5JEH, Robert Morse, Arlington, Texas  
 W5LA, Edmund Christy, New Orleans, Louisiana  
 W5QDG, Roy Mock, Tularosa, New Mexico  
 W6AHP, William Williams, Los Angeles, Calif.  
 W6DOC/HK3, Thomas Green, Coronado, Calif.  
 W6GNR, Charles Jones, Delano, California  
 W6NVF, Robert Farrell, Los Angeles, Calif.  
 W6SSL, Clarence Heine, Atascadero, Calif.  
 WN7ITW, Emmett Blackmun, Grants Pass, Oregon.  
 K7KRV, Forrest Stubblefield, Mesa, Arizona  
 W8DTW, Edward Smith, Fostoria, Ohio  
 W8EYL, Joseph Simonec, Detroit, Michigan  
 W8HFU, Bert Mackelburg, St. Clair Shores, Michigan  
 W8YFL, Angelo Formenti, Iron Mountain, Mich.  
 WA9AJF, Clyde Bidgood, Elmhurst, Illinois  
 W9DMU, Henry Holland, Indianapolis, Ind.  
 W9PJX, Robert Shoemaker, Anderson, Indiana  
 W0BHH, Henry Heraldson, Aneta, North Dakota  
 K0GZN, Kirkland Bush, Harper, Kansas  
 WA0HXR, John Fisher, Orchard, Nebraska  
 VE3BQI, Clifford Marsh, Queenston, Ontario, Canada  
 VE7ATJ, Donald Dell, Dawson Creek, British Columbia, Canada

## "It Seems To Us . . ."

(Continued from page 9)

the formation of a Region III (Asia and Oceania) organization. President Denniston traveled to Australia to attend the inaugural Region III congress. IARU membership now stands at 80. During the year, the International Telecommunications Union announced plans to hold a world administrative conference in the latter part of 1970 to deal specifically with space radio communications problems and allocations.

So 1968 has presented us with the goals of 1969. Can we meet the challenge?

HAPPY NEW YEAR!

QST

## Strays

Worked WC4GSC October 12-20? That was the Ogeechee Fair station, manned by Georgia Southern College. QSL via W4DQD.

## Stolen Equipment

Between Tuesday, November 12 and Tuesday, November 19, 1968, the club headquarters and station of the Providence Radio Association, Inc., W1OP, was burglarized. The following equipment was stolen: Transmitter, Hallicrafters HT-32, Serial No. 185981; receiver, National NC-303, Serial No. 524-1673; D-104 microphone; various station accessories such as hand key, wall clock, cables, etc.; and 6- and 2-meter converters (matching the NC-303 receiver). Write or call the station trustee, Robert C. Bellise, W1KKE, 77 Howland Rd., Cranton, R. I., (401)-467-7248

On June 12, 1968, my home was broken into and a Hallicrafters SR-2000 and PS-2000 power supply was stolen. I would appreciate it if anyone who has information on this matter contact me immediately. Al Snyder, WA8VOD, 20810 Mastick Rd., Fairview Park, Ohio 44126.

## Feedback

In the writeup of the Sept. V.I.L.F. QSO Party in QNT for December 1968, W5XNR/5 (New Mexico) was a multioperator station (5 operators), and the call used by WA1s HOL and JCX (Conn.) was WA1JCX.

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.



Amateur radio was well represented at the Daytona Beach Home Show, October 23-27, 1968. K4BV, club station of the Daytona Beach Amateur Radio Association, handled 375 pieces of traffic to 43 different states and Canada. From left to right are WB4GUH, W4WAF, WB4HQX, and WA4JCP's mother.



# Operating News



GEORGE HART, WINJM, Communications Manager  
ELLEN WHITE, WIYYM, Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, W1ZJE  
Contests: ROBERT HILL, WIARR

DXCC: ROBERT L. WHITE, W1CWP  
Training Aids: GERALD PINARD

**W6ZRJ Backup for W6OWP.** It is more years back than a lot of us can remember that Forrest Bartlett, W6OWP, took it upon himself to provide West Coast coverage for W1AW's code proficiency qualifying runs. Bart has been as steady as a clock, ever since, once each month transmitting a qualifying run so that the west coast amateurs and other code proficiency aspirants will have a strong signal to copy. Many have suspected, we feel sure, that Bart has been paid by the League to perform this service.

Not so. It's 100% volunteer and always has been. But now change of employment schedule puts the West Coast qualifying run transmission from W6OWP in a precarious position. Yes, Bart, like all of us, has to make a living. The new situation isn't yet definite enough to make necessary any change in published plans, but W6ZRJ has offered to be Bart's backup man for the qualifying runs. Whenever, or if ever, W6OWP cannot be on, W6ZRJ will take his place, same frequency, same procedure. So if you should hear W6ZRJ identifying in an ARRL code proficiency qualifying run, instead of W6OWP, don't tune away. It's official.

**FMT Results on W1AW.** Beginning with the FMT of last September, the official measurements were transmitted over W1AW on Sept. 26, so those who measured just for the fun of it didn't

have to send in a report. This will be standard procedure henceforward—that is, the official measurements of W1AW's frequencies during the FMT will be transmitted over W1AW about two weeks after the transmissions.

This means that those who wish to qualify for a written report (with copy to SCM for possible qualification as Class I or II Official Observer) will have a deadline, because once the readings are given over W1AW, "the cat is out of the bag." Reports received after that time will be filed without action. You will have approximately twelve days to get your report to headquarters before the W1AW transmission will nullify any received thereafter. So don't delay if you are trying for OO.

**New RCC Policy in Effect.** Not so long ago we were notified by one of our windier amateurs that he had received *four* RCC certificates, and would we please stop sending them. Please see Oct. *QST*, p. 108, announcing the new policy.

Effective at once, RCC nominations will be acted upon only if they are received from the *nominee*, who is the only one who knows for sure if he has already received this honor. Therefore, if you want to nominate someone send the nomination *to him* for forwarding to headquarters. If you send it direct to headquarters, it will not be honored.

## OPERATING EVENTS (Dates in GMT)

### ARRL-IARU-SCM-Affiliated Club-Operating Events

January	February	March
2 Qualifying Run, W6OWP 4-5 VHF SS (p. 63, last issue). 11 Qualifying Run, W1AW 11-13 CD Party (c.w.)* 10-12 Arkansas QSO Party (p. 114, last issue). 18-20 CD Party (phone)* 18-19 Connecticut QSO Party (p. 122, last issue). Louisiana QSO Party (p. 114, last issue). 19,26 VE1 Contest (p. 118, this issue) 25-26 Simulated Emergency Test (p. 62, this issue). Jan. 26-Feb. 2 Kansas Week Award (p. 101, this issue). * League Officials and Communications Dept. appointees, only.	1-2 DX Competition, phone (p. 64, last issue). 1-16 Novice Roundup (p. 67, this issue). 5 Qualifying Run, W6OWP 7-9 QCWA QSO Party (p. 83, last issue). 8 Frequency Measuring Test (p. 95, this issue). 8-9 Arizona QSO Party (p. 112, this issue). Vermont QSO Party (p. 103, this issue). 11 Qualifying Run, W1AW 15-16 DX Competition, c.w. (p. 64, last issue). 22-23 YL/OM Contest, phone (p. 97, last issue).	1-2 DX Competition, phone (p. 64, last issue). 6 Qualifying Run, W6OWP 8-9 YL/OM Contest, c.w. (p. 97, last issue). 12 Qualifying Run, W1AW 15-16 DX Competition, c.w. (p. 64, last issue). 29-30 West Virginia QSO Party  <div style="text-align: center;">June</div> 14-15 VHF QSO Party 28-29 Field Day

Of course you can nominate yourself, too. That is, if you have just completed a conversational QSO lasting a half hour or more, drop us a line giving the call of the station contacted, the date, times and frequency band and in due time, if your info checks out, you'll get your certificate.

**SCM Election Procedures.** There seems to be some confusion and misunderstanding regarding the democratic processes in our operating organization. As you know, it is headed up by the Section Communications Managers, the only elected officials in the Field Organization. (Directors and vice directors are also elected, but they deal with over-all policy, not just operating.) There are 74 sections (see p. 6), and each elects its SCM for a two-year term. Nomination is by petition of five or more full members of the section, and ballots, if more than one candidate is nominated (quite often there is only one) are mailed to each full member of the section.

Unlike most such offices, if an SCM resigns or dies in office there is no "term" to be finished. An "acting SCM" is immediately appointed by the Communications Manager (who usually gets recommendations from the outgoing SCM or some other section official) to serve as SCM until an election procedure can be completed. The first available issue of *QST* solicits nominating petitions for that section, giving a deadline date some time not sooner than the month following the date of issue. If more than one valid nomination is received, an election must be held, which involves corresponding with the candidates regarding their eligibility and biographical data, composing the latter, ordering ballots, having them printed and mailing them out. If an SCM suddenly resigns or dies, it is usually four or five months before the necessary steps can be completed to replace him with another elected official.

In the normal course, an expiring SCM term is announced in *QST* at least five months prior to its expiration date. For example, December *QST* (p. 103) announced upcoming elections in six sections, one by resignation, two expiring in

## BRASS POUNDERS LEAGUE

Winners of BPL Certificate for October Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	497	2539	2316	127	5479
K5PEY	7	2296	2179	2	4484
K6JNK	183	1977	1952	22	4134
W7BA	10	149	1017	125	2301
K5BNI	6	1106	1024	32	2168
W3VR	329	916	833	39	2117
W8UPH	6	843	790	49	1688
WA4DYI	7	828	748	5	1588
W493NV	4	718	692	1	1415
W9JYO	593	319	308	13	1231
W6RSY	21	604	440	137	1202
K9PZX	2	515	503	9	1029
VE2ADF	74	424	14	391	903
WA9ATH	21	443	310	99	873
W6LXC	36	452	360	25	873
K9IVG	6	119	357	9	791
WA0PNB	15	376	368	3	762
W50BD	28	365	361	2	756
W10JM	6	356	356	0	718
W4NLO	4	355	344	15	718
W3BAL	19	381	287	1	688
WA5PVL	6	336	285	3	654
K7RQZ	26	313	269	46	654
W8LJX	47	309	156	115	627
W1PEX	41	297	237	23	598
W47HKR	10	287	267	8	572
W7LW	21	263	255	5	554
WA8AUZ	201	236	222	0	551
W3MPX	157	232	121	26	536
K3NSN	100	255	130	50	535
WA9QKP	15	260	255	0	530
K9KZB	18	251	132	119	520
WA7DZL	9	255	238	17	519
W9EQO	154	178	177	1	510

Call	Orig.	Recd.	Rel.	Del.	Total
K6ONK (Sept.)	287	1049	998	52	2386
W6GYH (Sept.)	82	111	408	0	901
WB6BBO (Sept.)	33	258	239	1	531

### More-Than-One-Operator-Stations

W6YDK	4284	37	12	25	4358
Late Reports:					
K0WBD (Sept.)	1356	28	18	10	1412
K0WBD (Aug.)	1132	42	30	12	1216

BPL for 100 or more originations plus deliveries

K4BV4 423	W4RHA 125	WA9TUM 110
W4FVH 222	W9KII 122	WA3AOJ 107
W9QQQ 183	WA1GNN 121	W3TNN 106
W5JBM 182	WA2CAL 119	WA9GHI 104
WA1HOL 168	WA3INC 118	WA6ITN 103
WA3IYS 157	W8NOH 118	WA6BYZ 102
WA2UVB 145	WA0LBB 117	WB2NSV 101
W9EJSJ 140	WA9QNI 114	Late Reports:
WA0LLC 130	W2OE 112	WN4RHA (Sept.) 122
		WA6KZI (Sept.) 119

### More-Than-One-Operator-Stations

W8LT 161	W1AW 104
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BPL Medallions (see July, 1968 *QST*, p. 99) have been awarded to the following since last month's listings: W2FR, WA2UFI, WA3AOJ, W4IYT, K4YZU, WA5TYE, K7RQZ, W9EJSJ.

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 sura 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 ARII form.

VIPs galore at the Roanoke Division Convention last September 28-29. Front row, L-R, **WA4LWE** Asst. Dir., **W4BNU** SCM N.C., **K4LMB** Asst. Dir. and Founder of the YLRL, **WA4EFP** Asst. Dir., **W8DUV** Asst. Dir. and Past Pres. YLRL, **W4SHJ** SCM Va., **W8BT** Asst. Dir. and **W4PED** SCM S.C. Rear row, L-R, **W4ACY** Vice Dir., **K4TTN** Asst. Dir., **W4QDY** Asst. Dir., **W4KFC** Dir., **W8JM** SCM W. Va., **W4CE** Asst. Dir., **W4AJT** Asst. Dir. and **WA4FJM** Asst. Dir.



April, three expiring in May. All the rest of the announcements are repeats of previous announcements (Oct. QST), as these six will be repeated in the February issue — except Alberta, which will be repeated only if no petitions are received by the deadline. If, by deadline, only one valid petition is received, the candidate is declared elected and that's that. If no valid petitions are received by deadline, the QST

solicitation is repeated and the deadline set ahead until a petition is received. Meanwhile, the incumbent SCM continues to function, unless he specifically wants out, in which case an Acting SCM is appointed.

It all sounds more complicated than it is, but it's quite orderly and according to a set procedure. The most significant point to be made is this: watch the Election Notices in



## DX CENTURY CLUB AWARDS



From October 1, through October 31, 1968, DXCC certificates based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

### New Members

K6CH.....321	DL5ML.....125	VE7BQF.....109	WA9UVP.....104	DJ7TO.....102	W9LH.....101
CX1RY.....237	DJ8DV.....124	W8QJW.....108	CT3AU.....103	DL7NS.....102	K2MFY.....100
SM6CKU...231	SM5ZZ.....124	WA1ED.....108	F3IV.....103	K6NIQU...102	W1ARE.....100
W5LO.....226	WA4GQM...121	W7MKW...108	K5JBC.....103	WB2EJZ...102	W2HLI.....100
OH5VD.....206	HL9KA.....118	DL8AA.....107	K9UKM...103	WB2ZUB...102	WB2RXS...100
WA1HN...202	DJ9QT.....113	W4IN.....107	V77NF...103	WA4THL...102	WA3EPB...100
VE3CDP/	EA4JG.....113	DK1IZ...106	W6RXT...103	WB6RTJ...102	W5OUT...100
W9.....159	FO8BJ...111	G2AYG...106	WA6JDT...103	PY7VNY...101	W5ULN...100
DL9LY...141	VE1ATP...111	KR8BY...106	W8FE.....103	W3BYV...101	K5WUP...100
JA2JAA...131	DJ4LC...110	W6GLM...105	W9YGN...103	W4JVN...101	W8JEX...100
SM0TG...127	DL7JY/W6.110	JA2CZS...104	W9GBD...103	W9HZM...101	WA9EQG...100
		W2ECO.....104	YV4MC.....103		

### Radiotelephone

YV5AHR...308	WA1HEN...146	VE3CDP/	VE1ATP...109	WA0JBX...104	G5AFA...101
W3PH...290	W6HPS...130	W9.....120	W5HAK...109	WA4DWR...103	GM5AHS...101
W4DRK...240	DL5KY...129	K3BYV...118	K7AXF...108	SM5ZZ...103	W6FKD...101
SM6CKU...207	TIAPC...126	K7UXN...113	YV1WX...108	W2SHE...102	G3RQ...100
W5LOU...182	SM0TG...125	DL6KG...110	O4AYM...107	W3AVJ...102	H3MG...100
SP9ANH...180	3V8BZ...125	1ICAT...110	DJ3EJ...105	ZLIUH...102	W2GA...100
K1UHY...158	WA4GQM...121	K6OJO...110	W4EAL...105	5Z4KO...102	W4ORT...100
		EA4JG...109	WA9RQY...104		

### Endorsements

Endorsements issued for confirmations credited from October 1, 1968 through October 31, 1968 are listed below. Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

<b>340</b>	W6OME	I1XK	SP6AAT	K7PJF	OH3XZ	WB6OLR	WA2V8Q
W6KUT		JA7AD	VK5KO	PY2BJH	VO1AW	W9DE	W3STA
<b>335</b>	<b>315</b>	K6EIV	W1DEP	SM5BFJ	W7NPU	W9HDR	W9CBD
DL7AA	K7ADL	O4H2BC	W8DCH	SM6CAW	WA8PYL		
G5VT	W4BQY	SM7ANB	W9UX	WB2AMO	WA9LMY	<b>140</b>	<b>120</b>
W5UX		VK3YL		WB2CDZ	WA9TFM	DJ9EM	DK1HP
W9PGI	<b>310</b>	W7WLL	<b>220</b>	WA4DCP	W8NSU	JA1AA	K8NQF
	W6DQ		K6CWS	W5EGS	9J2IE	JH1ANB	K8QYQ
<b>330</b>	W6ISQ	<b>260</b>	K9GSV	W7CRT		K2EUR	K0DEQ
W9GFF	W6KG	DL8CH	WA2MNG	WA8RWU	<b>160</b>	K4OCE	W1YU
		VE3TB	W4HSJ		DJ6EO	K6DR	W2AQT
<b>325</b>	<b>305</b>	W4DRK	W6DOD	<b>180</b>	K1UDD	K6HWC/1	W2IBF
W7ADS	W4UKA	W5LRY	W6FB	DL6KG	K6KQN	O68RT	WA2WLN
		W9LKJ		H1Z	VE3ACU	O82DB	W6BPW
<b>320</b>	<b>300</b>			K3RUR	VE3BBB	VE3GHL	W4FFS
HB9EO	W2GDX	<b>240</b>	<b>200</b>	K4AVC	WA2VWI	W1LMZ	W8LAU
W2PDB		DL1BS	JA1TAA	K4QIE	W6HPG	W1VAH	W0DAK
W4CFD	<b>280</b>	K4IEP	K1UHY	LA5ID	W6HPS	W2R8O	ZS6BMD
	DL7CX		K4GLA				

### Radiotelephone

<b>330</b>	<b>305</b>	W6ZKM	W2PDB	K6CWS	F5RV	W8WRP	W4UF
G5VT	W7ADS	W7MKI	W6ZBS	LA5ID	F8SJ	W9KHI	WA8DEX
	W8BGU	YV4IQ		OH2XA	HB9ADE		WA8PYL
<b>315</b>	<b>300</b>	<b>240</b>	<b>200</b>	W1EED	11CTL	<b>140</b>	<b>120</b>
G3HDA	W5JWM	CT1BH	K2GPL	W3ABI	K6AO	DL3LS	JA1AAT
K2B2T		W18XQ	K4VKV	W41UO	K6GSV	K6HWC/1	K2EUR
ZS6UR	<b>280</b>	W5DL	WA1IHN	WA6DOB	WB2UZU	K6KQN	VE2AKZ
	IT1TAI	W7WLL	WB2LRK	W9DOR	W3MDJ	VE3ACU	WB2CDF
<b>310</b>	W3JK		W5EGS	<b>160</b>	W41XL	VE3GHL	W1DO
KP4CL		<b>220</b>	WB6CCV	DJ7CX	W6HPG	W1MDO	WA4NIB
OZ7FG	<b>260</b>	K1BDP		DL1BS	W7CRT	W2DY	WB4EWU
W5LZW	W1HJB	K8VCB	DJ9JX	DL1RA	W7WS	W4GRG	5U7AL

**QST**, so you will know when your SCM is coming up for reelection and you can act accordingly. If he is a good SCM, you will want to reelect him. If you don't like him, this is your chance to put *your* man in office. Five signatures aren't many. Too often, SCMs are elected by default—only one valid petition. Keep your eye on "Election Notices"—they are an important part of the democratic aspect of your League.—*WINJM*.

### 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 Jan. 11 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 Jan. 2 at 0500 Greenwich Mean Time on 3950 and 7129 kHz. **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 Jan. 11 becomes 2130 EST Jan. 10. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP for the coming 3-month period.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the 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. **CAUTION!** 0230 GMT Tuesday corresponds to 9:30 p.m.

(EST) and 6:30 p.m. (PST) Monday evening. 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 first 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 November QST
- Jan. 10: *It Seems to Us*, p. 9
- Jan. 14: *The Mainline FS-1 . . . Standard*,\* p. 34
- Jan. 22: *An R.F.-Actuated C.W. Monitor*, p. 39
- Jan. 30: *Amateur Radio Public Service Corps*,\* p. 78
- Date Text from *Understanding Amateur Radio*
- Feb. 3: *Grounded Antennas*, p. 98
- Feb. 7: *Impedance Values*, p. 99

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

### Ooops . . .

When it came time to reprint the *Operating an Amateur Radio Station* booklet (affectionately called OARS in the CD!) W1YYM had a brainstorm—why not include all countries in those "split sections" so newer type amateurs would readily identify their section.

One slight difficulty cropped up, however. All Western Pennsylvania counties were shown under an Eastern Pennsylvania heading! Transpose the East/West notations in the Atlantic Division and carry on, OMs. (*Sorry about that!*)

### OCTOBER CD PARTIES

Autumn is when leaves start falling and CD Party scores start rising. The October extravaganza saw three ardent Party-liners with over 900 exchanges and 300 kilopoints on c.w.; three of the Seedy Gang hollered their way to 100,000-plus on phone. Yet, as K2KIR noted, it was more a case of increased multiband operation than of increased participation. (There must be some way to work in the word "ubiquitous" here.)

Before you flip over some of the fancy QSO-per-hour rates below and in the CD Bulletin, keep in mind that the

### W1AW SCHEDULE, JANUARY 1969

The ARRL Maxxim 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 New Year's Day, January 1, 1969.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000					RTTY OBS <sup>3,7</sup>		
0030	←		CODE PRACTICE DAILY <sup>1</sup> 10-13-15 w.p.m.				→
0100		←		C.W. OBS <sup>1</sup>			→
0120-0200 <sup>4</sup>			7.020	3.520	7.020 <sup>6</sup>	3.520 <sup>6</sup>	7.020
0200		←		PHONE OBS <sup>2</sup>			→
0205-0230 <sup>4</sup>			3.820	50.120	145.6	1.820	3.820
0230	←	CODE PRACTICE DAILY <sup>1</sup> (15-35 w.p.m. TTTSat), (5-25 w.p.m. MWFSa)				→	
0330-0400 <sup>4</sup>			3.520		1.820		3.520
0400	RTTY OBS <sup>3</sup>		←		RTTY OBS <sup>3</sup>		→
0410-0430 <sup>4</sup>			3.625	14.095	7.095	14.095	3.625
0430	Phone OBS <sup>2</sup>		←		PHONE OBS <sup>2</sup>		→
0435-0500 <sup>4</sup>			7.220	3.820	7.220	3.820	7.220
0500	C.W. OBS <sup>1</sup>		←		C.W. OBS <sup>1</sup>		→
0530-0600 <sup>4</sup>			3.520 <sup>6</sup>	7.020 <sup>6</sup>	3.520	7.220	3.520
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		14.095	21/25 <sup>5</sup>	14.280	
2100-2200		14.100	14.280	14.100	14.280	14.100	
2300-2345		7.255	21/28 <sup>5</sup>	21.1 <sup>6</sup>	21/28 <sup>6</sup>	7.255	

<sup>1</sup> C.W. OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02 and 145.6 MHz.

<sup>2</sup> Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.6 MHz.

<sup>3</sup> RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 29.015 MHz.

<sup>4</sup> Starting time approximate. Operating period follows conclusion of bulletin or code practice.

<sup>5</sup> Operation will be on one of the following frequencies; 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.

<sup>6</sup> W1AW will listen in the Novice segments for Novices, on the band indicated (but will transmit on the frequency shown) before looking for other contacts.

<sup>7</sup> Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.

Maintenance Staff; W1s QIS WPR. \*Times-days in GMT. Operating frequencies are approximate.



use of good old "rubber-clock" time-fudging tricks (which, if you don't already know them, we aren't going to broadcast) is becoming prevalent enough so that something ought to be done to curb the practice. We're considering the adoption of a minimum time-off period similar to what we have in the SS, except that 15 minutes rather than 30 would be more appropriate for the Parties. It doesn't seem fair that a few contestants can perform feats of such astounding chronometric legerdemain that they actually wind up with as much as three hours of operating that appears in the log as "off time!" Let's call it a vote for equal opportunity.

In the following list of high claimed scores, read (from left to right) call, total score, number of QSOs, number of sections, and (hhmm) hours of operation. Final results will appear in the January *CD Bulletin*. — *W1ARR*

<b>C.W.</b>		WA7IFD	135,765-426-63-10
W1BGD/2	325,380-950-68-17	W0NH	128,990-391-62-8
K2KIR	318,780-950-66-19	W6NKR	124,990-424-58-15
K2EIU/5	311,100-908-68-20	W3KJJ	124,945-403-61-13
WA8SDC	289,440-858-67-19	K9CNC	124,440-408-61-8
K1ZND/8	287,640-839-68-20	K6LBY	121,695-394-61-15
W1EOB	266,640-801-66-20	K2KNV	116,400-382-60-7
W6DGH	261,690-786-66-20	W1FJU	116,290-401-58-11
W1ET (K1YKT, opr.)	250,250-764-65-19	W9RQM	110,010-379-57-6
VE7BDJ	246,895-730-67-20	K6QPH/4	108,560-363-59-13
K4RIN/5	240,320-747-64-20	WB4FEC	107,800-392-55-14
K2LWR	236,610-717-66-19	WA2ABY	107,400-353-60-15
WA9ITB	235,520-729-64-15	W8AEB	107,400-353-60-10
W4UQ	234,630-704-66-19	K3EXE	107,100-357-60-18
K0AZJ	214,170-645-66-18	W4HM	104,100-341-60-6
WB2RKK	207,900-653-63-19	W4KPC	104,160-365-56-4
K3HKK (K3AHT, opr.)	204,290-652-62-18	W4SQE	101,600-365-56-17
W3GN	194,370-622-62-13	WA9OTD	101,500-350-58-10
WB4AIN/4	192,820-616-62-18	W1AX	101,260-325-61-3
W6GEN	191,835-602-63-20	W0BM	100,890-335-59-6
W1ETU	186,000-600-62-17	W3DJP	100,800-329-60-8
K4FU	176,545-520-67-12	W6RW (W6s DQX RW, K9ZMS)	359,040-1056-68-20
K7WWR	171,105-556-61-20		
W9PJT	168,055-547-61-15		
K8HKM	165,750-506-65-16		
K2LJG	156,000-515-60-18		
WB4GTS	154,635-500-61-15		
WA8OCG	154,635-501-61-15		
W5QGZ	145,200-478-60-19		
W8DET	145,808-462-62-18		
WA9VZM	143,955-451-63-11		
W2FR	142,740-461-61-16		
WA1ABW	140,160-431-64-18		
W2PU (K8JLF, opr.)	135,765-424-63-14		

**PHONE**

K2EIU/5	178,890-527-67-19
W1BGD/2	160,225-486-65-15
K1ZND/8	122,450-388-62-16
K6QPH/4	81,780-277-58-20
W5QGZ	80,100-261-60-20
W8OWG	76,175-274-55-18
W3GN	75,350-267-55-12
K1PKQ/4	71,960-257-56-18
K9LBC/7	64,190-255-49-7
WA8SDC	56,970-205-54-5
WA9HHH/1	56,160-202-54-17

K4IEX	55,650-203-53-9	W6DGH	44,880-169-51-6
K3WUW	55,000-200-55-7	WA1ABW	44,345-174-49-9
WA5GZX	51,255-201-51-12	WB2TKP	43,000-168-50-11
K4TSJ	49,400-190-52-7	K4FU	42,550-178-46-7
K2KNV	46,500-180-50-7	K5ARH	42,000-165-50-4
W6GEN	46,280-171-52-9	K2LJG	40,185-168-47-10
W8NOH	45,050-165-53-8	K3AKR	40,038-153-51-19

**Remember the SET, January 25-26, 1969. QRV?**

**RESULTS, SEPTEMBER FREQUENCY MEASURING TEST**

The September 14, 1968 FMT, open to all amateurs, brought entries from 261 participants who made a total of 1040 measurements. Of these 56 ARRL Official Observers submitted 251, and 205 Non-OOs made 789 readings. All taking part have received individual reports of their readings. The standings accredited to the more precise in each group appear below; all listed show ability of the highest order in Frequency Measurement.

Following is a report of the standings of the FMT leaders in this test. In consideration of the minimum possible error, due to 'doppler' and unavoidable factors, we accredit as of equal merit all reports where computations show 4/10ths parts per million, or higher accuracy. Our direct comparisons with the umpire's readings otherwise establish this order of listing.

Observers	Parts/ Million	Non-Observers	Parts/ Million
W1BGW, W3BFF,		W1UYK, W2GBX,	
W3PYW, W4JUI,		W3CSZ (opr. of	
W4NTO, W5FMO,		WA3DZC) W3EKT,	
K6KA, W6RQ		K3LPP, W5BT,	
(ex-W6GQA)		K5EVK, W5UJF,	
(0 to 4)		WB6AAL, W6QEO,	
K9WMP.....	3	W6SPB, W7EJD,	
W6CBX.....	1.0	W7FNA, K7UWZ/	
K0BRS.....	1.1	CT2AT, W8LZY,	
W4ZEQ.....	2.6	K9KRW, K9QKB,	
VE6HM.....	2.6	VE3CSN, VE3CUS,	
K6EC.....	3.1	VE3DWG	
K8QKY.....	4.3	(0 to 4)	

**FREQUENCY MEASURING TEST FEBRUARY 8 (GMT)**

ARRL invites every amateur to try his hand at frequency measuring when W1AW transmits signals for this purpose starting at 0230 GMT, Feb. 8. **CAUTION:** Note that since the date is given in Greenwich Mean Time, the early run of the frequency measuring test actually falls on the evening previous to the date given. *Example:* In converting 0230 GMT Feb. 8 becomes 2130 EST Feb. 7. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3540, 7030 and 14,118 kHz. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 0236. It is suggested that frequencies be measured in the order listed. Transmission will be found within 5 or 10 kHz. of the suggested frequencies.

At 0530 GMT, February 8, W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies will be 3547, 7045 and 14,151 kHz.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will be-

come eligible for appointments by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified approximately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing, page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for QST listing of top results. Listing will be based on over-all average accuracy, as compared with readings may be a professional lab.

W1AW will transmit the official readings for the February 8 FMT via a special bulletin (on or about February 20). Thus, to qualify for an official written report, your individual results must be received at ARRL Headquarters no later than February 19.

• 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—SEC/PAM; W3DKX, RM: W3EEB. The First State ARC held its Annual Picnic at Pine Waters, Pa. W3DEO and K3YBU won the F.S. ARC 2-meter hunt. W3IID is asst. secy. of VPI ARC. W3CZS is the new Kent County EC. W3ADYG is signing up amateurs for RACES IN N.C. County. W3HKS has a new antenna up. W3CCT is now out of the Army. W3GSM, W3GKI and W3GQY are operating portable from the U. of Delaware. W3HWC is using a 6- and 2-meter quad. The Delaware Six Meter Net seems to have gone into a slump, so what say, gang, let's start checking into the net every Tue. evening. K3AXW reports African DX on 6 meters. W3AIOQ is now General Class. K3JLY passed the Advanced Class exam. DEPN reports QNI 56. QTC 8; DSMN reports QNI 39; KCEPN reports QNI 32, QTC 2; JTMN reports QNI 40. Traffic: W3DKX 46, W3EEB 32, W3HWC 5, W3ADUM 2, W3HKS 2, K3NYG 2, W3GSM 1.

**EASTERN PENNSYLVANIA**—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3AES, RMs: W3EML, K3MVO, K3YVG, W3MPX. PAMs: K3MYS, K3WAJ, V.H.F. PAM: W3FGQ. OBS reports were received from W3AFI, K3WEU, K3BHU, K3RDM, W3EEC and W3INC; OVS reports from W3HDI, W3BJQ, K3VAX, W3ZRR, W3IAZ and W3EEC; OO reports from W3KEK, K3NOX and K3RDT.

Net	Freq.	Operates	QNI	QTC	RM/PAM
EPA	3610	Daily 6:45p	385	507	K3YVG
PTTN	3610	Daily 8:00p		257	W3MPX
PFN	3960	Daily 5:30p	509	493	K3MYS
EPAEP&TN	3917	Daily 6:00p	615	323	K3WAJ
VHF (8)	50.25	Mon-Fri 7:00p			W3FGQ
VHF (2)	145.8	Mon-Fri 8:00p			W3FGQ

Note the PFN is now daily the same as the other nets. We have a new OPS, W3BNR. W3IUV is working on low-level antennas. W3HDI, W3JOB, W3FDB and W3HFY assisted local police in Halloween Patrol. W3BUR is off to Nassau. K3NOX has a new dipole antenna. W3AXA is back from K17-Land now rigging an antenna to work new friends up that way. The U. of P. hams just got a complete new station. W3BSV has a new HW-12 and an HW-32. K3MDG is busy at K3JHQ, Valley Forge Hospital station. W3INC fixed a BC-342 that was reported to be unfixable! W3ATQ and K3YJK took time out to go down to the FCC office and get their A tickets. K3WEU is going strong on the Book Review Net and servicemen's traffic for the holidays. W3AFI and W3CBH work as a team on broadcasts. K3OIE is finding that work interferes with ham radio sometimes! The EPA Section Dinner was a delightful success, thanks to W3FCP. W3NCNM is back on the traffic nets again. The winner for EPA in the N.Y. QSO Party was W3HOM. W3ICC, Bucks Co. EC, reports three new Asst. ECs—W3KTK, K3ZIG and W3BUR. W3ICC, assisted by K3ZAC and W3MPX, gave an ARPS Night at a Penn. Wireless Assn. meeting. The following EPAers participated in the FMT with their average accuracy following their calls: W3NCC 11.5, W3JET 8.6, K3EMA 14.8, W3BFF 0.3, W3AYW 321.3, K3DBD 26.5, W3FBP 28.2, W3NKLK 13.5, W3PT 0.6, K3LPP 0.0. BPL this month: W3CUL, W3VR, W3EML, W3MPX, K3NSN, W3INC, W3AOJ, W3ICC had a

dry run for Bucks Co. ARPS. K3KTH says computer school is cutting his ham time. Traffic: W3CUL 5479, W3VR 2117, W3EML 688, W3MPX 536, K3NSN 535, W3INC 307, W3ERL 281, W3CID 271, K3MVO 256, W3AOJ 191, W3HKN 175, W3AIZ 158, K3YVG 138, W3IUV 31NC 307, W3ERL 281, W3CID 271, K3MVO 256, W3AOJ 191, W3HKN 175, W3AIZ 158, K3YVG 138, W3IUV 128, W3AJKB 104, W3FCP 98, K3PIE 89, W3EXB 81, W3AGT 74, W3AGLI 70, K3VAJ 69, W3ATQ 6, W3HDI 66, W3EPC 63, W3HK 61, W3ABT 60, W3NWL 55, W3AFI 54, W3GUK 50, W3BNR 48, K3WEU 41, W3FGQ 40, K3OIO 36, W3EEC 27, W3AXA 26, K3BHU 24, K3HVK 22, K3MDG 22, W3CBH 19, K3RUA 19, W3VAP 18, W3JLF 15, K3SLG 12, W3CND 10, W3KJJ 10, K3KTH 8, W3OML 8, W3OY 8, W3ABSV 7, W3BFP 6, W3KEK 4, W3GYE 3, W3BJG 2, K3FOB 2, W3IAZ 2, W3ADE 1, W3BUR 1, W3EU 1, K3NOX 1, K3RDM 1, K3VAX 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	341	12.2	W3HTQ, RM
MDS	3643	0130Z	Daily	27	36	4.3	W3CBG, RM
MDCTN	3920	2300Z	S-T-T-S	18	67	18.5	K3GZK, PAM
MEPN	3920	2300Z	M-W-F	22	88		K3IAG
MTMKN	145.206	0200Z	T thru S	22	9	8.2	W3IFU

New appointees: W3UCE/3 as ORS, W3AJR as OPS, W3AERL as OPS, W3AIA as ORS, endorsed appointments: W3IN as OO Class I, W3ATQ as ORS and OO Class IV, K3LFD is the new SCM for MDC. I hope that John will get the same cooperation from the ARRL members of the MDC section as I did. W3LDD has published a new MDC Emergency Operation Plan which will be used in the coming SET. W3TN and W3IYS both made the BPL. W3FU was QRL with Intruder Watching and OO duties in Oct. W3GN reports 78 activity and was active in the V.H.F. Party on c.w. K3LGZ/3 has resumed ORS functions as a transplant from Missouri. K3NCM has new-car blues as he must build a new power supply for his mobile rig. W3KEB reports 10 states so far for his WAS. K3IRC/3 is a transplanted ORS from Michigan section. W3AYW was the MDC winner of the N.Y. QSO Party. W3EOV has had his activity curtailed by school. W3KCP has 24 states confirmed for his WAS. K3LFD has been appointed Asst. Director of the Atlantic Division. W3MYB is running two Novice classes. W3JBY will be mountain-topping in Frederick again. W3GYP has a new Advanced Class license along with WAC and WAS certificates. W3GEB is refurbishing his shack. W3JPT was one of the hot-shots at K4CG during the CQWW DX Contest. W3HRV/3 was the top man in the MDC QSO party from this section. W8QHW was tops from all the other ARRL sections. W3ECP is prepping his oldest grandson for the Novice exam. W3EOP has a new 2-meter HW-17 rig. W3FA finally has his antenna farm planted, W3JPT is relocating one of his antenna towers. W3ODC reports activity in the YLRL, YLAP and CD Parties. W3ENW reports handling emergency traffic with H18XMB. W3GGG reports successful operation on his 6-meter transceiver with troubles cured and is assembling a 40/80-meter c.w. rig. Traffic: (Oct.) W3IYS 477, W3TN 241, W3ATO 167, W3CRG 125, K3GZK 81, W3AERL 62, K3LED 53, W3IAQ 46, W3AJBY 39, K3JYZ 28, K3LFN 21, K3QCD 22, W3PCP 20, W3FA 11, W3ECP 10, W3EOV 10, W3AJR 9, K3IRC/3 6, W3AHNV 5, W3DPJ 4, W3EOP 4, K3LGZ/3 4, K3NCM 4. (Sept.) K3LFN 15.

**SOUTHERN NEW JERSEY**—SCM, Edward G. Rasmussen, W2ZZI—Asst. SCM: Charles E. Travers, W2YPZ, SEC: W2LVW, RMs: W2KIP, W2BLV, PAMs: W2AUVB, W2ZI, NJN reports QNI of 440 stations and 483 traffic; NJEPN reports QNI of 505 and 160 traffic. The N.J. Emergency Phone & Traffic Net's 10th Annual Dinner was held at Bhare's Tavern near Hightstown on Oct. 19 with some 47 in attendance. W2ZI formally turned over the net management to W2PEV, after serving 15 years as its manager and "grand-daddy" of the net. W2ABY and W2PU (K3JLF) both scored over 100k points in the Oct. CD Party. W2ZI attended the 6th

Annual Historical Radio Conference in Washington, D.C. Oct. 4-5-6 held at the Smithsonian Institution. W2EET, formerly of Oaklyn, now W4VJR, of Deerfield Beach, Fla., would like his friends to know he is working on 14 Mc. and looking for his old buddies. W2HIQ is MC of the RCA Net, which meets on 3885 Mon. and Fri. at 8 p.m. WA2BZY, winner of the NYS QSO Party, also made the 4th national spot in the contest. The Penn-Jersey V.H.F. Society held its annual auction Nov. 11. W2TLO has been released from the USAF. A new YL member of the NJPEN is WA2FGS, YF of W2CDZ. WB2UVB made the BPL again. SEC W2LVW has been in the hospital. WB2DRG sent in his first report. W2BHH and W2RVMX made good scores in the Sept. ARRL FMT. K2RXB (N0JZE) is now on the Navy MARS RTTY circuit. WA2GAA is in Veteran's Hospital, Philadelphia, Pa. WB2VEJ, our 81-year young vet of the NJN, finally made 100 messages. WA2EMB worked W9WCD in DeKalb, Ill., on 432 Mc., a record for this band. Traffic: (Oct.) W4ZUVB 225, WB2VEJ 111, W2ZL 109, WA2ABY 94, WA2WLN 90, W2ORS 67, W2FU 58, WA2-KTF 48, W2CKF 32, K2SHE 32, W2FU 21, W2YPZ 13, W2BLM 17, WB2FJE 16, K2JJC 11, WB2SFX 8, K2SOL 6, WB2GTE 4, WA2KAP 4. (Sept.) K2SHE 24.

**WESTERN NEW YORK—SCM.** Richard M. Pitze-ruse, K2KTK—Asst. SCM: Rudy Ehrhardt, W2PVI. SEC: W2RUF. Nets: NYS, 3675 kc., 1900 local; NYSF-TEN, 3925 kc., 2200Z; ESS, 3590 kc., 1800 local; NYSCN, 3675 kc., Sun., 1000 local and Mon. 1945 local. If your net is not listed here and does operate on the section level (but not necessarily NTS) please let me know. WA2CAL is a new ORS. Renewals are WB2FPG as ORS, K2LCT as OBS and WA2HSB as OPS. The section is in need of stations desirous and capable of being OBS and OOs. OVSs WB2ZDF, K2DNN and K2LGI moan the lack of 50-Mc. activity in Oct. W2ZDF continues progress on his 432-Mc. gear. W2MA yearns for the grandfather clause applying to the Extra. The Chemung County AREC elected WA2HPL, pres.; WA2FJJ, vice-pres.; WA2ZBD, secy.-treas.; K2DNN, trustee. W2QCTG is a new Rochester Novice—one of his first QSOs was with a PY. With the help of the power company, K2KBI got rid of the noise plaguing his 20-meter DXing. K2HOH celebrated his 50th year in amateur radio. Clarke College ARC elected WB2ARS, pres.; KA2BXX, vice-pres.; WB2PQS, secy.; W2SIT, treas. WA2s: SNV, HSB, CRC, WVI, JOH, GLA, JPM, JTY, TRI, EKT, JKA, UH, WB2, AXM, ZOC and W3EGP/2 all cooperated with the Plattsburgh RACES and police during their annual "Goblin Patrol" on Halloween. W2MTA reports traffic up in NYS to 399 in Oct. from 338 in Sept. Your SCM, along with K2KIR, W2ER, W2MTA, and W2RUF, represented W.N.Y. at the Hudson Division Convention in Tarrytown. W2GBX and W2EB each averaged less than 1 part per million error in the Sept. FMT. WA2YNS has a new three-element quad. A 50-ft. tower is on the way. W2ARB returned from a trip to England and Ireland. W2PZD made WAS and is QRX for the cards to prove it. WB2NZA got his Advanced Class license and Private Pilot's license all in one week. W2OE and WA2CAL again made the BPL. The RAGS Field Day group, using W2WS/2, finished 7th in the nation in the one transmitter class and was top W2. Traffic: (Oct.) W2FR 426, WA2CAL 410, W2OE 300, W2BOYE 258, WB-2GAL 213, WB2SMD 198, W2RUF 155, W2FVE 128, W2-MTA 110, W2QC 99, K2CC 61, K2RYH 58, WA2HSB 54, W2HYM 53, WB2VND 52, WB2ZDK 40, W2RQF 39, K2-JRX 37, W2ARB 24, W2PZL 21, K2IMI 19, K2OFV 19, K2DNN 16, WB2RWR 13, K2QDT 9, W2PVI 7, WB2-WZG 7, W2PNW 6, WA2PZL 6, WA2GLA 4, W2CFP 2, WA2YNS 2. (Sept.) WB2GAL 151, W2RQF 43, WB2NZA 6, WA2GLA 2.

**WESTERN PENNSYLVANIA—SCM.** John F. Wojtkiewicz, W3GJY—SEC: W3KPF, PAM: W3WFR. RMs: WA3AKH, W3KUN, W3MFB, W3NEM. Traffic nets: K3SN, 2330 GMT, 3585 kc. WPA, 0000 GMT, 3585 kc. The section's condolences are extended to the families of W3LXQ and W3WXX who passed on to the land of Silent Keys. This office wishes all a Happy and Prosperous New Year. Nominations are now requested for the outstanding amateur in Western Pennsylvania during 1968 for the William G. Walker, W3NUG, Memorial Award. Nominations, in triplicate, should be mailed to John F. Wojtkiewicz, W3GJY, 1400 Chaplin St., Conway, Pa. 15027. Deadline is midnight, Jan. 31, 1969. W3ELZ tries his new two-element quad on DX. K3AIT/73 got his Amateur Extra license. K3SMB has been appointed EC for Allegheny County. W7FDZ is the former K3NJZ. WA3GQO won first place in the New York State QSO Party. K3ZNP serves as a liaison station between the PEN and W.Pa. traffic nets. WA3RSP put up a tri-band beam. W3WFR and W3RSB were hon-ored with meritorious award certificates by W3YA, At-

lantic Division Director, for their outstanding services to radio amateurs in the section. W3QNI builds transverters for 144 Mc. W3ZUH is QSL Manager for 6Y5ET. K3ASI is looking for RTTY skeds on 146.70-Mc. A-2 transmissions. K3NPF is asst. chief engineer of TV channel 53 at Pittsburgh. WA3FOJ and his XYL, WA3-FOL, are using a new beam on 6 meters. WA3KSM, at Ellwood City, and others are on s.s.b. and c.w. during auroral openings just above 145 Mc. but most stations are crammed in down below 144.1 Mc. You Techs. who want to build up your code speed should try your c.w. above 145 Mc. W3BWU has performed the extraordinary feat of qualifying for "WPX" on 6 meters. It's imperative that we show good usage of amateur frequencies and privileges. One good way to do it is to participate in the Amateur Radio Emergency Corps. ECs are needed in counties throughout our section. You can help. Drop a line to SEC W3KPF for full details. A New Year's resolution: Check the expiration date on your license. Traffic: (Oct.) WA3-IPU 215, K3ZNP 163, W3NEM 130, W3LOS 88, K3HKK 68, K3SOH 36, W3GJY 23, W3KAT 23, K3ASI 22, K3SIN 16, W3YA 14, K3HCT 13, WB2P1/3 11, W3IDO 9, K3-SMB 9, W3LOD 8, W3ELZ 4, WA3HSI 4, (Sept.) WA3-HSI 19.

## CENTRAL DIVISION

**ILLINOIS—SCM.** Edmond A. Metzger, W9PRN—SEC: W9RYU. PAMs: WA9CCP and WA9PDI (v.h.f.). Cook County EC: W9HPG.

Net	Freq.	Time	Days	T/c.
IBN	3940 kc.	1400Z	Sun.	No report
ILN	3960 kc.	0000Z	Daily	203
NCPN	3915 kc.	1300Z	Mon.-Sat.	638
NCPN	3915 kc.	1800Z	Mon.-Sat.	
Ill. PON	3925 kc.	1700Z	Mon.-Fri.	602
Ill. PON	145.5 Mc.	2000Z	M.W.F.	217
TNT	145.36 Mc.	2100	Sun.-Fri.	338

This column's sympathy is extended to the family and friends of W9PMP and K9UNZ, who recently passed away. W9CEG, K9QKB, W9VOX, K9TPC, W9REC, WA-9OXI, W9CAA, K9KRW, W9KFK, K9WWP, W9KCY, K9HKJ and K9CZU participated in the League's recent Frequency Measuring Test. New appointees include WA9-ZUE and WA9YQT as ORSs, K9DTB as OVS, WA9-UPL and WA9VLK as OBSs. WA9LHU was appointed EC of DeWitt County. A W9 DX Contest, sponsored by the NIDXA in combination with the Annual W9-DXCC Dinner, will feature the most countries worked and confirmed starting Jan. 1, 1969, at 0001 GMT and ending at the DXCC Dinner. Contact K9VLE or W9-LKJ for details. W9JJN's new call is W9EY. The winner of the 1968 New York QSO Party in the Ill. section was WA9MMT. W9NWK reports that the traffic count for the 75-Meter Interstate Single Sideband Net was 424. W9JXV is the new net manager and W9NWK is assistant. W9T-EM operated from the National Electronics Conference at the Conrad Hilton Hotel Dec. 9, 10 and 11, K9AAU spoke about amateur moonbounce at a meeting at the Shedd Planetarium. K9FRZ is now Extra Class. Many of the Chicago Area amateurs participated in the Operation Eagle-eye on Election Day on 2-meter f.m. K9TXJ has been appointed trustee of the Palestine, Ill., Radio Club. W9HSD now has a complete 1-kw. s.s.b. portable equipment including generator, linear, exciter and antenna. The Radio Amateur Megacycle Society, Inc., will sponsor the 7th Annual Illinois QSO Party Aug. 2 and 3, 1969. Write to W9GFF for details. WA9TXW, K9BAG, WA9-TTH and WA9QCH were elected as officers of the Kishwaukee Radio Club of DeKalb. WA9RPF is looking for a high-quality, low-power c.w. station. W9CVY is hospitalized and we wish him a speedy recovery. W9ZZX has returned to W9-Land after a sojourn to the West Coast. The Barrington ARC holds regular meetings Thurs. at 8 p.m. at the Barrington High School. All are invited. WA9QZE is working DX and awaiting his con-firmations for a DXCC award. K9QXK, Radio Officer of Elmwood Park Civil Defense, reports that the motorized wheelchair fund for W9CUZ was successful. WA9NDM was guest speaker of the Nov. 6 meeting of the Chicago Area Teletypers Society. The Rolling Meadows Amateur Radio Club has published its first bulletin. A new Novice call heard is W9NZUR. Special Sesquicentennial medals were presented to the members of the Sangamon Valley Radio Club (Springfield) for their inauguration and diligence in making the Illinois QSL program a success by Mr. L. A. Wollan, jr. assistant chairman of the Sesquicentennial Commission. WA9CNV, WA9MHU, K9-KZB, W9KII and WA9TUM are RPI certificate recipients. Traffic: WA9CNV 1415, WA9MHU 873, K9KZB 520, W9-KII 405, W9NXC 337, WA9TUM 269, WA9AKR 167,

WA0OTD 127, WA9BRO 86, WA9PPA 78, WA9WNH/9 71, W9DQO 60, W9YH 58, WA9ZUE 54, WA9LDC 50, WA9-TC 38, W9HTZ 33, K9FRZ 9, K9HSK 9, W9LNU 8, W9PRN 8, K9TXJ 5, K9RAS 2.

**INDIANA**—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: W9BUQ.

Net	Freq.	Time	Oct. Tfc.	Mgr.
1FN	3910 1330Z	Daily 2300Z M-F	228	K9IVG
1SN	3910 000Z	Daily 2130Z M-S	701	K9CRS
		3900Z M-F		
QIN	3656 0100Z	Daily	186	W9HRY
Ind. PON	3910 1245	Sun.	49	K9EFY
Ind. PON V.L.F.	50.7 0200Z	Mon. Thurs.	34	WA9NLE

With deep regret I report W9DMU, of Indianapolis, and K9WRK, of Jeffersonville, as Silent Keys. W9PMT, mgr. of the Hoosier v.h.f. nets, reports Oct. traffic as 46. W9DOK is back on the air after being bedfast. W9EJI is on 6 and 2 with a new antenna. WA9QEQ has big trouble. WA9CJR has a new Swan 250. W9DGA received his Extra Class license. The Allen county Amateur Technical Society of Fort Wayne Ind., is setting up a 2-meter f.m. repeater. K9UBE and WA9UFU will soon have a club license. The Indiana Amateur TV and U.H.F. Club held its fall meeting Oct. 13 at the Naval Avionic Facility radio club house. The Indianapolis Radio Club held the first Annual Award Dinner Oct. 25. W9BS was recipient of the Award. Endorsements due in Jan.: K9IVG as PAM; W9SNQ and W9JSV as ECs; W.9A9UM and W9SNQ as ORSs; K9UIF as OVS; W9PMT and W9SNQ as OBSs. QIN Honor Roll: K9HYH 30, W9QLW 25, W9BDP 24, K9DHC 17, WA9MTY 17, WA9JBQ 16. Amateur radio exists because of the service it renders. BPL certificates went to W9JYO, K9FZX, K9IVG, W9EQO and WA9QOQ. May the year 1969 be a good year for all of you. This column wishes each and every one a Happy New Year. Traffic: (Oct.) W9JYO 1231, K9FZX 1029, K9IVG 791, W9EQO 510, W9HRY 322, WA9QOQ 219, W9JBQ 185, WA9VZM 129, K9CUB 95, W9ICU 88, WA9RWS 85, W9BPD 73, WA9RSL 65, K9HYH 62, K9RWZ 45, W9BUQ 44, WA9CJR 42, K9EFY 28, K9QVT 22, W9FWH 21, W9UEM 21, K9LLK 19, K9JQY 18, WA9VGB 18, W9LG 17, K9KYB 16, WA9EQE 16, WA9ALM 15, W9YXX 15, W9DOK 13, W9EUM 13, W9CMT 11, WA9KOH 11, W9DZC 10, WA9AUM 9, WA9BVL 9, W9SNQ 9, W9FJ 8, WA9KYG 7, WA9VJB 7, WA9VGN 7, W9DGA 6, W9PMT 6, K9GBR 5, (Sept.) WA9QLW 258, WA9VZM 237, K9HYV 40, K9JKD 35.

**WISCONSIN**—SCM, Kenneth A. Elbeter, K9GSC—SEC: W9NGT, RMs: W9DND and K9KSA. PAMs: W9NRP, WA9QNI, K9DBR, WA9IZK and W9LVC.

Net	Freq.	Time	Days	QNI	QTC	Mgr.
BWN	3985 kc.	1245Z	Mon.-Sat.	414	270	W9NRP
BEN	3985 kc.	1800Z	Daily	652	217	W9LVC
WSBN	3985 kc.	2300Z	Daily	1337	506	WA9QNI
WIN	3662 kc.	0115Z	Daily	309	92	W9DND
WSSN	3780 kc.	0030Z	Daily	215	43	K9KSA
WRN	3620 kc.	0130Z	Sun.	12	1	K9GSC
SWRN	50.4 Mc.	0300Z	Mon.-Sat.			K9DBR
SW2RN	145.35 Mc.	0230Z	Daily	429	47	WA9IZK

Net certificates went to K9WRQ for WSBN, WA9WOC for WIN, W9CGC for BEN and WA9YBM for WSSN and WIN. Renewed appointments: W9IQW, K9WTE and K9DHN as ORSs; W9IQW as OO and K9WTE as OPS. New appointment: WA9TXN as ORS. Welcome to K9-DHN, who moved to Wisconsin from Indiana. FMT results: W9BCY .6, W9ZZI 21.4, WA9VJL 107.7, WA9FZU 628 p.p.m. error. BPL certificates for Oct. traffic went to WA9QKP, WA9QNI, WA9GJU and W9ESJ. The Winnebago County gang held its Annual Halloween watch. WA9VNY is on 2-meter f.m. W9CHD won the New York QSO Party. W9NUW was NCS for the election-reporting net in N. Wis. K9GDF led the OOs with 13 notices. K9-DHN has a new SB-200. Traffic: (Oct.) WA9QKP 530, WA9GJU 379, W9ESJ 301, K9CPM 258, W9DND 247, W9CXY 218, WA9QNI 201, WA9RAK 154, WA9UMT 120, K9PHI 95, W9KRO 58, K9TBY 58, WA9PKM 57, W9DMU 49, W9NRP 43, K9KSA 42, W9DXY 40, W9AOW 38, W9AYK 37, WA9TXN 34, W9BCH 33, WA9RTP 32, K9JPS 29, K9DHN/9 26, W9IRZ 23, WA9OHY 22, WA9WOC 18, WA9QQM 14, WA9TUP 18, K9GSC 12, W9RQM 12, WA9SAB 8, W9ONI 5, K9GDF/9 4, (Sept.) W9CXY 137, W9DND 114.

## DAKOTA DIVISION

**MINNESOTA**—SCM, Herman Kopiselike Jr., W0TCK—SEC: WA0IEF, RMs: KO0RK, WA0EPX, PAMs: WA0MMV, WA0HRM. MSN meets daily on

3685 kc. at 0030Z. M/N meets Tue.-Sun. on 3685 kc. at 0100Z. Noon MSPN meets Mon.-Sat. at 1305Z on 3945 kc., Sun. and holidays at 1500Z. Evening MSPN meets daily on 3945 kc. at 2315Z. Appointments renewed: W0-QAC as ORS and W0FIT as Freeborn Co. EC. Results of the Aug. 14 FMT are: W0HEN 8.9 parts per million, W0DAK 26.2 p.p.m. and K0ZXE 107.2 p.p.m. Members and guests of the Minn. Wireless Assn. were guests of the Viking ARS in Waseca for an enjoyable time in Nov. Another year has come and gone with several serious communications emergencies along with the routine traffic-handling and other CD activities. I want to again thank everyone who took part in these various activities, the SEC, RMs, PAMs, ECs, OOs, OBSs, ORSs, OPSs, net controls and all workers in this section. With this large group of active amateurs working together toward ever-increasing public service work, much good can be accomplished for our amateur radio interests. I am pleased to see considerable interest in the upcoming SCM election this year, and hope when you receive your ballots, you will carefully review the qualifications and the interest the candidates have shown by their past activity in the Communications Dept. held before casting your ballots. Traffic: (Oct.) K0ZXD 416, W0MMV 37, WA0IEF 83, WA0MKF 74, W0FHH 68, WA0MMV 69, K00RK 60, W0TCK 59, WA0QNS 58, K0MVF 57, W0BUC 53, WA0ODB 40, W0BE 34, K0SRK 30, W0HEN 22, W0FHO 20, WA0QT 20, K0CNC 18, K0EFT 18, K0DEF 16, WA0NQI 16, W0KRN 15, W0KYG 15, W0EQO 13, WA0DT 12, W0BCO 9, WA0JPR 7, W0SZJ 5, K0ZBI/0 4, W0KLG 3, WA0SSN 3, WA0DPT 2, (Sept.) WA0SSN 11.

**NORTH DAKOTA**—SCM, Harold L. Sheets, W0-DM—SEC: WA0AYL, OBS: K0SPH, PAM: W0CAQ, RM: W0ELO, WA0OYV prevailed upon his fellow stage crew members of Central High to help him set that tower and quad at the new QTH. The GFAB Radio Club is starting Novice and upgrading classes. K4AAK is working with the theory while WRAB is the code instructor. K6WSP/0 is on 6 meters. The club meets for ragchews on 10 meters Sun. WA0TBR has everything ready to hoist that beam. K0PVG is back after a stint in the Army and has the Heath line on all bands where he lives in the country with plenty of room for an antenna farm. He works for the State Highway Dept. out of Valley City and keeps the mobiles going for them. WA0VGJ made it. That fills out the whole family of four hams in Abercrombie. K0PZY is working in Chienzo for the winter. W0FVX has been holding skeds with his brother, WA9YXB, on 40 meters. W0-TXQ spent several days with W0DM on route to Spokane, where he will spend the winter and receive medical treatment. W0DM has the radio classes well underway at Valley Jr. High with good response on the part of the pupils. Tentative plans are being made for such a course for Novices at the University after Jan. 1. Watch for later development on this, says WA0AYL. W0-NMV's traffic report is soaring. WA0HUU still finds the time to handle a few, too.

NDRACES: Sess. 22 Ck-ins 656 Tfc. 117 K0SPH, W0CAQ, W0EJF, W0HJU, K0PZK, W0GFE  
 NDPON: Sess. 12 Ck-ins 169 Tfc. 8 WA0TBR, WA0KRI, W0DXC, W0HKZ  
 Traffic: WA0HUU 176, W0NMV 118, K0SPH 18, W0DM, 10, WA0FUS 9, W0DXC 4, WA0TBR 3.

**SOUTH DAKOTA**—SCM, Seward P. Holt, K0TXV—SEC: WA0CPX, RM: W0IPP, PAM: WA0CWW, RM W0IIP reports the new c.w. SDN schedule as follows: Mon. through Fri. inclusive at 0045Z on 3645 kc. The late session has been discontinued. WA0PNB, WA0MFP, K0MZN and K0HYV report a successful link on HTTY. From reports of classes being conducted we should have a good group of new operators by the end of winter. Congratulations to WA0PNB on making the BPL three months successively. W0ZWL again is conducting the Weather Net at 1400Z on 3955 kc. Net reports: Morning Net—QNI 385, QTC 15, NJQ Net—QNI 332, QTC 292. Late Session Phone Net—QNI 1171, QTC 42. Total informals on three nets—194. Traffic: WA0-PNB 762, W0IG 40, WA0LLG 16, W0DVB 6, W0FJZ 3.

## DELTA DIVISION

**ARKANSAS**—SCM, Dennis Schaefer, WA5IIS—SEC: W5PBZ, PAM: W5PPD, RM: W5NND, WA5TLS reports that the Monticello emergency center is almost finished. K5BOC and WA5CAW are new Extras and WA5-RCK, WA5KQU and WA5TAF passed the Advanced Class exam. WA5VDH is a new OBS. The contest season is now in full swing. Let's try to make our section a little less rare in the operating activities this year. Net reports for Oct.

Net	Freq.	Time	T/c.	Stations	Mgr
OZK	3790	0100Z	29	235	W5NND
APN	3885	1230Z	21	481	WA5QM/Q
PON	3925	2130Z	153	276	W5MJO

Top stations on OZK were W5QOO 29, W5NND 28, WA5NOC 23, K5EDH 21 and WA5TFE 21. Traffic: (Oct.) W5OBD 756, W5NND 128, WA5KEF 66, W5MJO 62, WA5QPI 31, W5ELF 26, W5MYZ 17, WA5LYA 12, WA5OWZ 9, W5PBZ 8, WA5PKO 8, K5TCK 7, WA5TLS 1.

**LOUISIANA**—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: K5ANS/5. V.H.F. PAMs: WA5DAX, W5UQR.

Net	Freq.	Days	Times/GMT	Net Mgr.
LAN	3615	Daily	0030/0400	W5MBC
Delta 75	3905	Sun.	1330	WA5EVU
LAPON	3915	Sun.	1300	W5KC
LaRTTY	3612.5	Sat.	0100	W5GHP
CanGCHN	3935	Daily	0015	WA5NRG

W5ERR is a new OVS and W5EKF a new OBS. It is with deep regret that we hear that W5LA and Ex-5JJ/W5FUS have joined the ranks of Silent Keys. W5LA helped yours truly become a ham some 42 years ago. W5EA spends most of his activity with Army MARS. RM K5ANS/5 says he regrets that through an oversight LAN was not registered in the Net Directory. W5CEZ has recovered from a cataract removal. W5NVID worked 15 states during his first month on the air and on 15. W5HGT, the La. Tech. ARC station, is most active on LAN, according to WA5OHH. WA5QVN says W5NVQQ and W5VQR plan to join the Monroe 6-meter f.m. gang. WA5GIU has a new 6-meter f.m. rig. W5VRC will soon be on with a new rig. W5BUK and his XYL vacationed on Huntsville way. WA5LGO says his operating time has been fouled up by school skeds. The Ozone ARC has moved its meeting site to one offered by the Slidell Civil Defense. Code and theory classes have started. K5JBC, of Covington, was the La. winner of the Washington State QSO Party, while WA5KQN won state honors in the New York QSO Party. If interested in handling traffic on c.w. contact K5ANS/5 in Monroe. W5EXI has started his Annual Novice Roundup classes. W5WUMU made 522 contacts in the recent DX Contest. W5CQF has joined the Extra ranks. Traffic: W5CEZ 115, K5ANS/5 66, W5HGT 55, W5EA 14, WA5QVN 8, WA5OJG 4.

**MISSISSIPPI**—Acting SCM, Clifton C. Comfort, WA5KEY—It has been brought to my attention that the Columbia ARC has 100% membership in ARRL. The trick is to charge enough dues in the local club to pay each member's dues in ARRL. The MSBN had the privilege of working a unique liaison with CB radio on Oct. 27 when W4TOH, Pensacola, broke WA5PTE (NCS) and asked for help in contacting fishing boat *Pette*, somewhere off the coast of Mississippi and equipped only with CB radio. The Skipper's son had a 50-50 chance after an emergency operation. WA5KPS Pascagoula, WA5PPS Gulfport, W5BW Biloxi and WA5INL New Orleans, contacted local CBers while WA5SEG, WA5OKI and others "rode shotgun." In less than one hour word was passed that Capt. Zanetti was on his way home. More amateurs should attempt to train their local CB clubs in AREC and RACES methods of message-handling "just in case." W5JHS reported that the tornado near his home caused minor damage. There still are many openings for appointments as EC, ORS, and OPS. Check into our nets: Gulf Coast Side Band Net 3925 kc. 2330 GMT daily; W5JHS, net mgr.; Miss. Side Band Net 3947.5 kc. 0015 GMT daily; WA5TUD, net mgr. Traffic: K4RIN/5 84, W5BW 50, WA5JWD 13, WA5WKN/5 7.

**TENNESSEE**—SCM, Harry A. Phillips, K4RCT—SEC: W4WJH. RM: WA4YEM. PAMs: W4FPF, WA4YB, WA4EWW, WA4CRU.

Net	Freq.	Days	Time	Sess.	QNI	QTC	Mgr.
TSSB	3980	Tue.-Sun.	0030Z	27	1248	108	WA4YBT
TPN	3980	M-Sat.	1245	31	1090	117	W4FPF
		Sun.	1400				
ETPN	3980	M-F	1140	23	626	44	WA4EWW
TPN	3980	Thurs.	0200	5	(Wed. CST)		W4TYV
TPO	3980	Mon.	0030	4	94	2	K4RTA
TN	3635	Daily	0100	31	203	111	WA4YEM
TFN	7290	Daily	2200	31	306	62	WA4CRU
ETVHF	50.4	Tu.-Th.-Sat.	0000	14	189	1	WA4TJJ
ETVHF	145.2	Wd. & F.	0000	10	70	1	WA4TJJ

All club secretaries are requested to send a list of officers to K4RCT, address page 6. K4RTA is now Ad-

vanced Class. W4FX had his traffic activities curtailed by a gall bladder operation. Everyone should contact his local EC and/or SEC to make plans for group and individual participation in the Simulated Emergency Test Jan. 25-26. All clubs are invited to send a representative to the Tenn. Council Net (TCN) each Wed. night. Contact W4TYV for more information. Traffic: W4OQG 211, WA4YEM 195, W4SQE 169, K4AT 154, W4WBK 82, WA4UAZ 66, WA4GLS 61, WB4GSS 54, W4KQL 54, WB4HYX 42, WB4DGI 32, WA4NEC 31, W4FPF 24, WA4YFG 20, WB4ANX 12, WA4CGK 12, WA4TWL 12, WB4BHK 10, WA4WVW 10, K4LTA 9, W4OQG 8, K4RTA 8, W4TYV 8, WA4EWW 7, W4VJ 7, K4UMW 5, K4AMC 3, W4WJH 3.

## GREAT LAKES DIVISION

**KENTUCKY**—SCM, George S. Wilson, III, W4OYI—SEC: W4VYS. Appointments: W4CID and K4AVX, each as EC and ORS; W4TOY as OPS, OVS, OO and PAM (Owensboro Emergency Net). Endorsements: W4BAZ as RM, K4AVX as OPS. With the passing of WB4BKG we lost one whose conscientious ability left his mark on his every field of effort. His example as PAM of FCATN should inspire us all. WKU and EKV club stations have been most active on the nets. The Owensboro Club proxy is WB4FAY. WA4HFF is now with WCPO-TV. W4JUI was off only 14 kc. in 22 measurements in the FMT, with fine scores by W4RHZ, WA4WQZ, WA4AGH and K3-DXX/4. The new Telephone Co. Club in Louisville has 36 with K4QFE as pres.

KRN	343	QNI	34	QTC	KTN	859	QNI	161	QTC
MKPN	427		125		KTN	380		891	

Traffic: WA4DYL 1588, W4NLO 718, WA4FYH 333, W4BAZ 207, WA4AGH 129, WA4VZZ 112, W4NBZ 100, WB4AIN/4 98, W4UK 91, K4MAN 88, W4BHUS 82, WA4WWT 77, W4OYI 58, K4HOE 48, WB4FDK 46, WB4EQY 38, K4OEK 34, WB4HQW 31, WB4LZX 28, K4MPT 28, WA4GHQ 28, WA4UAZ/4 23, K4AVX 21, WB4EOR 19, WA4UHR 16, K4UMN 16, K4NYO 12, W4VYS 12, W4CDA 11, K4VDO 11, K4FPW 9, WA4GMA/4 7, WA4VEC 6.

**MICHIGAN**—SCM, Ralph P. Thetreau, W8FX—SEC: W8MPD. RMs: W8FWQ, W8RTN, WA8OGR, K8KM/Q, W8LXJ. PAMs: K8GOU, K8JED, V.H.F. PAMs: W8CWP, W8YAN. Appointments: W8EUI, W8IWF, W8JTC, K8KM/Q, W8PBO, K8QLL, W8RTN, W8SH, W8UFS as ORSs; WA8LRC, W8OQH as OPSs; WA8DHP, K8PBA as OVSs; K8JED as OBS; W8ARCU as EC. Silent Keys: W8MCC, W8WEK, W8WS, W8AN. BPLers: W8LXJ, W8NOH.

Net	Freq.	Time	Days	QNI	QTC	Sess.	Mgr.
QMN	3683	2300	Dy	1009	642	93	W8FWQ
WSSB	3955	2400	Dy	914	169	31	K8WRJ
C.L.E.N.	3992	0230	Dy	1010	94	31	W8ONZ
PON-DAY	3955	1800	M-Sat.	434	288	27	K8LNE
B/R-MEN	3930	2230	M-Fri.	915	79	27	W8OWG
PON-G.W.	3645	2400	M-Sat.	37	15	26	VE3DPO
MGMTN	50.7	2400	M-Sat.	270	47	27	WA8LRC
UPEN	3920	2230	Dy	559	65	30	WA8UCD

New officers: Brasspounders ARC—K8BDI, pres.; W8-FWQ, vice-pres.; K8UPE, secy.-treas.; K8KJL, act. dir. Hills ARS—W8YPB, pres.; WA8ZUW, vice-pres.; WA8TMX, secy.; WA8ELM, treas.; W8A8BN, W8HFM, WA8YQM, board. W8MPD and W8A8FO have a new son. The K8LNEs now have an adopted daughter a year old. U. OF M. ARC officers are K8QKY, pres.; WBZ-FIT, secy.-treas. The Wolv. V.H.F. S.S.B. Net is on 50.115 Sun. at 0200, the Noct Net on 50.418 daily at 1600. W8IV says he is moving to Arizona as soon as he sells out. W8EGR is hospitalized. W8JFJ, from Ø-Land, now is in Ypsi. WA8PII got an "Outstanding Service award" at the TAWAS Hamfest. W8LL's other hip operation was a success. WA88YZ is out of the hospital and in the nets. Both the CMARC and SMARA are running ham classes again. K8VQP (WOLDB/8) is back in Plymouth. K8HEW is with USAF Medical in Laredo. SPARS (W8NHJ) operated "spook patrol" on Halloween. WA8VZI is up at Mich. Tech. WA8ZUD is trying out an HA-1200. WA8TLW had successful knee surgery. Ask W8ZKL about his "new design" 2-meter antenna. WA8EMJ is building anew house. Cupid seems to have shot W8YFQ. WA8SIQ finished a new 40-ft. tower—and worked Germany. WA8ZNX is with the army in Alaska. The CMARC had a nice hobby show. Ask K8YRD about the desk phone he built into a slick monitoring device. Traffic: (Oct.) W8IXJ 627, WA8SQC 474, K8KM/Q 317, W8WNO 268, K8ZJU 256, K8LNE 241, W8JTC 215, W8DET 204, W8GAI 162, W8HLD 129, W8OQK 117, K8JED 94, W8UM 76, WA8OGR 72, W8RTN 69, WA8UPB 68, K8HKM 61, K8GOU 58, WA8ZAV 42, W8FX 40,

W81V 37, W8UFS 35, WA8LRC 34, W8YAN 31, WA8KRH 29, W8BEZ 21, W8IUC 17, WA8ONZ 17, W8MIO 16, W8-CUP 15, W8TBP 15, WA8ZPH 14, W8IWF 13, W8FVQ 12, WA8MGM 12, W8WB 11, W8VGO 11, W8OWG 9, W8AUD 8, K8VDA 8, W8EU 6, W8OQH 6, W8HKT 3, W8AVBL 2, W8MPD 1, W8SS 1, (Sept.) K8HKM 150, W8PEB 38, WA8QCW 13, WA8LRC 10, W8S 2.

**OHIO**—SCM, Richard A. Egbert, W8ETU—Asst. SCM: Roger Barnett, K8DDG, SEC: W8OUU. RM: W8IMI. PAM: K8UBK. V.H.F. PAM: WA8ADU. Oct. traffic reports:

Net	QNI	QTC	Sess.	Freq.	Time	Mgr.
(O)SSB	1555	743	58	3972.5	1530 & 2345Z	K8UBK
BN	613	443	61	3580	0000 & 0300Z	W8IMI
OSN	133	70	29	3580	2325Z	WA8VNU
06MtrN	338	94	30	50.6	0000Z	WA8ADU

BPL in Oct. was made by W8UPH, WA8AUZ and W8LT. Net certificates went to (BN) W8IUS and W8ETU; (OSN) WA8CZS, WA8BZR, WA8UTX, WA8TRE, WA8-UPI, WA8NTA, WA8CXY, W8IMI, WA8VNU, K8DDG and W8GVC. OSSB daytime session has a new manager, WA8KHR. Asst. mgr. is WA8DWL. Contrabulations to new Extras K8WVZ, K8VCW and W8ZNQ, and to new Advanced K8LFI, WA8VBS, W8DYF, K8QEW, W8DRW and WA8DRL. Oct. appointments: W8DYF as OBS; W8-ELE as OO; WA8GR, WA8GPX as OVSS; W8ELE as OPS; WA8ULF, W8GOE, WA8GRR, W8IUS as ORSs. New officers of the Lancaster and Fairfield Co. ARC are WA8SSI, pres.; WA8WFL, vice-pres.; WA8VCV, secy.; WA8SSJ, treas. OO W8QMT helps out local nets in checking their frequency, new rigs, etc. Herb's "Basement Lab" is well known to local hams who are interested in getting dope on their signals before putting them on the air in general use. WA8FLD copied facsimile transmissions from Nimbus weather satellites while they were in operation. Al used the equipment described in Nov. 1965 QST, and expects to resume activity when Nimbus IV is launched in May. W8BU reports 100 mile QSOs with 100-Mw. International crystal OX-L oscillators costing \$2.35 less the crystal. K8WVZ reports that the Henry Co. RACES is in business on 53.36-Mc. f.m. First exercise was the Spook Patrol with six mobiles in operation. The fall meeting of the Ohio Council of Amateur Radio Clubs was attended by representatives of 24 clubs, nets and other groups. The next meeting will be held Mar. 1, 1969 in Columbus. I attended the Second ARPSC Conference in Toledo Oct. 19. NTS and AREC/RACES personnel from Ohio, Mich. and W. Va. were in attendance. W8RYP, W8CHT and K8LFI did a dandy job of organizing the meeting. The next meeting will be held in W. Va. next fall. I attended the very enjoyable pre-Sweepstakes meeting of the Miami Valley Amateur Radio Contest Society Oct. 23. These contesters split their club into two groups competing against each other to enhance the SS battle. January is Simulated Emergency Test month. ECs and AREC members, as well as NTS personnel, should have their plans all laid by now. ECs would do well to contact the Section Net Managers and find out what the SET schedules are and plan to work both the local and long-haul operations together. Traffic: (Oct.) W8UPH 1688, WA8AUZ 551, W8RYP 343, W8SZU 241, W8IUT 239, W8IMI 228, W8-QZK 141, WA8VNU 126, W8FGD 118, WA8UTX 115, WA8OCG 109, W8ERD 103, WA8ULF 100, W8IJK 97, WA8SD 96, W8CHT 95, W8GVC 95, WA8AJZ 87, W8-QCU 86, W8LRE 81, W8SUS 73, K8UBK 73, K8UDG 71, WA8CXV 70, WA8FSX 70, K8ONA 69, WA8CXY 67, WA8ZGC 64, W8PMJ 60, W8IUS 56, WA8WJR 51, W8-FEB 50, W8SZU 50, WA8ADU 49, K8BYR 46, WA8LAM 46, WA8DUL 45, W8GOE 44, K8QYR 42, W8OUU 38, WA8RQ 36, W8ETU 32, WA8MHO 32, WA8DWL 29, WA8YHN 27, W8JEH 26, WA8SH 26, WA8VVP 25, W8BED 25, WA8PPK 25, WA8UTX 24, K8LXA 22, W8BBH 20, WA8QFK 20, WA8RWK 20, W8UX 19, K8-PDG 18, K8LFI 18, W8OE 18, W8ELE/8 17, K8VCW 17, K8CKY 15, W8FRV 15, W8HNP 13, W8LAG 11, WA8NTA 11, WA8SKI 11, W8OXQ 10, W8LZE 9, WA8-GRR 8, WA8GZE 8, W8VND 8, W8YGR 8, W8GRT 6, WA8UXL 6, WA8COA 5, WA8KPN 5, WA8UPI 5, W8-WEG 5, W8A4ZH 4, K8FKG 4, W8VVL 4, WA8WTK 4, KRWZI 4, WA8ZNC 4, W8EEQ 3, WA8LEM 3, W8DYF 2, (Sept.) WA8RWK 40, W8QXQ 38, K8WKS 21, W8EIK 3.

## HUDSON DIVISION

**EASTERN NEW YORK**—SCM, Graham G. Berry, K2SJN—Asst. SCM and RM: Ruth Rice, WA2VYS, SEC: W2KGC. PAM: WB2VJB. Section nets: NYS, 3675 kc. nightly at 0001Z; ESS, 3590 kc. nightly at 2300Z; NYSPT&EN, 3025 kc. nightly at 2300Z. Appointments and renewals: WA2JWL as EC for Westchester County, WB2RBG as OPS and OVS, K2AJA as ORS, WA2VYT as OPS and ORS. Srv. to lose two County ECs who have left ENY—WB2FXB and K2GCH. W2HZZ takes over Dutchess County. Club activities: Niskayuna HS is

building a 6-meter rig and reports WB2WDH, pres.; WB2DUO, vice-pres.; WB2EUQ treas.; and WA2CRW, secy. Other school clubs are requested to get in touch re a possible HS net. The WARA had WA2FLJ present a demonstration on slow-scan. TV equipment at its Oct. meeting. Note: The WARA Tech. Net now meets at 28.650 Mc. Tue. at 8 p.m. local. Hudson Council (HARC) officers for '69 include K2SJO, pres., and K2IES as director. The Harmonic Hills RL was visited by Division Director W2TUK, Vice-Director K2SJO, the SCM and Asst. SCM at its Oct. meeting. Net activities: the NYS met eyeball at the Division Convention in Tarrytown and reports the issuance of many Section Net certificates this quarter to qualified members. 2RN also met at Tarrytown. The ENY and WNY traffic-handlers met on an informal but helpful basis at Tarrytown, too. NYSPT&EN still is keeping the QNI count high month after month. W2MXH was the honor station for the last report period with 29 check-ins out of a possible 30. Individual activities: Congrats to W2CFN on 50 years of being licensed. In the recent official Frequency Measuring Test, W1U-YK/1, WA2BUC and K2BJG all racked up fine scores. Congratulations to all. Welcome to WN2HHO, checking in via mail while away at school in Mass. WB2YUQ reports the Oct. sunspot storm and aurora kept things jumping on v.h.f., as did W42GXF. He's still looking for an early A.M. sked on 145.080. WB2RBG reports hearing VE2, VE3 and Ws 1.2,3,8 and 9 on 50 Mc. during the aurora and working three W4s in Florida during the Oct. 29-30 opening. Your ENY staff enjoyed meeting a number of people, too many to list, at the HARC Convention in Tarrytown. Traffic: (Oct.) WA2VYS 184, WA2VYT 83, W2ANY 47, W2ODC 42, K2SJO 35, WB2-RBG 27, WA2BVF 26, W2FOA 26, W2TPV 22, WB2-CRW 21, WB2VEU 17, W2VJB 17, WA2VGS 9, WA2BUC 1. (Sept.) WB2VJB 25.

**NEW YORK CITY AND LONG ISLAND**—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGL. SEC: K2OVN. PAM: W2EW.

NLI*	3630 kc.	1915/2200 Nightly	WA2UWA RM
NLIVHF*	145.8 Mc.	1930 MTWTF	WB2RQF PAM
NLIphone*	3933 kc.	1600 Daily	WB2ZET PAM
Clear Hse	3925 kc.	1100 Daily	WA2GPT Mgr.
Mic Farad	3925 kc.	1300 Ex. Sun.	K2UBG Mgr.
East U.S.	3663 kc.	0001 Nightly	K2UBG Mgr.
All Svc	3925 kc.	1300 Sun.	K2AAS Mgr.
NYSPTEN	3925 kc.	1800 Daily	K2AAS Mgr.

\*Section nets. All times shown above are local. WB2BDJ/2 picked up loads of traffic at the Brookhaven National Lab's "Open House." A priority message came into the Clearing House Net last month; it was weak, but the entire net stood by and struggled to copy it. A New Jersey RACES operator was critically injured and the need for blood was urgent. The net fanned out immediately to about 20 more nets and within 24 hours they had more donors than necessary. The magic of amateur radio working again? No! Just a bunch of traffic-handlers taking care of one of several similar emergencies that occur in the average traffic net throughout the year. Nothing magical about it; they simply wrote another paragraph in the history of amateur radio's contribution to public service. Wouldn't you like your station to be part of this chapter? Then get thee hence to a traffic net, doggone it! Congratulations to WA2GLR, who just passed the General Class exam but still likes the wood old 6-meter ground-wave stuff on a cold winter night. W2EW is using an Ameco 2-meter converter on the HQ-150 and has a 'X62 to match. We were sorry to learn that W2ER has joined the ranks of the Silent Keys. W2BCB claims he has the old rig all fired up for phone operation nowadays. The 21st Annual QCWA Dinner was held Oct. 25, 1968, with W4VI as the guest speaker. Another 25 fifty-year awards were given out, raising the total to 207 issued since 1964. WB2PTS has two new antennas up for chasing DX on 10 and 15 meters. WB2THL won the Flatbush RC's WAS contest with his trusty old R4-T4X combo. The NYL over at W2UAL's locked up all the mikes and keys then showed him where the paint brushes were stashed. K2-IYG completed his Ph.D. last summer and then in the fall journeyed to London with 25 other Ws to attend the annual FOC Dinner. The Massapequa RC now meets at C.D. Headquarters over in Massapequa Park. Officers of the Kings County RC are W2MBU, vice-pres.; WB2YPN, secy.-treas.; WB2NDI, communications mgr. The Kings County RC meets the 1st Mon. of the month at the Brooklyn Public Library at Grand Army Plaza. W2AML, WA2FMN and WA2QBB are new stations on the NLIVHF Net. Congratulations to WA2EYV, who passed the Advanced Class exam. The same goes for WB2QFV, who passed the Advanced also. Happy New Year one and all! Traffic: WA2GPT 271, K2UBG 174, K2UAT 110, K2AAS 36, WB2PJH 29, W2DBQ 24, WA2RUI 22, W2VEW 20, W2EC 16, WB2YKU 13, W2BCB 12, WA2GRT 10, W2PF 10, WA2LJS 9, W2WCS 8, WA2EMP 7, W2LJK

4, WB2PTS 4, WB2DXM 2, WB2QLL 1, WA2QJU 1, WB2THL 1.

**NORTHEN NEW JERSEY**—SCM, Louis J. Amoruso, W2ZZZ—Asst. SCM: Edward F. Erickson; W2CVW. SEC: WA2ASM.

**ARPS Section Net Schedules.**

Net	Freq.	Time	Days	Sess.	QNI	Tfc.	Mgr.
NJN	3695 kc.	7:00 P.M.	Dy	31	440	483	WB2DDQ
NJSN	3740 kc.	8:00 P.M.	Dy	10	34	6	WB2RKK
NJEPTN	3928 kc.	6:00 P.M.	M-Sat.	31	505	160	W2PEV
NJPON	3930 kc.	6:00 P.M.	Sun.	4	83	17	WA2TEK
NJAN	50,300 kc.	8:00 P.M.	M-F	24	384	46	WA2KZF
PVTEN	145,710 kc.	7:30 P.M.	Dy	31	362	96	K2KQD
ECTN	146,700 kc.	9:00 P.M.	Dy	31	306	101	WA2TEK

RM: WB2DDQ and WB2RKK. PAMS: W2PEV, K2-KDQ, WA2KZF, WA2TBS and WA2TEK. New appointment: WA2CRF as OVS.. Endorsements: WA2ASM as EC for Plainfield. W2CVW, K2DEL, K2KQD as OVSs. W2BSC as OPS and ORS. W2JDH as OO and WB2-ZSH as ORS. New club officers of the Fairlawn ARC are WA2WYV, pres.; WN2EGR, vice-pres.; W2NPT, treas. The N.J. Phone Net Dinner had another good turnout. W2ZI used the occasion to turn the net manager's job over to W2PEV after 14 years on the job. WB2MEE added the SB-200 to his gear. WA2EZZG now is using a TX-60. WA2DZD has a new Swan 400. WA2-AMM is building the HW-100. K2DEL has a new TR-4. The TA-33 and 75-meter dipole make up the antenna farm. K2KQD is on 2-meter RTTY and looking for QSOs between his net sessions. WB2RKK made the national high score in the recent N.Y. QSO Party. W2TUK, with W2ZZZ, presented the affiliation charter to W2FCL. WB2MXZ joined Air Force MARS. WB2DRJ received his WAC. WN2EPI has 14 worked for his DXCC on 15 using his DX-60. K2PPZ, WA2CCF, WB2CZM and WB2JRC submitted measurements for the Sept. FMT. Congratulations to the following on moving up a grade: WN2GIE to Tech.; WA2DMI to General; W2-DLT, W2ISK, WA2KNS, WB2FUF and WB2YQP to Advanced; W2MFP and WB2UVP to Extra. WB2RUM is building an answerback for his RTTY. WA2DMI now is using the HX-10. WB2RKK is looking for additional NCSS for his NJSN. All N.J. nets will be active for the SET operation. We hope everyone reading this will send a message to the SEC or your local EC to let him know you are participating. Thank you for keeping me another two years. I will continue to do my best but I need your reports. Hope to hear you in the SET. Traffic: (Oct.) WA2IGQ 397, WB2DDQ 336, WB2RKK 328, WB2-NSV 186, WA2TEK 164, WA2TBS 154, K2KQD 90, WA2TAF 90, WA2AMV 80, W2EWZ 76, WB2ZSH 63, WA2DQE 58, WB2ZBI 56, W2ZZZ 54, WA2ACJ 52, WB2-BXK 50, WA2AMM 47, WB2VLC 38, WB2WNZ 38, W2PEV 29, K2ZZF 20, WB2YQP 28, WA2ACP 20, WA2-CRF 20, WB2YXY 17, WA2CLO 14, WB2NJB 13, WA-2GLI 12, WA2KZF 12, K2DEL 10, K2MPX 9, WB2BK8 8, WN2CWU 8, WB2BCS 7, W2TFM 6, W2JDH 4, K2-JSI 4, WB2DRJ 2, K2EQP 2, WB2RUM 1. (Sept.) WB2TUL 102, WB2AMV 37, WB2YQP 22, WA2ACP 9, K2KAB 8, WB2BXC 7, WA2KOS 6, WB2CCL 1, WN2-GIE 1.

**MIDWEST DIVISION**

**IOWA**—SCM, Wayne L. Johnson, K0MEX—SEC: K0LVB. PAM: W0PZO. RM: W0LGG. OBSs: W0-LCX, W0JQA, W0AMIT. Official Bulletins are sent from W0LCX on 3560 kc. just before the Tall Corn Net, Mon., Wed. and Fri. evenings. New officers of the North Iowa Club are WA0IRP, pres.; WA0NYU, vice-pres.; K0YVU, secy.-treas.; W0KUS, act. mgr. The Cedar Valley Club has installed a permanent 50-Mc. groundplane for emergency work and initiated it assist-ing the Cedar Rapids Police Dept. on Halloween. W0-BIT reports twelve cars with transceivers were involved. W0PFP observed good aurora on Nov. 2 and worked a K1, a VE6 and heard a K17. WA0OTE says that ISU has slowed him down some but he has 152 confirmed with 167 worked. W0MOW, K0AKQ and K0MKD par-

ticipated in the Sept. FMT. WN0SWQ has joined the WAVES. The Annual SET comes up in Jan. There still are a few EC vacancies. K0LVB would like full partici-pation and complete coverage of the state. Can Iowa improve on last year's score and perhaps lead the nation? ECs: Please make Gregg happier than he is already! Happy New Year.

Net	Freq.	Day	GMT	QNI	QTC	Mgr.
Iowa 75	3970	M-Sat.	1830	1093	138	W0PZO
Iowa SSB	3970	M-Sat.	2359			W0YLS
Iowa 160	1815	Daily	0100	610	12	K0TDO
TLCN	3560	Daily	0030	140	57	K0AZJ
PON	3915	W & F	0030	168	28	WA0DYV
PON	3697	Tue. & Sat.	0030	43	7	WA0DYV

Traffic: (Oct.) W0LCX 873, W0LGG 82, WA0SDC 49, WA0SRM 38, WA0DYV 32, K0TDO 30, K0TFT 18, WA0AIW 12, WA0JUT 12, WA0QZL 2. (Sept.) W0LGG, 177.

**KANSAS**—SCM, Robert M. Summers, K0BXF—SEC: K0EMB. RMs: WA0MLE, WA0JFV. PAM: K0JMF. V.H.F. PAMS: WA0CCW, WA0LSH. Silent Key: W0-ONH passed away Nov. 3. Our deepest sympathy to his family. Let's welcome W0CJH, Junction City, back to the ham bands after a lapse of several years. New OPS: WA0SHG, Shawnee Mission. On the sick list: WA0BHG, net mgr. HBN, heart attack. Same W0VRZ. WA0RKY is recuperating. New EC appointee for Zone 1 is WA0OZP, Hiawatha.

Net	Mgr.	Freq.	Days	Time CST	QNI	QTC	Sess.
KWN	WA0LLC	3920	Daily	1800	685	175	30
KSBN	K0JMF	3920	Mon.-Sat.	1830	720	275	30
KPN	"	"	M-W-F	0645	120	11	7
			Sun.	0800			
Kans PI	WA0CCW	145.34	Sat.	Varies per section	5f	2	7
EC Net	WA0CCW	3920	Sun.	1300	41	1	4
HBN	WA0BHG				444	78	23

The Zone 14 AREC/Rag Chew Net now is back on Sun. at 2 P.M. on 3920. Kansas Novices still are needed. QNI QKN 7160 kc. 2100Z Sun. and 2300Z on 3735 kc., Wed. on 7160 kc. at 2300Z. RM WA0JFN invites all classes not just Novices. Other V.H.F. Nets, including Zones 7, 9, 11, Coffeyville 2-Meter Net and ACARA, 210 QNI, 12 QTC from combined 22 sessions. Zone 11 reports 75 QNI and 8 QTC in 4 sessions. Traffic: W0LXA 283, W0JNH 218, WA0LLC 183, WA0NFP 176, K0HGI 172, WA0-LBB 127, K0JMF 118, K0BXF 113, K0VDN 74, K0J-DD 70, W0QQQ 62, W0CCZ 51, W0BGX 48, WA0OZP 45, W0FDJ 39, WA0SHG 32, K0LPE 31, WA0OWH 30, WA0CCW 25, K0GIL 23, K0GZP 23, W0FPI 17, WA0-JOG 17, W0SFP 14, K0UHV 13, WA0KPE 10, W0ICV 9, W0OAQ 6, W0DHC 4, W0LYC 2.

**KANSAS WEEK AWARD**

January 26-Feb. 2, 1969

Work Kansas for the Kansas Week Award, sponsored by the Jayhawk Amateur Radio Society of Kansas City, Kansas. The event begins at 0001 GMT January 26, 1969 and ends at 0600 GMT February 2, 1969. Kansas stations contact 25 out-of-state stations. The rest of the U.S. work 10 Kansas stations and DX stations work 3 Kansas stations. Send full log data (plus an s.a.s.e.) to the Jayhawk Amateur Radio Society, Box 1144, Kansas City, Kansas, 66117

**MISSOURI**—SCM, Alfred E. Schwaneke, W0GS—SEC: W0BUL. K0AEM renewed EC appointment for St. Louis and St. Louis Co. K0JPL renewed as OPS, and WA0FKD and K0RPH as ORS and OPS. WA0-ELM has resigned as mgr. of MTTN, and has received ORS and OPS appointments. A new manager is needed. The net met on 3940 at 5 P.M. (2300Z) Mon. to Fri. New officers of the UMR ARC (W0EEE) are WA0-NOK, pres.; WA0PQF, vice-pres.; WA0HOR, secy.; WA0RHM, treas.; WA0ACF, station mgr. W0EEE has a new operating console. WA0EBS and K0GXZ are new members of the St. Louis ARC (K0LIR). Clay Co. RACES held an emergency exercise in October with 17 operators active. K0ONK has returned from U. of Denver, where she attended a theatre workshop and also performed for KRMA-TV. W0AMO, while vacationing

**SWITCH TO SAFETY!**



in KH6, ran across ex-KØJDM from K.C. (now KH6-GEK). The meeting resulted from an ARRL decal on KH6GEK's auto. KØIOG passed the Adv. Class test. KØEY is now Extra Cl., KØRPH is new Adv. Cl. WÑOSYI passed the Gen. Class exam and is now WØ3V. WØRFD has a new NCX-3. WÅBBS, from Arkansas, is new in Monett. WÅQOI has a new tri-band quad on 48-ft. tower. SS messages were received from WØEMS, KØEY, WÅOLI, W. KØREV, WÅTKV and WØYOR. WÅOFL, WÅOHTN, KØIKZ, WØLLB and WØRWH participated in the Sept. FMT. Net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MEN	3885	2330Z	M-W-F	13	154	12	WØBUL
MØSSB	3963	2400Z	M-Sat.	26	855	474	WØRTO
MNN	7063	1900Z	M-Sat.	26	89	26	WØUD
SMN	3585	2200Z	Sun.	1	6	1	WØUD
MoPON	3930	2100Z	M-F	27	95	53	WØHVJ
PHD	50.45	0130Z	Tue. (GMT)	4	91	8	WÅØKHU

Traffic: (Oct.) KØONK 4134, WÅOHTN 227, KØAEM 128, KØVVH 107, WØUD 81, KØRPH 71, WÅOQX 50, WØEEE 43, KØJPS 34, WØRTO 26, WØBUL 25, KØORB 22, WÅOFMD 20, WÅØKHU 16, WØGBJ 4. (Sept.) KØONK 2386, KØWBD 1412, WØEEE 6. (Aug.) KØWBD 1216.

**NEBRASKA**—SCM, V.A. Cashon, KØOAL—SEC: KØODF. Monthly net reports for Oct.: Nebr. Storm Net, WÅOLOV, 0303Z session, QNI 581, QTC 70; 2330Z session, QNI 1136, QTC 75. Nebr. Emergency Phone Net, WÅOGHZ, QNI 1092, QTC 301. Nebr. Morning Phone Net, WÅOJUE, QNI 1175, QTC 36. West Nebr. Phone Net, WØNIK, QNI 513, QTC 15. AREC Phone Net, WØIRZ, QNI 186, QTC 3. AREC C.W. Net, WÅOEEI, QNI 10. Nebr. C.W. Net (NEB), WÅØHVR, first session QNI 86, QTC 23; second session, QNI 98, QTC 19. 160-Meter Phone Net, WÅOCBJ, QNI 75, WØQFB has retired from the Omaha Fire Dept. Art, was Nebraska SCM 1944-46. The Ak-Sar-Ben ARC's new meeting place is at Red Cross Headquarters. Hastings ARC has 40 enrolled for radio theory and code classes. Hastings ARC holders of Advanced Class tickets are WØLJO, WÅOFNY and WÅORKQ. Congratulations! The 160-Meter Phone Net meets on 1995 kc. at 0230Z. Traffic: (Oct.) WÅOIBB 328, WØLOD 180, WÅOGHZ 109, WØHTA 88, WÅØHVR 56, WÅOCBJ 32, WØQFB 30, WÅOEX 28, KØJFN 27, WØBNV 20, WÅOJUE 20, WÅØKGD 20, WÅOJMY 19, WÅOPCC 17, KØFRU 16, KØJTW 16, WÅOJH 14, WØNIK 14, KØDGV 13, KØKJP 13, WÅOQLE 10, KØJNY 9, KØODF 8, WØVEA 8, WÅOLOV 6, WÅOPIF 6, WØSWG 5, WÅOGK 4, WÅOEF 4, WÅOGAT 4, KØJPP 4, WØPHA 4, KØSFA 4, WÅONYM 3, KØOAL 3, WÅOQX 3, WÅOFGV 2, WØQOP 2, WÅOIBL 2, WÅØIHW 2, WØYFR 2, KØYRL 2, WØBEN 1, WÅOJKN 1, KØTPK 1. (Sept.) WÅOJH 8, WÅØKGD 2.

## NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, John McNassor, WIGVT—SEC: WIPRT, RM: WÅIHNS, PAM: WYIBH, V.H.F. PAM: KISXF. Activity report for Oct.:

Net	Freq.	Days	Time	Sess.	QNI	QTC
CN	3840	Daily	1845	31	290	420
CPN	3880	M-S 1800	Sun.	1000	31	604 384
VHF 2	145.98	M-S	2200	23	10	25
VHF 6		M-S	2100	23	223	62

High QNI: CN—WÅIHOL, WÅIHNS and WIRFJ. CPN—WIGVT and KISXF 29, WÅIHEW 28, WYIBH and KIGYS 27, WÅIEG 25, WILUH/WÅIYJK and WYIU 23, WÅIFXS 22, KILFW 18, KISRF 16. WIPRT appreciates EC reports. The Talcott Mt. U.H.F. Society provided Election Day EC for Avon. Goblin Patrols were active Halloween. Many amateurs took the FCC exams at the Tri-City Hamfest. The Annual ARRL Night was observed by the Hampden County and the Hartford County Clubs with the Hampden Club as host this year. The Southington ARA and Meriden ARC presented Friendship Trophies to visiting amateurs PÅØMDG and PY2DXI. Include our Director's letter and the ARRL Affiliated Club Bulletin at your next club meeting. The Murphy Message is a must for all contest operators. Candlewood ARA will appreciate your support of the Conn. QSO Party Jan. 18-19. WYIBH has prepared a new CPN roster for all members. WÅIHNS edits the *Nutmeg Net News* for CN members. Congratulations to: WÅIFJU on Extra Class; WÅIGIX on Advanced; WN-1JVG on becoming a new Novice; WÅIHOL on Oct. BPL and CP-25 and WÅIGGN on making the BPL in Oct. For the New Year: Resolve to improve your signal, your operating procedure and your "on-the-air-

image"! A Very Happy New Year to All! Traffic: WIVQG 337, WIEWW 314, WÅIHNS 290, WÅIHEW 287, WÅIHOL 258, WYIU 249, WÅIWF 208, WÅIGGN 204, KISXF 142, WÅIGIX 118, WIGVT 58, WÅIEG 61, WÅIAR 49, WYIBH 35, WÅIJCX 34, WYIBN 26, WYIBI 21, WIVQ 15, WÅIFXS 14, KIGYS 14, WYIBP 12, WICTI 7, WÅIFZE 7, WICUH 6, WICRH 3, WÅIUD 1.

**EASTERN MASSACHUSETTS**—SCM, Frank L. Baker, Jr., W1ALP—Again I want to thank everyone for their cards while I was in the hospital for the second time. W1AOG, our SEC, received reports from Wis UJF, ZMO, JVZ, RPF, WÅIDXI, WIDQF, the XYL of WIBB had a very serious heart attack up in Maine, but is home and gaining slowly. WÅIFAD is our new PAM for 2. Appointments endorsed: W1AQV and W1AOG as OBSs. W1AOG as SEC and ORS. W1OKF and K1FWF as OVSs, WÅIBFD as OPS/OVS. K1DPE is in Navy MARS. W1EAE say the Acton c.d. group was out with 5 mobiles on Halloween. K2GLQ/1 was winner of the N.Y. QSO Party in this section. W1CTR went everywhere on vacation. WÅIFFS/W1VRE is now Extra Class. New YLs: WN1s KØQ Peabody, KDI Plymouth. KØVBL bought a house in Randolph. The T-9 RC met at W1TP's. K4GGI/1 is active at W1MX. W1FBT spoke at the South Shore RC on Galaxy's new R-530 receiver. W1VAF has a new QTH. W1ALP joined the OOTC. WÅIBFD is working DX on 10-15. WÅ3TR/1, who is at MIT, worked WÅICUH in Martha's Vineyard with a Twoer. WÅIJJY, ex-WN1ICD is on 2 with a Gonsel mobile converter. He is a member of Canton C.D. K1PRB is in our traffic nets and now is an ORS. WÅIHHK has a new s.s.b. transmitter and is NCS for the No. Shore RC Net. The New Eng. Emerg Phone Net had 4 sessions, 66 QNIs, 4 traffic. WÅIDEC-DED went on a trip to the Bahamas and P.R. WILFM moved to Acton. K1FWF is at Cornell Univ. W1MX worked WBARW on 220 Mc. and W2JKI. K1QDR has the 2-meter converter done now. The following took part in the Sept. FMT: Wis BGW, PLJ, PNH, WTF, YAH, BW, AYG, IU, DDO, OQF, DAL, KINMC, WÅIJZG, WÅICEO, on 2 from the top of Prudential Tower in Boston, has applied for OBS appointment. W1DTY spoke at the Massanut ARA on "Solid State and the Amateur," and the club held a banquet. WNIKBE spoke at the Chelmsford ARA on "Bioelectricity." WN1JZP, an XYL, is public relations and publicity chairman. The Capeway RC met at K1HGT's QTH. WÅ3BX was at the Sept. meeting. New Advanced Class licenses are K1HGT, W1ZST, K1NFZ and WÅ3BQX. K1MAK is in the hospital. W1AOG-DFS went to the Granite State Phone Net gathering in Concord. N.H. W1DFS works G2UF, who was in this country. W1EAE is laid up with his back. W1LMU attended the hamfest of the 160-meter gang in Chatham, N.Y. W1ER has a new RBL receiver. W1CFU is on 160. W1DYS is having fun with the HW-100 and is going to get on 432. The 6-Meter Cross Band Net had 19 sessions, 118 QNIs, 3 traffic. EM2MM had 23 sessions, 136 QNIs, 120 traffic. W1OJM and W1PEX made the BPL. The Avon AREC group on 2 and 6 met at K1YGV's QTH. Wis CE, PGN, WJH, HYZ, CZO, CDJ, N1J, JVZ and K1NFV helped the Melrose people on Halloween. Seven mobiles were used with control at police station. WÅIJSN spoke at the Middlesex ARC on how to make up coax connectors. Wis UOH, BVV and K1DPE fixed up W1ALP's antennas for him. WÅIBFD is in the Yankee S.S.B. Net on 50.1 Mc. WÅIFHU spoke at the Yankee RC on "Vapor Phase Cooling in Transmitters." Traffic: (Oct.) W1OJM 718, W1PEX 598, WÅIJJY 350, W1EMG 183, WÅIFAD 129, K1PRB 102, WÅIFHU 46, WÅIHHK 43, K1CLAY 24, W1DOM 19, W1AOG 16, WÅIAJN 12, WÅIDEC 12, W1CTR 11, W1DGD 10, W1DFL 7, K1OKE 3, WÅIDED 2, W1LE 2. (Sept.) K1PRB 23. (Aug.) K1PRB 9.

**MAINE**—SCM, Herbert A. Davis, K1DYG—SEC: K1CLF, RM: W1BJG, PAM: WÅIFLG. Traffic nets: Sea Gull Net meets Mon. through Sat. on 3940 kc. at 1700; Pine Tree Net meets daily at 1900 on 3596 kc. c.w. W1GPF is on a boat heading for Viet Nam and some of the fellows are working him. It is with deep regret that we pass on that W1HSD, of Millinocket, is a Silent Key. He will be sadly missed by all who knew him along the way. K1CLF is starting a net on 3900 kc. Sun. at 1300 local time. Traffic: W1BJG 372.

**NEW HAMPSHIRE**—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: K1QES, PAM: K1AFO, RM: K1BCS. Appointments: W1ET (K1YKT) as OPS. Endorsements: K1BGI and K1FQV as ORS, plus W1B/W1-APK as OBS, K1DWE, of the MVAREC reports 142 check-ins in October. W1FZ won the 1968 New York QSO Party. Welcome to new hams WÅIKDF, Derry, and WNIKED, Rye. K1EDD MC's the Nashua Mike and Key Club Net Mon. on 28,750 kc. at 8 P.M. local time. W1YMJ has a new tower and tri-band beam. W1PYM is no longer a bachelor. Congrats to you and your XYL, Paul. WÅIHH will be going to Northeastern



next Sept. The MVAREC held its annual banquet in Concord with Assistant Director WIGNX as guest speaker. The Manchester Radio Club, W1HPM, says the recent auction helped the treasury. It is with regret that I have to report the passing of W1PZA. W1YWOC has a new 18A VQ. W1UXE has a new home in Hampton by the sea. W1LOO and K1JFQ are heard often on the 75-meter nets. W1RCC is working lots of DX on 10 meters. Traffic: W1IHH 179, K1PQV 81, W1YMJ 12, W1BYS 2.

**RHODE ISLAND**—SCM, John E. Johnson, K1AAV—SEC: K1LII, RM: W1BTV, PAM: W1TXL, V.H.F. PAM: K1TPK, Endorsement: K1QFD as ORS. RISPEN report: 31 sessions, 408 QNI, 83 traffic. A meeting was held at the home of W1BTV to discuss problems affecting the Rhode Island Traffic Nets. The following LOs were present: W1TXL, K1NJT, W1JFF, K1TPK, W1YKQ and K1AAV. The W1AQ Club of Rumford will begin a class covering the requirements for the Advance Class license. Members will hold the class every Fri. night before the club meeting. Club treasurer K1LII announced his engagement to be married in Apr. and the club wishes him the best. W1AICQ made contact with the Recovery Ship *Essex* during the recent space flight. W1AIEJ is now attending school in Boston and can be heard on the air from that location. All clubs and hams are invited to send information on their activities to the SCM. The NORC of Newport held another successful auction, according to members W1JFF and W1TXL. Traffic: W1TXL 167, W1BTV 90, K1YVC 45, K1TPK 37, W1AIEJ 15, K1QFD 6.

**VERMONT**—SCM, E. Reginald Murray, K1MPN—

Net	Freq.	Time	Days	QNI	QTC	N. Mgr.
Gr. Mt.	3855	2230Z	M-S			W1VMC
Vt. Fone	3855	1430Z	Sun.	108	—	W1AEDI
VTNH	3685	2330Z	M-F			K1UZG
VTGD	3990½	1500Z	Sun.	45	6	W1AD
Carrier	3865	1400Z	M-F	202	0	W1KKD
VT8B	3909	2230Z	M-S	778	109	KL7DVE/1
		1330Z	Sun.			

Welcome to new Novices WN1KDJ (N. Hero), WN1KDN (Rutland) and congrats to W1AKEN (Rutland). W1MRW was first for Vt. in the N.Y. QSO Party. W1KJG is gearing up for 2-meter f.m. The 2-meter f.m. group rendered valuable assistance reporting election returns in the state. New officers of the BARC are W1DQO, pres.; W1SOV, treas.; F. Hall, Secy.; W1-

## VERMONT QSO PARTY

February 8-9, 1969

All Amateurs are invited to participate in the Vermont QSO Party, sponsored by the Central Vermont Amateur Radio Club.

Rules: 1. Time, the 28-hour period from 2300 GMT Feb. 8 to 0300 GMT Feb. 10. 2. No power restrictions, all bands can be used and contact credit with the same station on different bands and/or modes will be given. 3. Vermont stations score 1 point per contact and multiply by the number of ARRL sections and foreign countries worked. Outside stations score 3 points per Vermont station and multiply by the number of Vermont counties worked on each band. 4. Certificates will be awarded to the highest scoring station in each ARRL section, plus a trophy to the highest scoring station outside Vermont. A trophy will also be awarded to the top Vermont scorer, with 2nd, 3rd and 4th place stations receiving a gold-trimmed certificate. The W-VT (Worked Vermont) certificate will be awarded stations working 13 out of Vermont's 14 counties, provided the station has not previously been issued this award. A special certificate too, for multiplier stations. 5. Suggested frequencies: 3685, 3855, 3909, 7030, 7240, 7290, 14,040, 14,290, 14,325, 21,050, 21,375, 28,100, 28,600, 50,250, 50,360, 144-144.5, 145.8, and Novice frequencies. 6. Vermont stations send number of QSO, report and county. Others send QSO number, report and section. 7. General call to be used "CQ VT" on c.w. and "Calling any Vermont station" on phone. 8. Logs should be postmarked no later than March 31 and sent to the CVARC, c/o E. Reg Murray K1MPN, 3 Hillcrest Drive, Montpelier, Vermont 05602. Stations sending as s.a.s.e. will receive a copy of the results.

VSA, K1PPW and W1PCF, trustees. Happy New Year. Traffic: K1QBQ 391, W1FRT 51, K1MPN 40, W1MRW 30, W1GKS 5, W1KKD 4.

**WESTERN MASSACHUSETTS**—SCM, Norman P. Forest, W1STR—RM: W1DVW. Bob reports attendance up for Oct. with 156 QNI and 169 messages. He was happy to have W1IHI, of Worcester, calling in. Also, W1BYR is back after power line voltage troubles almost wiped out his whole station. The "high ten" were in the following order: W1DVW-30, W1ZPB-24, W1JHZ-19, K1WZY-17, W1STR-14, W1KKX(ex-W1MNG)-13, W1BYR-11, W1ZOB-7, W1ZEL-7, W1IHI and W1YK-4. This was out of a possible 31 scheduled sessions. WMN would enjoy more QNIs so why not give it a try. W1ZPB is doing a fine job at Mt. Hermon with 10 new prospective and 6 Novices from last year. W1FI was speaker of the evening at the Oct. CMARAI Club meeting on the topic "One to One SWR—What does it mean?" W1MNG now has the call W1KK. K1PMK has a new mobile rig. W1CJG has a new quad. W1ADNB is now on s.s.b. with a Swan. The HCRAI v.h.f. group will operate from the top of Provin Mountain this year, courtesy of WWLP, Channel 22, and hopes to beat the Talcott Mountain Club, just across the border in Connecticut. The VARC has a new hour for its Sun. night net, which is now at 8 P.M. local time on 29,000 Mc. K1YQ should be back to work by this time after a long siege in the hospital. After 32 years in the Postal Service W1LOK expects to retire on Mar. 1 and has a new basement shack for comfort. Traffic: W1EOB 222, W1ZPB 204, W1DVW 146, K1WZY 42, W1IHI 40, W1BYR 37, W1KK 32, W1JHZ 18, W1IC 16, W1STR 16, W1UPH 14, W1TAU 11, W1ABW 2.

## NORTHWESTERN DIVISION

**ALASKA**—SCM, Albert F. Weber, KL7AEQ—Via *NARC News* we hear that the Novice and General classes are going right along three nights a week. The classes in Fairbanks still are going along, and the first of the new crop of licensees will be showing up very soon. It's interesting to note that this bunch is ninety percent from the ranks of the CBers, at their request. KL7FON has been making so many trips to Prudhoe Bay, via Fairbanks, that we are beginning to wonder if he doesn't have a bit of oil land staked out up there that he hasn't said anything about. KL7FJW and KL7FHN have caught the slow-scan bug, and are trying to infect the world with it. Amchitka Island seems to be getting a bit of a ham population with KL7GKA and KL7GFN operating from there. Traffic: KL7CAH 167.

**IDAHO**—SCM, Donald A. Crisp, W7ZNN—SEC: K7THX. The FARM Net convenes week days on 3935 kc. at 0200 GMT. W7DDP was elected sheriff. K7ORA is moving to Pocatello. W7GHT is a PAN check-in. W7IRA is moving to Pocatello. K7ORJ was elected "Ham of the Year" at the Idaho Amateurs, Inc., meeting at Boise and K7YUX and K7JSD were elected directors. Other officers elected are W7HOV, pres.; K7PKD, vice-pres.; W7ORJ, secy.-treas. W7KWO is a new ham in Lewiston. W7IFG has a first phone license. K7ORA was elected net mgr. of the FARM Net and W7ZNN was elected chief net control. W7AXL is organizing a Search and Rescue Squad in Fremont County. FARM Net report for Oct.: 24 sessions, 952 check-ins, 78 traffic handled. Traffic: W7BDD 87, W7GHT 81, W7AXL 6, W7ZNN 6, K7CSL 4.

**MONTANA**—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. RM: W7DMA. PAM: W7ROE.

Net	Freq.	Time	Days	QNI	QTC	Mgr.
Mont Traffic Net	3910	0000	M-F	488	138	W7ROE
Mont PON	3950	1515	Sun.			W7PWY
Mont Section Net	3950	1700	Sun.	42	4	
Big Sky Net	146.76	0200	Sun.			W7FLG

The Butte Club has started republishing its *T-ler* paper. The club also is going to move into a new club room in the County Court House. W6MDL is now on with an f.m. 2-meter rig. The state hams are saddened with the passing of W7JDZ. K7PKV is building a home and shop in the Great Falls area. Remember to check into the State RACES Net the 1st and 3rd Sun. of each month. 3996.5 is the frequency. We still are in need of more help in the state ARRL. If you are interested write your SCM and we will get you started. As you can tell from this column we also need more news of activities in the state. Have your club secretary write me on activities in your area. Traffic: K7YLR 14, K7EGJ 13, W7TZR 10, W7FIS 1.

**OREGON**—SCM, Dale T. Justice, K7WWR/WA7-KTV—RM: W7ZFH. PAM: K7RQZ. Section net reports: W7ZFH reports for the OSN for Oct., sessions 23, check-ins 125, traffic 29. WA7AHW reports for the AREC Net, sessions 31, maximum number of counties 23, check-ins 1003, traffic 30, contacts 122, QSTs 5. K7IFG reports for the BSN, sessions 60, traffic 181 and check-ins 1262. New appointment: W7LXR as OPS. Russ has a three-element quad on 40 meters beamed south. K7EWY, W7FHX and W7GTW have been hunting deer. WA7GFS is working Japan on 15 meters, but is looking for a better antenna to work into Europe. WA7JAU and WA7-JAV are now General Class. K7AXF is now Advanced Class. K7RQZ is doing some temporary EC duty in Deschutes County. WA7FTN made 605 telephone relays into S.E. Asia during the month. WN7JKQ is operating from Forest Grove. WN7IYX is a new call in Grants Pass. Traffic: K7RQZ 654, K7OUF 201, K7IFG 132, W7ZFH 50, WA7AHW 32, K7WWR 23, W7DEM 16, WA7 GFS 12, W7MLJ 9, WA7FTN 1.

**WASHINGTON**—SCM, William R. Watson, W7BQ—SEC: W7UWT. RM: K7CTP. PAM: W7BUN.

WSN 3590 kc. Daily 0245Z QNI 335 QTC 230 Sess. 30  
 NTN 3970 kc. Daily 1930Z QNI 896 QTC 577 Sess. 30  
 WARTS 3970 kc. Daily 0200Z QNI 1462 QTC 289 Sess. 30  
 NSN 3700 kc. Daily 0400Z QNI 347 QTC 98 Sess. 31

Plans for the 1969 SET exercises are well underway. Coordination with the local chapter of the American Red Cross is an important part of this exercise. ECs will use 3930 kc. for liaison to the SEC; traffic nets will operate on 3970 kc. for phone and 3590 kc. for c.w. As usual, the NTS will operate continuously during the exercises. Plans are underway for an early filing of the State License Plate Bill in the Washington Legislature to have our \$5.00 fee reinstated. New appointment: W7FQE as OPS. We regret the passing of W7DDI, of Bremerton. W7QVC now is the proud owner of a 25-year ARRL pin. W7DP helped with mobile equipment during halloween. W7PUL and W7AXT both report matching networks for 1:1 ratio on any band. W7IEU, Mgr. of NSN, recommends the net for those who want to start building up their code speed and learn traffic-handling fundamentals. W7U suggests efforts to upgrade quality of message traffic against quantity. K7OXL, W7APS and W7MCW all returned from Oct. vacations. W7MCW kept daily contact with home via mobile W7AXT and W7PI have both accepted nomination for WSN Manager. WA7-EYN is now regular NCS on RN7. The SRA reports a new trailer for its 2- and 5-kw. generators available for emergencies and exercises. W7OEB and W7WCW make weather broadcasts each morning over their local radio stations with information taken from the NW Weather Net. The Rodeo City Club took 1st place in FD for Washington with 1 transmitter. The Tacoma Club was on hand with 11 transmitters. Our best wishes to all in 1969. Traffic: W7BA 2301, WA7IKR 572, W7ZIW 554, WA7DZL 519, W7DZX 471, W7AXT 298, W7KZ 295, W7PI 245, K7CTP 212, WA7BZY 202, W7IEU 122, W7BQ 113, WA7EYN 103, K7KPA 99, W7AAO 87, W7MCW 82, W7BTB 69, WA7EDQ 56, W7APS 53, WA7ACQ 50, W7-HMA 48, W7GYF 47, WA7BDB 46, W7BUN 46, K7NWS 42, W7OEB 42, K7JXO 39, W7RXH 39, W7GCV 36, WA7GXF 33, K7THG 31, WA7JBM 25, WA7HSJ 22, W7-JWJ 20, K7TCY 20, WA7CYY 17, K7LRD 15, WA7IB 14, W7UO 14, K7OXL 13, WA7ILC 11, W7UWT 9, K7MGA 8, W7ZHZ 7, K7YFJ 5, W7FQE 2, W7PUL 2.

**PACIFIC DIVISION**

**EAST BAY**—SCM, Richard Wilson, K6LRN—Appointees as of Nov. 1, 1968: OO—W6OJW, W6EY, W6-CBF, WA6AGA, ORS—W6IDY, W6TYM, W6UZX, W6FHH, K6PMG, W6BDHH, OBS—WA6UFV, W6-LGW, OVS—WA6AGA. If your call isn't mentioned and you think it should have been, please contact me. There are plenty of vacant appointments. The requirements are outlined in the *Handbook and Operating an Amateur Station*. The job of SCM also is open. I have held this position for almost five years and feel it is time for a change. W6BDHH is working on an S.S.B. Exciter and RTTY gear. W6OJW is getting close to phone DXCC with "only" 8 more to go. W6CBF has set up at Ross-moor and made over 10k points in the Oct. CD Party. WA6AGA reports the W6CX repeater has a new transmitting antenna. W6BBS and W6BTCG are new on the W6CX repeater. WA6ANE joined the WB6AAE repeater. K4RAD/6 has applied for an OO appointment and is waiting a # call for his Berkeley QTH. WA6CWH, W6BZUX, WA6LID, WN6LBT, WA6BYL, WN6LAD, WN6LTN, WN6LUD, WN6LUK and WN6LUG are new calls in the East Bay section. WA6LID has an appropriate QTH on Voltaire St. (his current "Ohm" has much potential) ugh! Last time I tried to be funny I got into trouble, so please send some news items, station

activities—anything. NCN meets daily at 0300Z on 3.630 Mc. NCN needs you—you need NCN. Traffic: (Oct.) K6PMG 16, W6BDHH 10, W6CBF 2, K6LRN 1. (Sept.) K6PMG 8. (Aug.) WA6AGA 8.

**HAWAII**—SCM, Lee R. Wical, KH6BZF—SEC: KH6-GHZ. PAM: W4UAF/KH6. RM: KH6AD. V.H.F. PAM: KH6EEM, QSL Mgr.: KH6DO. RACES Nets (40, 10, 6 and 2 meters) coordinate with KH6AIN.

Nets	Freq. (Mc.)	Time (GMT)	Days
League Appointees	7.290	0700Z	Wed.
Friendly Net	7.290	2030Z	M-F
Pacific Interisland Net	14.330	0830Z	M-W-F
S.E. ASIA Net	14.320	1200Z	All
Marianas Island Net	3.850	0830Z	2, 3, 4 Tue.

KH6BZF reports that his DX-pedition planned from KM6 to Kure Island didn't materialize because of transportation difficulties. W6WGL, an Asst. Director/Pacific ARRL Division, is now operating portable from Waikiki for several months. KH6GKI passed the Advanced Class exam recently. K6GAED called me during his recent visit with his brother Wes to chat over old times. Ex-KH6FRE reports that he's now signing W5JKJ using an HX-10, a Drake 2B to a 5-band vertical from Oklahoma City. KH6BZF recently worked South America's OA4C in Lima, Peru, and CE3QG in Santiago on 50.104 Mc. in October over a T-E path. ZK1AA has been making daily 6-meter beacon transmissions on 51.022 Mc. The beacon is turned off at 0530 GMT for listening purposes. Ex-KR6UD now signs W0QBW/KH6 from Aiea Hts. WA4BCX has been signing portable KM6 lately. Those of you who are interested in a copy of great circle azimuths to many of the DXCC countries from Oahu, please send me an S.A.S.E. marked "azimuths" and one will be sent. Best of holiday wishes to all from the Hawaii section staff. Traffic: (Oct.) KH6BZF 14, K6G-AQI 9, W4EXM/KH6 3, KH6GPQ 1. (Sept.) KH6GKL 121, K6GAQI 4, W4UAF/KH6 2.

**NEVADA**—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. The Nevada Emergency Net meets on 3996.5 Mc. at 1900 PST Mon. and Thurs. W7PRM has a new 2-meter rig. K7ZOK and his XYL have new wheels for their mobile rig. WA7LIN is a new call in Sparks. K7-RKH and WA7ESM are rebuilding surplus 2-meter gear for an a.m. and RTTY network. W7TKV has retired from Los Angeles D.W. & P and is now living in North Las Vegas. K7RBM is home from active duty with the Navy. W7YRY has a new tower and quad for DX. W7-CSI needs one more QCVW member to form a Nevada QCVW Chapter. W7TVF will schedule anyone, DX or stateside, who needs a Nevada QSL. W7PBL is active on s.s.b. W7PBV attended the Director's meeting and Greater Bay Area Hamfest. W7FJM has been active on W5PAA while attending FAA school. W7AKE reports increased activity on the WIDDB repeater, f.m. 146.34/146.94 Mc. K7ZAU is getting things in order for the WCAR5-7255 officers and directors installation at "SAROC." Communications for Nevada Admission Day Parade were handled by W7PC, W7SRM, W7SMP, W7-TQE, WA7IRW, K7NFK, K7QOP, K7UHC, K7ZAU, WN7KKN, WN7KOE, and W6MTH/7.

**SACRAMENTO VALLEY**—SCM, John F. Minke, III, WA6JDT—ECs: W6MND, K6RHV, W6BRSY, W6SMU, WA6TQJ. RMs: W6LNZ, W6BYTX. ORSs: W6LNZ, W6BQZ, W6BRSY, W8VDA/6, W6VUZ, W6BYTX, K6-YZU. OPsS: W6EAG, K6IKV, W6MAE, W6BVC, W6VUZ, OBSs: W6MAE, W6NKR, W6BPHQ, W6B-WJO. OOs: W6DOR, K6GG, OVSs: WA6CXB, WA6-FWU. Mark your calendars for the week end of June 14 and 15. There will be a Pacific Division Convention at the El Dorado Inn in Sacramento. The California QSO Party had a large turnout with most of the W6 stations from Los Angeles County. SV participation consisted of a few in Sacramento County and W6UNP in El Dorado County. Ex-SV'er, W6CIS, was operating portable down in Mariposa County. WA6FWU has been active with the Placer Co. Sheriff's Communications Reserve along with K6SLB and WA6CUL. Sept. FMT participants were WA6CXB, K6GG, W6KJD, K6PAC, W6QEO, W6TFH and W6BYTX. W6QEO had an average error of 0.2 p.p.m. (parts per million). K6GG claims 7 years without missing an FMT. WA6TQJ is attempting to get the El Dorado ARC affiliated with the ARRL. The Yolo County C.D. Net is about to move to another frequency because of interference from repeaters. W6VUZ recently passed the Advanced Class exam and is now working hard towards 20 w.p.m. W6NKR put up a five-element Yaesu for 2 meters. W6BYCL and W6BTCX have been maintaining nightly code practice on 50.110 Mc. Traffic: (Oct.) W8YDA/6 82, WA6JDT 62, W6BYTX 59, W6LNZ 35, K6KRL 14, K6IKV 10, W6MAE 6, W6NKR 4, W6VUZ 1. (Sept.) K6KRL 4, WA6FWU 2. (Aug.) K6-KRL 18. (July) K6KRL 13.

# EIMAC

zeroed in on some grid problems so you can get higher power gain.

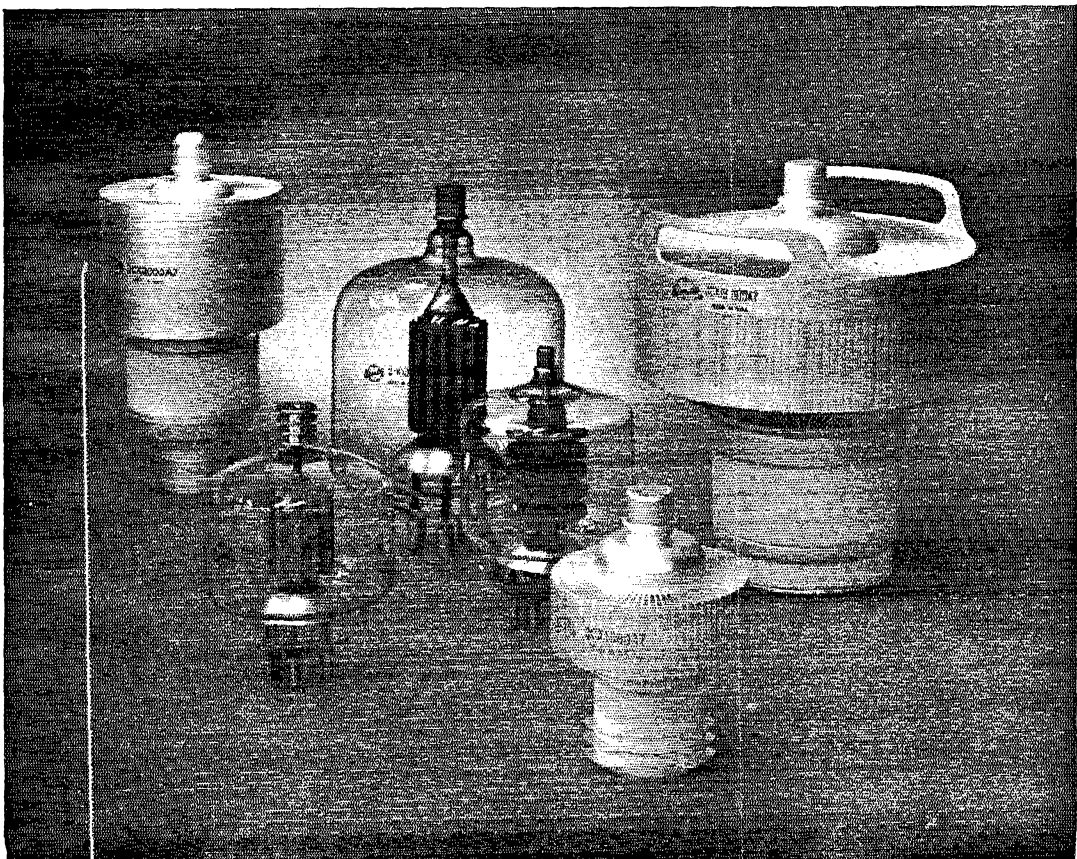
Want up to 20 times power gain in a cathode driven circuit? Try one of the tubes in our complete zero-bias power triode line. While you're solving problems, throw out the bias power supply. Forget some of the associated circuitry. And don't worry about destroying the tubes if you lose grid voltage. They don't need any.

These triodes are designed for use as Class B or C amplifiers in audio or radio-frequency applications. We've got zero-bias triodes ranging from 400 watts to 10,000 watts—the most complete range of zero-bias triodes available.

For more information on EIMAC's line of zero-bias power triodes, write Amateur Services Department, or contact your nearest EIMAC distributor.

	TYPICAL OPERATION					
	GLASS			CERAMIC		
	3-400Z	3-500Z	3-1000Z	3CX1000A7	3CX3000A7	3CX10000A7
Plate Voltage, Vdc	3000	3000	3500	2500	5000	7000
Max Signal Plate Current, A	0.333	0.333	0.75	0.800	1.56	5.0
Drive Power, W	32	35	85	60	215	1540
Output Power, W	655	644	1770	1170	5500	24,200
Filament Voltage, V	5.0	5.0	5.	5.0	7.5	7.5
Filament Current, A	14.5	14.5	21.5 23.0	28/33	51	94/104

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**new 3-500Z offers  
high power gain,  
less circuitry.**

EIMAC's new 3-500Z is a compact, heavy-duty power triode with 500 W plate dissipation, designed for operation in zero-bias Class B r-f or audio amplifiers. The tube can be used as a cathode driven (grounded grid) linear amplifier where low distortion, high plate dissipation, and great thermal anode reserve are desired. The 3-500Z may be operated at plate potentials up to 3000 Vdc, and eliminates expensive, bulky screen and bias supplies. The 3-500Z will replace EIMAC's 3-400Z where additional plate dissipation or greater reserve is desired. Forced-air requirement is approximately equal to that of the 3-400Z, and a blower capacity of only 13 cfm at a back pressure of 0.2 inch is satisfactory for a single tube. The 3-500Z's zero-single plate current is somewhat higher than that of the 3-400Z. When used as a replacement for the latter tube, the 3-500Z's zero-signal plate current can be reduced by addition of a simple zener diode in the cathode return. This technique is particularly suggested if plate potentials over 3000 Vdc are contemplated, or if the tube is used in equipment that is power supply limited.

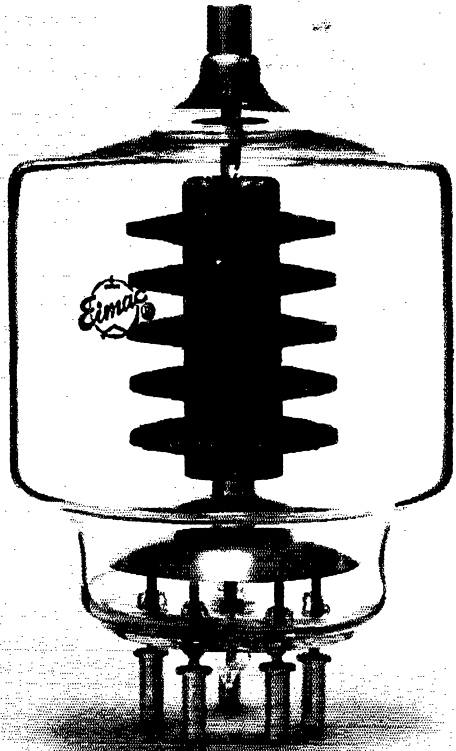
3-500Z TYPICAL OPERATION*	
(Minimum Distortion Products at 1 kW PEP Input)	
DC Plate Voltage.....	2500 V
Zero-Sig DC Plate Current**	.130 mA
Single-Tone DC Plate Current	.400 mA
Single-Tone DC Grid Current	.120 mA
Two-Tone DC Plate Current	.280 mA
Two-Tone DC Grid Current	.70 mA
Peak Envelope Useful Output Power	500 W
Resonant Load Impedance	3450 ohms
Intermodulation Distortion Products	-33 dB

\*Measured data from a single tube  
\*\*Approximate

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For additional information, write Amateur Services Department or contact your nearest EIMAC distributor.



**SAN FRANCISCO**—SCM, Hugh Cassidy, WA6AUD—SEC: W6WLV, WA6BYZ was top in the code tests at the Greater Bay Area Hamfest, doing 50 w.p.m. and receiving a certificate. New officers of the Marin Club are K6JGX, pres.; WB6PQB, vice-pres.; WB6UJO, treas.; WB6CIE, secy. WB6FLT's travels to remote Mendocino County kept him from much activity during Oct. W6HNG is a new AREC member in the Petaluma area. W6CYO worked 116 JAs during the recent DX Contest. The Petaluma Amateur Radio Klub has a 2-meter net going on 146.65 Mc. Tue. at 8 p.m. local time. WA6BYZ made the BPL again. WA6QXV reports receiving the K6GWE 2-meter repeater at Ukiah since it was rebuilt. WA6AUD gave a talk on message format at the Oct. meeting of the Marin Club. W6WLV got into a bind on home projects and could not make the recent meeting called by the Pacific Division Director in Oakland. WB6YMW is the new editor of the North Peninsula Club paper. W6BIP worked hard in the Sweepstakes endeavoring to top the section again both on phone and c.w. WB6UJO just returned from a two month trip to the Orient, going as far as Penang. WB6QAT is looking for more ragchewers to join in at 8 A.M. and 7 P.M. local time on 7110 kc. Everyone is welcome. W6VIZ reports his main activity is 6-meter mobiling. The Tamalpais Club is considering the purchase of its own coffeepot to round out its list of club gear. WA6SBA continues to publish QUA for the Novato group. WA6SAZ is back in the northern Marin area after an absence of a couple of years. W6PZE has an active group in EC effort in the Petaluma area with WB6AGP, W6HLM, W6ISS, WB6FLT, WB6PZL, WB6YEV and WB6ZKP as full members and WB6TPS, W6I2R and WA6QFP as limited members. W6KG and W6DOD gave a program on the DX travels at the Sept. meeting of the San Francisco Radio Club. Gunnar Ahlstrom, ex-W6JQI, passed away in Australia in early Oct. W6ERS and WB6QAT visited the FCC for the Extra Class examinations recently. W6FAX is a regular checker-in on the Northern California Net. Traffic: W6KVV 355, WA6BYZ 293, W6WLV 190, WA6AUD 35, K6TWF 14, W6BIV 12, WB6LFT 11, K6TZN 9, W6PZE 6, WB6IMO 5, W6CYO 1.

**SAN JOAQUIN VALLEY**—SCM, Ralph Saroyan, W6JPU—Happy New Year, everyone. WB6RZI is the new EC for Tuolumne County. K6LXA is the new Stanislaus County EC. W6ZRJ made an official visit to the Tuolumne County Amateur Radio Club and was greatly appreciated by the TARS. W6ZRJ also visited the Turlock Amateur Radio Club. K2LOX/6 was heard operating in Fresno. W9VSU, ex-W6GXL, vacationed in Turlock, and attended the GBA Hamfest in Millbrae. K6GSS obtained his Advanced Class license and is operating on 6-meter c.w. WA6KZV is the trustee of the China Lake Elementary School, and the call is WA6YBN. The group operates with an Eico 723, Heath DX-20 and an SP-600. WB6RYA is running a Heath SB-100 into a 14AVQ. WB6VFU put a kw. on 75 meters which resulted in TVI. WB6RZI, W6JUK, W6JPU and WA6CZU were among those who attended the GBA Hamfest in Millbrae. K6HEZ has been shipped to Greece. W6WME was the guest speaker at the Tulare County Radio Club in Oct. The Delta Amateur Radio Club held its Social Dinner Oct. 26 with 33 in attendance. W6C0B has gone home. WA6VML is now WA6OUI. WB6YYG and WA6KOG are on 6- and 2-meter s.s.b. Traffic: (Oct.) W6ADB 441, WA6SCE 120, K6KOL 86, WB6WGR 49. (Sept.) WB6WGR 21. (July) WB6WGR 1.

**SANTA CLARA VALLEY**—SCM, Edward T. Turner, W6NVO—This report was written by W6ZRJ. Our SCM, W6NVO, recovered quite well from his recent illness, but has returned to the hospital for more tests, and will be back in business by the time this report is published. Our best to Ed from the entire section. W6LDO and W6ZRJ received their WAC certificates. Walt after 35 years in amateur radio and Doc after 22 years. Walt is active on the QCWA AM Net on Sun. mornings. W6TFT is the newly-elected RO for San Mateo RACES. W6M-MG was active in the CD Party. Al works PCN. WA6-BXH works WCARS and is busy trying for some DX. W6BYB was active in the CD Party and NCN. W6OII is busy revamping his station, but found time to work in the Phone CD Party. W6BPT received his Extra Class license Nov. 1 and was presented a certificate from the FCC at the Greater Bay Area Hamfest. Presenting the certificate was W6UDU of the SF FCC Office who, along with W6OWP, received the first "Certificate of Merit" from W6ZRJ. W6OWP for his work in the CP program and W6UDU for his many years of cooperation with amateurs as EIC at the SF Office. Also attending the GBA LO meeting from SCV were W6BPT, W6HC, W6VZE, W6VZT, WA6HVN and W6YHM. K6-HGV is active on Navy MARS. W6AUC reports much OO operation along with many other schedules. WA6LFA maintains several traffic schedules and is home more

often now that vacation is over. W6DEF reports that W6KG and W6DOD gave a fine DX presentation at the SCARS meeting. W6EMS is operating PAN. W6YBV visited L.A., which cut into his traffic total. Traffic: (Oct.) W6RSY 1202, W6WZE 349, W6YBV 182, W6EMS 158, W6DEF 115, WA6LFA 98, W6AUC 37, K6HGV 27, W6BPT 12, W6ZRJ 12, W6OII 8, W6BYB 6, WA6BXH 1. (Sept.) W6OII 8.

## ROANOKE DIVISION

**NORTH CAROLINA**—SCM, Barnett S. Dodd, W4-RNU—Asst. SCM: James O. Pullman, W4VTR. SEC: WA4LWE, RM: K4CWX, PAM: WA4AJT, V.H.F. PAM: W4HJZ, W4IRE is back on c.w. and RTTY with an HX-10 Marauder with very good results. WA4ZLK says college is keeping him too busy for much hamming except for a little on week ends. K4YYJ is now using his new 70-ft. crank-up tower for 2 meters. WA4KWC reports c.w. DX excellent on 10 meters. W4RWL is the proud possessor of an EAN Net certificate. K4TTN reports club code classes continuing with fine participation. WB4IHF has assumed the duties of asst. net manager for NCN (E).

Net	Freq.	Time	Days	QTC	Mgr.
THEN	3923 kc.	0030Z	Daily	167	W4ZZC
NCN(L)	3573 kc.	0300Z	Daily	55	WA4CFN
Late: (Aug.)					
S8BN	3938 kc.	0030Z	Daily	38	WA4LWE
(Sept.)					
S8BN	3938 kc.	0030Z	Daily	34	WA4LWE

Traffic: (Oct.) W4EVN 317, W4RWL 168, WB4IHF 114, W4FDV 75, W4AGMC 67, K4EO 40, W4IRE 40, WA4-VNV 40, W4ZZZ 26, WA4UQC 24, WA4AKX 22, K4TTN 12, K4VBG 10, K4ZKQ 10, W4VTR 6, WA4KWC 4, K4YCL 4, W4NAF 3, K4UVM 2. (Sept.) WB4IHF 71.

**SOUTH CAROLINA**—SCM, Charles N. Wright, W4-PEB—SEC: WA4ECJ, RM: K6QPH/4. PAM: WB4-HZA.

SCPN	3930 kc.	0830 and 1530 EST Sun.	12 Noon Daily
SON	3795 kc.	0000Z and 0300Z Daily	Oct. Tfc. 23
SS8BN	3915 kc.	0000Z Daily	Oct. Tfc. 115

The Low Country Amateur Radio Club has reorganized and is again active with the club call WA4PDZ. W4GZZ is pres. Fifteen amateurs in Anderson cooperated with city officials and Jaycees in a Halloween safety patrol. The group operated both 2- and 75-meter mobiles as well as base stations. City officials indicated the operation was very successful. The state's first election reporting effort, "Operation 68," found thirty of the 46 counties represented with over 90 amateurs and 25 non-amateur volunteers handling 136 messages and successfully furnishing speedy returns to participating radio stations. This operation was one of the largest and best-planned of any ever held in the section, thanks to the efforts of WA4ECJ, WA4EFP, W4WQM and all the participants. Traffic: K6QPH/4 97, K4OCU 47, W4NTO 40, W4VFO 33, W4PED 31, W4JA 27, W4BZA 18, W4FVV 11, WA4HFA 5.

**VIRGINIA**—SCM, H. J. Hopkins, W4SHJ—SEC: K4-LMB, PAM: W4OKN. RMs: WA4EUL, K4MLC. New officers of the Northern Virginia RC are WA4PBG, K6HPR/4, WB4DHT, WA4GHU and K4DC. WB4DRB passed the Extra Class exam and was awarded a 4RN net certificate. If you worked PJ3CC in a recent DX Contest chances are pretty good that it was W4GF, W4KFC or W4ZM on the other end. W4LK is moving to Florida. K4DC has earned a VSBN certificate. A few club stations were surprised to learn that the station may not be operated in the new restricted sub-bands if the station trustee does not himself hold those privileges. Best get all your trustees upgraded to amateurs Extras; then, any operator of a club station may operate up to the limit of his own class of license. A reminder that the annual ARRL SET will be conducted late in Jan. If you can't participate in an organized AREC effort, at least monitor one of your section net frequencies as time permits. Statewide nets meet seven nights per week on 3680, 3935 and 3835. Traffic: (Oct.) K4KNP 398, W4UQ 289, W4RHA 236, W4NLC 219, WB4DRB 141, WB4CVY 130, WA4EUL 109, K4FSS 107, WB4FDT 82, K4TSJ 73, K4KDJ 71, WA4JUF 59, K4DC 48, W4ZM 39, W4BDOY 38, WA4SJT 38, K4MLC 37, WB4FUJ 36, W4OKN 34, K4X 31, W4WO 28, WA4PBG 27, W4RZE 22, W4KX 15, K4GR 13, WB4GYV 13, WA4OGZ 12, W4SHJ 12, W4THV 10, WB4FLT 9, W4GEQ 8, WB4GTS 6, W4MK 6, WB4GDO 5, W4AYRH 4, W4ZAU 4, W4LK 2, W4WQQ 2, W4UJ 1. (Sept.) WN4RHA 181, W4OP 5.

**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—SEC: W8FV, RMs: K8MYU, K8TPF. PAMs: K8CHW, W8FYD. Net Mgrs.: C.W., K8MHU; phone, W8YOF. Officers of the Tri-State ARC of Huntington are WA8-

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BC-458 VFO 24	PS-150-12 DC sup. 39	NXXA AC supply 75
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200V Transmitter 449	P-5000DC supply 69	AC-200 AC supply 59
GC-1 Comp. amp. 29	HA-6 Transverter 89	NCL-2000 Linear 375
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312B-4 Sta. Cont. 149	MR-1 Receiver 49	5W-117C AC supply 75
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351D-2 Mount 75	HR-10 Receiver 49	500 Transceiver 369
PM-2 AC supply 125	SB-300 Receiver 225	117KC AC supply 80
COMDEL	SB-301 Receiver 249	405X MARKS osc. 35
CPS-11 75	SB-303 6m conv. 6	22 VFO Adaptor 22
DRAKE	HF-1 Q-multiplier 4	250 6m Xcvr 249
2A Receiver \$159	MT-1 Transmitter 39	TV-2 Transverter 249
2AQ Spkr Q/mult. 25	DX-40 Transmitter 39	TMC
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2B Receiver 189	DX-100 Transmitter 89	TAPETONE
2BQ Spkr Q/mult. 29	TX-1 Transmitter 115	XC-50N (30.5-34.5) \$ 29
2BS Speaker 9	HX-10 Transmitter 225	TEKTRONIX
2C Receiver 175	HX-20 Transmitter 149	512 Oscilloscope \$275
2CQ Spkr Q/mult. 34	HX-30 6m Xmr 175	UTICA
2NT Transmitter 99	HW-12 75m Xcvr 89	650 6m Xcvr/VFO \$ 99
TR-3 Transverter 375	HW-12A 75m Xcvr 89	650A 6m Xcvr/VFO 109
RV-3 Remote VFO 59	SBA-100-1 Mob. Mt. 9	WATERS
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753 SSB Xcvr 139	MP-1 DC supply 29	
751 AC supply 49	HT-1 AC supply 125	
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ELECTROPHYSICS	H-4 13 Hamscan 59	
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V-10 VFO 4	JOHNSON	
Galaxy V Xcvr 249	Challenger \$ 54	
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2m Linear II 89	6N2 VFO 34	
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	35-12 DC supply 75	
	400 Century DC sup. 75	

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730 Tuner Kit 39		
ST-97 Tuner Kit 59		
1050 Bac. Elim. Kit 33		
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HA-20 VFO SR-40 149		
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V-5 40-10M Vert. 26		
RV-44 Roof Kit 12		
NATIONAL	200 Xcvr \$299	
AC-200 AC Sup. 65		
NXXA AC Sup. 75		
HR-500 (Demo) 1428		
NCL-2000 (Demo) 580		

HSZ, pres.; WA8KCI, vice-pres.; W8DUV, secy.; W8-SQU, treas.; WA8RQB, trustee. WB88BQ, at Elkview, passed the General Class exam and WABAVQ is new in Richmond. Officers of the Opequon Radio Society of Martinsburg are WA8YHE, pres.; WA8TE, vice-pres.; W8DOY, secy.-treas.; K8KML, act. mgr. WVN C.W. Net reports 31 sessions, 162 stations with 84 messages. The Phone Net had 31 sessions, 794 stations and 137 messages. W. Va. State Convention officers are K8MYU, pres.; K8YBU, vice-pres.; WA8UUY, secy.; W8VOI, treas. W8HZA, WA8WCK and W8ANDY attended the 8RN-ARPC meeting in Toledo. The 1969 meeting is set for Huntington. MARA ARC's officers are WA8FQI, pres.; W8BOK, vice-pres.; W8JM, secy.; W8RELI, treas.; WN8BMV, act. mgr. Upshur County amateurs have a new club with WA8NDY, pres.; W8WVM, secy.-treas. WA8FJA, WA8POS, WN8YCG, WA3EQG, WB8-REO, W8APDJ and WA8UUY are active at the W. Va. Tech. Club station. WA8HZ, WA8HFZ is active on 28 Mc. from Huntington. Are you ready for the SET on Jan. 25 and 26? Be sure to mark your calendar for the State Convention, Jackson's Mill, July 5 and 6 and the Roanoke Division Convention, Huntington, Oct. 11 and 12. Happy New Year. Traffic: WA8NDY 88, K8MYU 79, WA8YB 73, W8HZA 61, W8AHZ 42, WA8POS 29, WA8-WCK 32, WA8YF 30, W8CKX 27, WA8RQB 24, W8-DUV 20, W8JM 19, WA8WIX 16, W8WEL 7, W8AEN 3, W8BAQ 3, W8BEG 3, K8ZDY 3, W8MLW 2, K8CFT 1, W8CUL 1, W8EBO 1, WA8FPZ 1, K8MSP 1, K8QYG 1, K8SOR/8 1, W8TGF 1, K8WIJ 1.

## ROCKY MOUNTAIN DIVISION

UTAH—SCM, Thomas H. Miller, W7QWH—SEC: W7-WKF, RM: W7OXC, W7OXC has received his 25-year pin from the League. TWN is back to 3570 kc. Utah nets: Beehive Utah Net BUN Daily 1930 GMT 7272 kc, Utah AREC-RACES UARN Sat.-Sun. 1530 GMT 3987.5 kc. W7JQ (formerly W7JPN) is more active lately and is a regular check-in on BUN, the FARM Net and the Utah Relay Club 2-Meter Net. He says that the 2-meter net has helped on deliveries. K7ZJS and W7MSY took part in the Sept. ARRL Frequency Measuring Test and both did fairly well. Nearly all of Utah's ECs have been cancelled because of lack of reports to either the SCM or SEC. WA7DVT is doing an FB job as NCS and net manager of UARN. I enjoy receiving a net report each month. How about a report from the URC gang in Provo? There are 17 recent licensees in Brigham City and 16 are from the Intermountain School. Congratulations, all! Traffic: (Oct.) K7ELR 229, W7OXC 79, W7JQ 19, WA7BME 16, K7SOT 15. (Sept.) WA7BME 32.

WYOMING—SCM, Wayne M. Moore, W7CQI—SEC: K7NQX, RM: K7KSA, PAMs: W7TZL, K7SLM, OBSs: K7SLM, K7NQX, W7SDA, K7TAQ, NTS: Pony Express, Sun. at 0800 on 3920; YO, daily at 0130 GMT on 3610; Jackalope, Mon. through Sat. at 1215 on 7280; Wx Net, Mon. through Sat. on 0630 on 3920. WATFHA has a new beam and is doing a lot of DX work. WA7IFJ has a new transceiver. WA7KTW has a new complete station. The Cheyenne code and theory classes are going nicely. The Casper Club classes have started the second phase toward the General Class. W7TZK and K7ITH came back from their elk hunt with some meat. The YO Net is picking up members. W7HEB and W7CQL came back from the hills with a couple of deer in Oct. It's nice to hear W7DQ back on the air again with a new rig. Traffic: K7NQX 262, K7ITH 110, WA7GYQ 109, K7KSA 91, W7TZK 37, W7YWW 25, W7YWA 19, WN7KR 10, K7QJW 9, K7AHO 8, K7OAF 8, W7BXS 6, K7DEJ 5, WA7EUX 4, W7AEC 3, W7BHH 2.

## SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4WHW—SEC: WA4FB, RM: K4BSK, PAM: WA4FEC. Looking back over past records we find that W4DGH has served faithfully as OPS for 12, W4CIU as EC for 12 and as OPS for 11 years. K4KJD has been active as OPS for the past 10 years. K4AOZ has been most faithful as OBS without fail for the past 7 years. K4ELJ has done a real fine job with the group in Macon County as EC for 8 years. The outstanding leadership that "Mrs. Sybil" WA4EEC has rendered as PAM and NM of AENM has been one of the highlights of the past few years in the section operation. One hesitates to start a review of this type for fear that someone will be left out. Even if I do want to extend our thanks to all who have worked with me during my term as your SCM and refer you on to my successor, Mr. Donald Bonner, W4WLG, of Huntsville. We welcome WN4KSL in his fine work with the AEND; he also has a new beam on 15. WA4VLD is doing some fine work on 15 with a quad at Athens. It's good to hear strangers from South Alabama (W4AWD and K4TNS) on again. Traffic: K4BSK 90, WA4FYO 70,

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**CANAL ZONE**—SCM, Russell E. Oberholter, KZ5OB—Our deepest sympathy is extended to WA5NUR (ex-KZ5TT) on the loss of her husband, WA5NVF (ex-KZ5LT). Code classes began in Nov. for prospective hams on the Atlantic Side. Classes are sponsored by the CARC. KZ5GC retired and will be operating as WA7EMD from Edmonds, Wash. KZ5RH returned to the states also and will be operating from Pensacola, Fla., as WA0TFR. KZ5SA and KZ5CT are off on a short stateside vacation. Traffic: KZ5OA 135, KZ5AD 75, KZ5JC 21, KZ5PA 15.

**EASTERN FLORIDA**—Acting SCM, William G. Blasingame, Jr., WA4NEV—SEC: W4IYT. Asst. SEC: W4FP. RM C.W.: W4ILE. RM RTTY: W4RWM. PAM 75M: W4OGX. PAM 40M: W4SDR. V.H.F. PAM: W4ABMC. It appears that the hurricane season is now over for us; we had very few problems this year. We understand that K4GT had to evacuate during the recent storm "Gladys." Also W4YRU set up in the Red Cross shelter in Pascoe County. It is easy to tell that the winter season is on the way, with the disappearance of our static and the lengthening of the skip on 80 meters. WA4QLZ reports that the Miami 2-meter f.m. repeater is now in service. The input is 146.340 Mc. and output at 146.760-Mc. narrow band. The call of the repeater station is WB4EAA. Congratulations are in order to the North Florida Amateur Society on winning the Florida Skip Field Day trophy for the most points scored in the state. They ran 4 transmitters this year. Also congratulations to the Beaches Amateur Radio Society on being No. 1 in W4-Land in the single transmitter class during Field Day '68. We hear that WB4NI is in the hospital in Gainesville. The Vero Beach Amateur Radio Club is now affiliated with ARRL. W4LEP reports that he has received his 25-year membership pin from the League. Traffic: (Oct.) WA4HE 467, WA4SCB 459, WB4AW 437, K4BV/4 423, W4LEP 361, W4JJS 338, WA4NEV 336, WB4HJW 168, WB4EPD 161, W4DFU 133, WA4FGH 131, K4LEC 88, W4SDR 88, WB4PLW 81, K4DAX 78, WA4HED 78, W4FP 70, W4YPK 69, WA4FJA 52, WB4EQX 50, W4OGX 44, W4NGR 42, W4CICQ 41, WB4DSP 36, W4AKB 34, WB8ZY/4 34, W4SMK 34, WA4QLZ 28, WA4NBE 27, W4TJM 25, WB4ADL 24, K4IEK 23, K4LPS 21, W4IYT 20, W4PBK 20, W4ARQR 19, W4IAD 18, WA4EYU 15, W4ZAK 12, K4BBE 7, WA4YRU 7, W4DVO 5, W4VPQ 5, K4DSN 4, K4JZL 4, W4SOM 4, WB4GUH 3, W4CBE 2. (Sept.) W4IAD 6.

**GEORGIA**—SCM, Howard L. Schonher, W4RZL—SEC: WA4WQU. RM: W4FDN. PAMs: K4HQI, W4YDN, WB4EMF now is Advanced Class. W4HYW participated in the Calif. and Mass. QSO Parties. Tom continues to recruit new ARRL members. W4LRR is active on 2. K4PZS has a new lunch box. K4HQI on HW-17, K4RZB a kw. on 6 and W4LRR a twenty-element colinear for 2. The Ga. S.S.B. Net reports 31 sessions with 761 check-ins and 104 formals. GSN had 62 sessions with 474 checking in for a traffic total of 292. K4HQI reports 50-Mc. openings on Oct. 12 and 14 into Texas and the Midwest. He also advises of increased 2-meter activity in the Athens and Augusta areas. WB6UTC is relaying between the c.w. and s.s.b. nets. W4TYE participated in the CD Party. WA4UQQ is planning on "Signal One" gear. K4TXK modified the Marauder for 15-ke. deviation f.m. and runs 200 watts s.s.b. and 120 watts f.m. on 2. W4PGU has a new inverted "V" for 40. Plans are being made to increase activity and change the time of GTN under the new net management of WB6UTC. Mike's previous experience along these lines will be of great help to the net and the section. Traffic: WB6UTC/4 196, W4CZN 187, W4TYE 180, WA4RAV 165, W4PIM 93, WA4UQQ 87, W4DDY 58, K4TXK 34, WA4LLI 33, WA4KQQ 23, WA4YDN 17, WA4JES 14, W4RZL 5, W4PGU 2.

**WESTERN FLORIDA**—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB. H.F. PAM: W7BNR/4. V.H.F. PAM: W4UUF. RM: K4UBR. Nets:

Net	Freq.	Time	Days	Seas.	QNI	QTC
WFPN	3957 kc.	2300Z	Daily	31	673	63
QFN	3651 kc.	2330/0300Z	"	62	—	—
FATT	3704 kc.	0000Z	"	—	—	—

Pensacola: The F4RA had a program on 2-meter f.m. and repeaters at a recent meeting. K4LAN is net mgr. for QFN for the next six months. K4Vfy/4 made 189K in the CD Party. W4UUF reported a good opening on 2 meters, with contacts to W8-, W9- and W0-Land. WA4WAR and WA4ZRN joined the 2-meter f.m. gang. K4NMZ is attempting meteor scatter skeds with W0EYE.

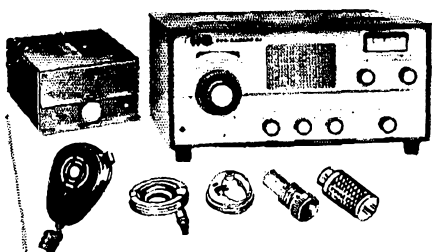


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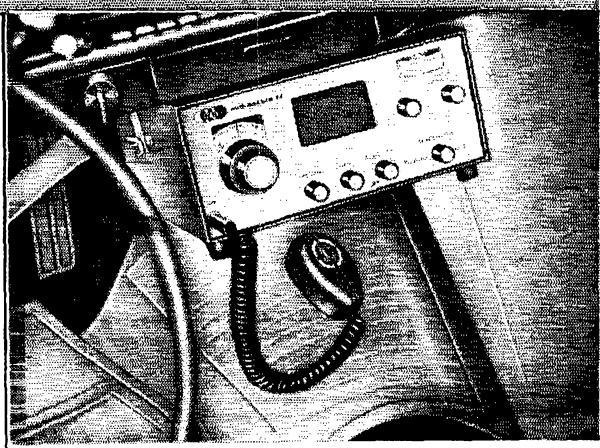


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Fort Walton: The N.W. Fla. F.M. Assn. received its charter as a non-profit corporation. The group provided election night communications between several remote precincts and the County News Central. Coordinator was WB4EQU. Port St. Joe: W4WEB was appointed RM for KTTY, and renewed as OPS. Also on KTTY are WA4WAR, K4HOX and W4IKB. Remember the FATT Net. Tallahassee: WA4EOQ sold his complete station and bought a new Swan 500-C. K4OHR moved to a new QTH and is busy putting up antennas. W4MLE renewed as OO and O.R.S. Cross City: W7-NQY/4 is the new EC for Dixie County. Traffic: K4-VFY/4 161, WB4DVAI 77, W4WEB 34, WA4WAR 30, W4IKB 24, WA4EOQ 11, W4RKH 8, K4PKQ/4 1.

## SOUTHWESTERN DIVISION

**ARIZONA**—SCM, Gary M. Hamman, W7CAF—PAM: W7UXZ. RM: K7NHL. The Amateur Radio Council of Arizona invites all hams to a hamfest at Estrella Park, near Avondale, Feb. 1 and 2. Sunday lunch is potluck. Camping sites are available Fri. and Sat. nights. Look for W7IO/7 on 3.878 Mc. for talk-in. The Simulated Emergency Test will be held Jan. 25, 26. Monitor 3.878 Mc. on the Copperstate Net and 3.9905 Mc. on the RACES Net for details. Maricopa RACES had a successful radiological monitoring exercise. K7VAG is pres. of the group this year. The Arizona ARC had a nice turnout at North Mountain Park for a hamburger fry with K8JTT and XYL as chief cooks. W7COWY has been holding code and theory classes on Wed. at 1930 in the Central Towers Building in Phoenix. K7MLE is pres. of the Kaiser Radio Club and has completed construction of an all-solid-state 6-meter transmitter-receiver running 13 watts input with a 12 v.d.c. supply. WA7DUB is a semi-finalist in the National Merit Scholarship Contest. W7FCD has worked 100 countries on a vertical with 200 watts. W7UXZ has a new counter that measures frequency to the nearest .001 kc. up through 50 Mc. K7VYR is now in Tokyo after being in Viet Nam. The Arizona Post Office Net handled 70 pieces of traffic. Congrats to K7UGA on his election to the U.S. Senate. Traffic: (Oct.) K7-NHL 281, WA7DUB 55, WA7ISP 6, W7DQS 3, W7CAF 2, WA7FD 2. (Sept.) WA7DUB 78.

## ARIZONA QSO PARTY

February 8-9, 1969

All radio amateurs are invited to participate in the third Arizona QSO Party sponsored by the Saguara H. S. Amateur Radio Society, and approved by the Arizona SCM.

**Rules:** The contest begins at 1400 GMT Saturday Feb. 8, 1969 and ends at 0200 GMT Monday Feb. 10, 1969. All bands and modes may be used. Stations may be worked twice per band, once on c.w. and once on phone. Arizona stations send contest number, RS(T) and country. All others send number, RS(T) and ARRL section or country. The call will be CQ Arizona or CQ test de Ariz (call) K. Arizona stations score 2 points per QSO multiplied by the number of ARRL sections worked. All others score 5 points per QSO multiplied by the number of Arizona counties worked (maximum of 14). Suggested frequencies: (c.w.) 3575 7025 14075 21075, (phone) 3850 7275 14275 21325 28600. (Novices) 3735 7175 21110. Certificates will be awarded to the top scorer in each section. When 4 or more logs received from one section, a second place certificate will be given. Logs must show date and time in GMT, stations worked, bands, modes and information exchanged. Please enclose an s.a.s.c. with your log if you wish a copy of the results. Send logs to Brian Wood, WA7FIK, 6707 N. 60th St., Scottsdale, Ariz. 85251 before March 9, 1969. ALL stations must submit a statement that all regulations have been followed and that decisions of the contest committee are final.

**LOS ANGELES**—SCM, Donald R. Etheredge K6UMV—Asst. SCM: Harvey D.D. Hetland, WA6KZI (The following is a report of Sept. activities.) A newly affiliated club in the L.A. section is the Northrop Institute of Technology. A new appointee is WB6SSZ. Two Silent Keys include WA6FAO and W6YHP. W6CZP and W6RCV are both sporting new Extra Class licenses. W6WGC is now W6QB and reports WAS and DXCC 6 178 under the new call! The WVARC has new officer with WB6TVH, proxy; WA6CXA, vice-pres.; W6GCSN secy. and WB6KPN, treas. The WVARC is now licensee as WA6LXN. The TRW RC sports a newly-named bulletin *Cross Talk*, and reports work is being done on

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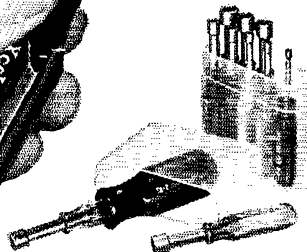


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TRW OSCAR with 144.1-Mc. input and 431.9-Mc. output. Passband is expected to be 3 kc. and optimum power output is 3 watts r.f. A recent visitor to W/K-Land was VU2AJ, who reports a habit of 100% QSL! ORS appointee WB6TMC has a 7-lb 11-oz. YL addition to the family. BPL was earned by W6GYH, WB6BBO and WA6KZI for Sept. traffic-handling duties. The Mission Trail Net (MTN) now meets on 3928 kc. instead of 3854 kc. WB6TQS is busy on a 813 linear amplifier. K9-QZ0/6 also passed the Extra Class exam recently. Cal Poly (Pomona) is publicizing its MARS and NTS traffic capabilities to its immediate area. Its call is WA6GYI. 6Y5NY has WB6VZD, OPS, as QSL Mgr. K6ASK is now licensed as Advanced Class. W6AM/mobile 6 reports some 112 countries worked. W6FTQ has a new Drake R4A receiver for his OO work. A new face on the SCN scene is WB6YUQ and WB6IQT is welcomed back. W6FD is on vacation in K7UGA-Land. WB6IMV has CE3QG and O4AC worked via 50-Mc. TE. WA6KIK has a new ten-element yagi gracing the sky for 6 meters. The Marina ARC reports WN6DGP as a Silent Key. A new L.A. section resident is HK3BKP. Operating under RACES, W6FXN, W6QYY, W6VHU, W6VZA, K6OXX, WA6GZK and WA6WPX helped with communications at the recent Duarte fire. A list of some 122 amateur radio clubs, mainly in the L.A. and Orang Counties, has been compiled and is available for an SASE with 12 cents postage affixed. All radio clubs are urged to write and verify data including updating of information. WA6KZI is working part time at KWKW and UCLA. The SFCO group recently acquired eight 450-Mc. transceivers for RACES purposes. Traffic: (Sept.) W6GYH 901, WB6BBO 531, W6QAE 334, WB6TQS 209, WA6KZI 205, WB6YSG 100, K6CWD 94, K9QZ0/6 75, W6FD 51, WB6WDS 46, WB6OLD 39, W6USY 36, WB6SXY 34, WB6KGG 33, WB6HG 26, WB6IQT 26, WB6SLG 19, W6DQX 18, WB6VZD 17, K6CL 14, K6EA 8, K6UMV 7, WB6AEL 6, K6ASK 6, W6DGH 4, W6TXJ 4, W6TN 3, W6AM 2, W6HUJ 1, W6GUD 1. (Aug.) K6EA 6.

**ORANGE**—SCM, Roy R. Maxson, W6DEY—On Sun., Oct. 27, at 9 A.M. eight hams representing the ARRL and the ARCC Orange Section 75-Meter Net surprise-visited the shack of W6TMY to present him a plaque commemorating his 260th consecutive check-in. "Mac" greeted WB6QAK, K6LJA, WB6RVM, WA6ROF, W6VAA, W6QAT, WA6YWN and W6DEY. An "eyeball QSO" was enjoyed by all. The Orange section winner of the 1968 New York QSO Party was K6OT. WA6ROF has a 75A-3 and a Mosley TD-2 trap dipole for 80/40-meter NTS and AREC activity. W6EI now is doing liaison between PAN3 and RN6 and has the problem of getting good ground out in the desert. W6EIE, K6MJU, WA6UBP and XYLs along with W6PJU and W6DEY joined in the 6th Mobile Caravan to Ensenada, B.C. Mexico. The members of the group were greeted by the Mayor and entertained by the members of the Iradio Club de Ensenada, Nov. 9-10. The Anaheim ARA and the Fullerton RC held annual banquets Nov. 9. WB6YU had 227 contacts, 70 stations, 100 watts phone for 20,737 points in the Sweepstakes. W6RYQ, WB6MZP, K6DM, K6VIZ and K6JBG submitted measurements in the FMT of Sept. 14. Traffic: WB6TYZ 170, WA6ROF 144, W6WRJ 26, W6EY 11, W6BUK 2.

**SAN DIEGO**—SCM, James E. Emerson, Jr., WB6GMM—The Oct. DX Club meeting was held at the home of W6RCD and was highlighted by a visit from ILEN. Look for K6HTO on the high end of 2 meters with a newly-revised i.m. rig using high power. The Palomar RC had as the main attraction of its Nov. meeting a tour through the Swan plant in Oceanside. K6EQN is in the process of building a 4-1000 linear and getting on RTTY. If you haven't received your 200th Anniversary QSL cards and log sheets, drop a line to San Diego 200 Anniversary, Inc., 635 C St., San Diego 92101. WA6CQW, of the San Diego Police Dept., is looking for fellow amateurs to assist in the ham game. His home phone is 264-4845. WB6HZL, one of our sightless hams, has donated a complete station to WN6NGU, one of our most recent sightless brothers to join the ranks. The ARC of El Cajon has begun a get-acquainted awards program it calls WAMO (Worked All Members Award). It's open to all amateurs. Contact a member for the details. The club also is planning to start Novice classes on Fri. nights. WA6COE is co-sponsor of the newly-formed ARC at Parkway Jr. High, WA6NAP. Thirty members are working for their Novice tickets. K6HAV has completed the wiring of his new shack and should be moved into by now. Traffic: W6YDK 4358, W6EOT 418, W6VNG 369, W6BGF 271, W6LRU 205, W6SE 84, K6HAV 71, WB6UMT 64, WB6GMM 23.

**SANTA BARBARA**—SCM, Cecil D. Hinson, WA6-OKN—SEC: K6GV. RM: W6UJ. WB6BWZ somehow finds time to eat in addition to checking into four daily

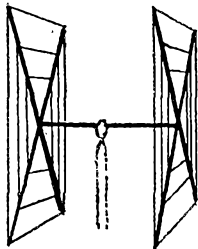
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—these two element beams have a full wavelength driven element and a reflector (the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete 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 fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!



### 10/15/20 CUBICAL QUAD SPECIFICATIONS

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

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

Dimensions: About 16' square.

Power Rating: 5 KW.

Operation Mode: All.

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Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

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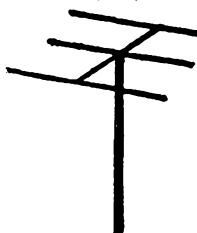
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3 E1 20 . . . . .	25*	7 E1 10 . . . . .	32*
4 E1 20 . . . . .	32*	4 E1 6 . . . . .	18
2 E1 15 . . . . .	15	8 E1 6 . . . . .	28*
3 E1 15 . . . . .	19	12 E1 2 . . . . .	25*
4 E1 15 . . . . .	25*		*20' boom
5 E1 15 . . . . .	28*		

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FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

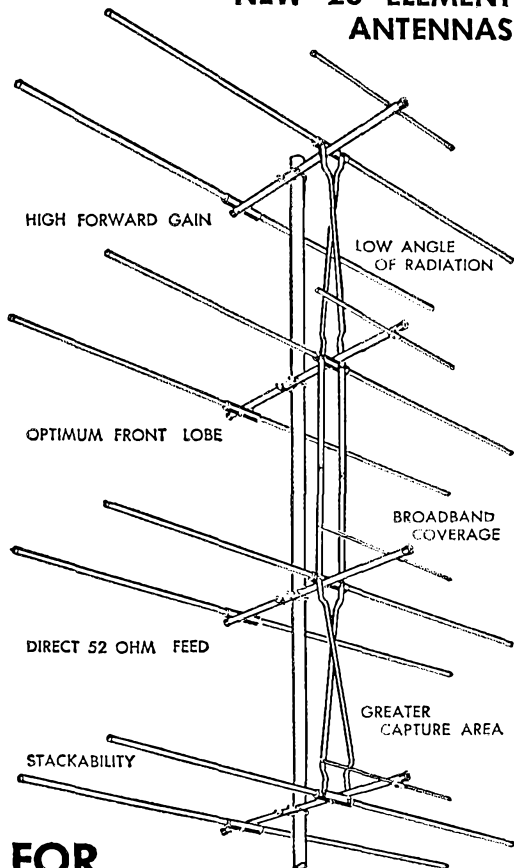
V40 vertical for 40, 20, 15,	
10, 6 meters . . . . .	\$14.95
V80 vertical for 80, 75, 40,	
20, 15, 10, 6 meters . . . . .	\$16.95
V160 vertical for 160, 80, 75,	
40, 20, 15, 10, 6 meters . . . . .	\$18.95

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- DX-220 — 220 mhz 22.50**
- DX-420 — 432 mhz 17.50**

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nets, getting on RTTY, getting on 2 meters and doing a great job as EC and OO. I understand he also has a job. W8UJ has been working some good 10-meter C.W. DX. K6GV put up his second "dilly dweller" antenna. W6BJM has been plagued with relay trouble in his KVM-2. K7RWI/6 is attending school in Santa Barbara and is a past ORS from San Diego. WA6FKY checks into the Golden Bear Net and handles traffic from the *Repose*, which I believe is a hospital ship in S.E.A. K6TOE will be missed by the Estero ARC while on a month's vacation. WB6YCH has a new 6-meter antenna and rotator. WA6DDQ is trying out his new tri-band quad. Traffic: K7RWI/6 174, WA6FKY 12, W6UJ 8, WB6BWZ 2.

### WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, L. E. Harrison, W5LR—State RACES in Austin came out with a new list of District and Alternate District Radio Officers. Thanks to WA5VTO, State RACES Officer. Our section is represented by WA4FUN/5 Dallas, W5TFW Nederland, K5SZC San Angelo, W5GHQ Lubbock, K5BGA and K5DMJ Amarillo, WA5CMB Wichita Falls, also W5AVA, and WA5CMC plus K5CLL. W5QWR has resigned as ORS. W5FCX has been endorsed and W5QGZ transferred. EC W5LGY has renewed as net mgr. of NETEXENET. This net meets each Sun. at 0800 local time on 3970 kc. The Brownfield Hamfest was the No. 1 attraction in Texas this past month. Vice-pres. W5NW, Director W5IQ and SCM W5LR attended. Sponsors of the event were the Terry County Radio Club with W5IWX as pres., and W5NFO, Asst. SCM. The Dallas Amateur Radio Club announced at the OT Night, attended by 125 people, the following nominations: WA5BFB, for pres.; W5IY, for vice-pres.; WA5BNW, for secy-treas.; WN5-NXL, for sgt. at arms; W5GG, for tech. dir.; W5AG, for program dir.; WA5LMG, for finance dir.; Jim Rhodes and Sam Goldstick, educational dir.; Pat Fox, XYL of W5OQO, public relations dir. The Texhoma Hamfest is now a matter of record. The Dallas Club's General license class started Nov. 1 to continue for 14 weeks. North Texas hams interested in RTTY equipment should contact K5BOA, DA8-1221 Dallas. Your SCM appeared before the Irving Amateur Radio Club Oct. 17. Ham Radio 1968 Style was discussed, including the area of advisory committees. The Irving Club issues a 3-page bulletin once per month containing all local items of interest as well as numbered OBBS. Comes next the Kilocycle Club of Fort Worth with a 4-page resume of club activities. Pres. WA5JJJ and his crew are doing a fine job. Club meeting rooms are located in Seminary South. The club's General Class school is well underway. KIZAT/5 reports from San Angelo that he has a new junior operator. Reports are now arriving from many West Texas places including Abilene, Hereford, Brownfield, Dalhart, Pampa, San Angelo and Weatherford. Our OOs are doing a grand job. Looks like our SEC is pushing this AREC business, four new ones in Oct. Remember, your SCM, SEC, PAM, RMs and OOs are at your service. Traffic: K5BNH 2168, WA5TYH 658, W5JSM 367, W5HVF 84, K5LZA 64, K5PBN 47, WA5DDB 41, WA5SIO 34, W5QZ 33, W5FCX 12.

**OKLAHOMA**—SCM, Cecil C. Cash, W5PML—SEC: WA5AOB. RM: W5QMJJ. PAMS: W5MPX, K5TEY, WA5JGU, K5ZCJ. Correction on July listing: W5KOZ, listed as Advanced, should have been *Extra Class*. Congratulations to the following upgraded and new licensees: Extra Class, K5GUZ and W5ZXD. Advanced Class, WA5AOB, K5BBA, WA5FVJ, WA5GCH, K5IRO, K5OXP, WA5SUD and K5WPP. General Class, WA5QYK. Novice, WN5WCB and WN5WET. New officers of the Enid Amateur Radio Club are WA5OUB, pres.; WN5UJG, vice-pres.; WA5NYX, secy-treas. There is quite a bit of 2-meter activity in the Enid area now that the repeater is full operational; also the v.h.f.ers report some good skip openings recently on both 6 and 2 meters. The Lawton Fort Sill Amateur Radio Club's fare-lifting is just about completed with the operating room including acoustical tile ceiling, mahogany paneling, wall-to-wall carpeting and air conditioning. Santa came early to the shack of K5CBA and left Preston a Heath SB-300 and SB-400. Net reports:

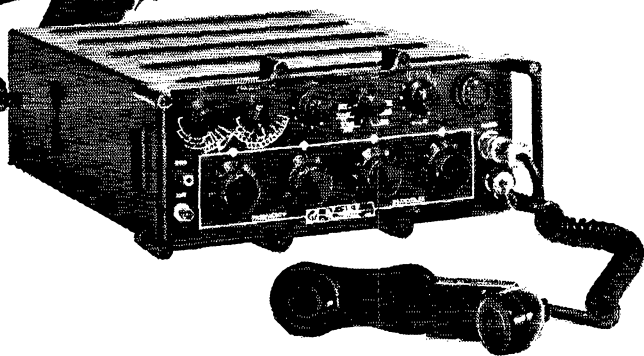
Net	Freq.	Sess.	Time	QNI	QTC
OPEN	3915 kc.	4	1400Z	156	3
STN	3855 kc.	27	2350Z	753	320
OPON	3920 kc.	23	2300Z	237	78
OLZ	3682.5 kc.	20	0100Z	49	34
SSZ	3682.5 kc.	16	0345Z	31	36

Help is wanted in OLZ and SSZ. (SSZ is slow speed.) Traffic: (Oct.) K5TEY 4484, WA5JGU 195, WA5KFT 68, W5PML 68, WA5IMO 61, W5QMJJ 51, WA5AOB 50, K5USA 50, W5FKL 33, WA5FSN 33, W5MPX 30, K5OOV



# SSB RF-301P PACK SET

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26, WA5SEC 24, WA5DZP 17, K5SWL 11, K5WPP 11, WA5KZA 5, K5CBA 4. (Sept.) K5SWL 14, W5FW 11.

**SOUTHERN TEXAS**—SCM, G.D. Jerry Sears, W5-AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. New appointment: K2EIU/5 as OO. W5ABQ has been OHS so long he is on his third certificate. WA5MBC will soon be heard as K9MFI from Peoria, Ill. The Houston ARC recently elected WA5JDI, pres.; W5CWE, vice-pres.; W5FFP, treas.; WA5IRD, secy.; W5JVR, membership; K5SOH, program. A radiogram was received advising that K2EIU/5 was winner of the 1968 New York QSO Party. The new call for the ARC at Randolph AFB is WA5SNH, as reported by K2EIU/5. Editor W5NGW notes in the El Paso, W5ES, *Bulletin* that: K5MTL now is back from Korea and W5LJU has gone to Korea for a year. WA5NGO moved to Louisville. K5VRF's beam lost a battle with the wind; just recently lightning got his 2-hand cliff-dweller. EC K5IMP now is operating RTTY and says it's lots of fun. W5ABQ reports that the San Antonio Chapter of the QCWA now has over 24 members. RM W5EZY reports that several stations missed recently for one reason or other on the TEX. C.W. Tic. Net, resulting in a lower count than usual. Some new stations are needed on TEX, which meets on 3770 kc. at 1900 and 2200 local time daily. W5KZT reports he still is trying to get his 75-meter antenna up and says DX is good on "10," and that WA5PDD has 40 states confirmed on 6 meters. It was nice seeing many of you from Southern Texas at the Houston ARC Hamfest at Spring Creek Park. W5BRM is back in the hospital for open-heart surgery. A nice letter was received from W5NWG in RVN. Best of luck and hope to see you in Southern Texas next May. Traffic: K5HZR 190, W5-QJA 123, W5BGE 111, W5EZY 97, W5AC 89, WA5INZ 84, K2EIU/5 83, WA5MX 76, W5FW 57, W5KZT 43, W5-ABQ 24, W5QO 22, WA5QKE 21, K5WYN 16, WA5GZX 14, K5QQG 10, WA5RXO 8.

## CANADIAN DIVISION

**ALBERTA**—SCM, Harry Harrold, VE6TG—PAM (APSN): VE6ADS. SEC: VE6FK. ECs: VE6SS, VE6-

## FIFTEENTH ANNUAL VE1 CONTEST

Jan. 19 and 26, 1969

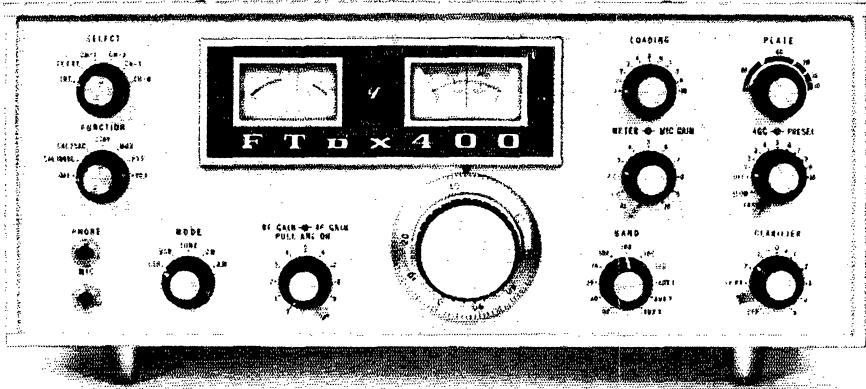
All VE1 amateurs are invited to participate in a contest sponsored by the New Brunswick Amateur Radio Association. The contest is divided into two sections, phone and c.w. The highest scoring contestant in each section will be awarded permanent possession of an engraved cup, the NBARA Trophy. A special certificate of recognition will be issued to any participant submitting logs showing 25 or more valid contacts and/255 or more valid contacts.

**RULES:** 1) The c.w. contest will begin at 1200 GMT and end at 2400 GMT January 19. 2) The phone contest will begin at 1200 GMT and end at 2400 GMT January 26. 3) Any and all amateur bands may be used but only c.w. to c.w., or phone to phone contacts will count. Any contestant may participate and be eligible for awards in both sections. 4) The same station may be counted but once for credit (in each section) regardless of band used. Mobile, portable, and home stations covered by the same station license constitute the same station. 5) The general call is "CQ VE1." 6) Exchange signal reports, county, province, and operator's name. Local QTH is not required. 7) Logs should show band, type emission, signal reports, country, province, time, and date. Logs not showing this information IN FULL will be disqualified. 8) Score one point for information received and one for information sent and confirmed. Multiply total points by the number of individual counties worked in the three provinces to determine final score. For contest purposes Sable Island will be classed as part of Halifax County. 9) Decisions of the contest committee will be final. Logs must be postmarked not later than Feb. 4 and should be in committee hands not later than Feb. 12. Forward all entries to: Contest Committee: c/o Roger Erskine VE1PI, R.R.1, Bathurst, L. B. Canada.

(Continued on page 122)



# NOT FOR THE NOVICE



## THE FT<sub>DX</sub> 400 "FULL HOUSE"

Conservatively rated at 500 watts PEP on all bands. 80 through 10 the FT dx 400 combines high power with the hottest receiving section of any transceiver available today. In a few short months the Yaesu FT dx 400 has become the pace setter in the amateur field.

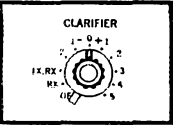
**FEATURES:** Built-in power supply • Built-in VOX • Built-in dual calibrators (25 and 100 KHz) • Built-in Clarifier (off-set tuning) • All crystals furnished 80 through the complete 10 meter band • Provision for 4 crystal-controlled channels within the amateur bands • Provision for 3 additional receive bands • Break-in CW with sidetone • Automatic dual acting noise limited • and a sharp 2.3 KHz Crystal lattice filter with an optimum SSB shape factor of 1.66 to 1.

Design features include double conversion system for both transmit and receive functions resulting in, drift free operation, high sensitivity and image rejection • Switch selected metering • The FT dx 400 utilizes 18 tubes and 42 silicon semi-conductors in

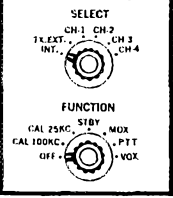
hybrid circuits designed to optimize the natural advantages of both tubes and transistors • Planetary gear tuning dial cover 500 KHz in 1 KHz increments • Glass-epoxy circuit boards • Final amplifier uses the popular 6KD6 tubes.

This imported desk top transceiver is beautifully styled with non-specular chrome front panel, back lighted dials, and heavy steel cabinet finished in functional blue-gray. The low cost, matching SP-400 Speaker is all that is needed to complete that professional station look.

**SPECIFICATIONS:** Maximum input: 500 W PEP SSB, 440 W CW, 125 W AM. Sensitivity: 0.5 uv, S/N 20 db. Selectivity: 2.3 KHz (6 db down), 3.7 KHz (55 db down). Carrier suppression: more than 40 db down. Sideband suppression: more than 50 db down at 1 KHz. Frequency range: 3.5 to 4, 7 to 7.5, 14 to 14.5, 21 to 21.5, 28 to 30 (megahertz). Frequency stability: Less than 100 Hz drift in any 30 minute period after warm up.

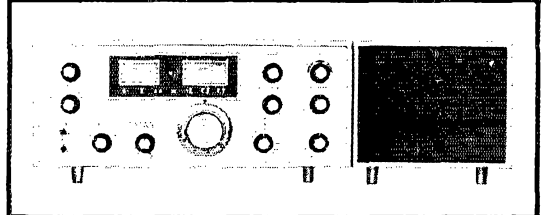


**CLARIFIER CONTROL**— Does the work of an external VFO — allows operator to vary receive frequency 10KHZ from transmit frequency, or may be used as an extra VFO combining transmit and receive functions.



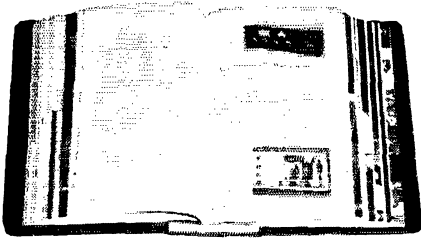
**SELECT CONTROL** — Offers option of internal or outboard VFO and crystal positions for convenient preset channel operation.

**FUNCTION CONTROL**—Selects crystal calibration marker frequency and desired transmit mode of operation.



FT DX 400 \$599.95 — SP-400 \$14.95

# QST PROTECTOR!



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LEAGUE**

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## 50-Mc. Transistor Transceiver

(Continued from page 15)

upon finding that certain items are not available, and replacements do not fit!

Preparation and etching of circuit boards is tedious but uncritical. The result, particularly in equipment using transistors, is superior mechanically and electrically to other methods of construction. Procedure is covered in detail in the ARRL *Handbook* chapter on construction practices (page 522 in the 1968 edition) and in *QST* for September, 1967, page 13.

No attempt has been made to estimate the cost of the transceiver, as many parts came from used stock. Some items listed are the closest equivalents likely to be available, rather than exact details of the surplus parts used by the writer. This should be kept in mind in laying out your circuit boards.

Power drain in receiving is only 17 ma. at 12 volts, with no signal. Room-level audio raises this to about 30 ma. Transmitting draws about 110 ma., unmodulated, and 165 ma. on audio peaks. This power can be furnished economically from "D" cells. For more on batteries for portable work, see *QST* for September, 1967, page 40.

### Operation

Working out with a QRP station of this nature requires considerable patience, a good antenna, and some know-how. Contacts have been made over a radius of 30 miles or so, with good reports, using a simple dipole antenna. A portable beam antenna of some kind is highly recommended. Suitable designs have been described many times in *QST*, and the subject is treated in detail in *The Radio Amateur's V.H.F. Manual*. The receiver is capable of bringing in stations that cannot be worked with such low transmitter power, but a good receiver is a great aid in getting the most out of a portable station.

Do not rule out the possibility of working out when the band is open for sporadic-E skip or other DX, but remember that these conditions result in immense pileups. Moving up or down a few kilocycles may help in keeping you from being drowned out by the kilowatts. In calling, mention that you are operating a QRP station. This may attract attention from operators who otherwise tend to ignore the weaker signals. We put out a special QSL for operators having the courtesy to answer a weak voice.

A self-contained transceiver is ideal for local emergency work, and is great fun in Field Day and v.h.f. contests, so long as operation is the main goal, rather than achievement of a high score. You'll never beat the kilowatt boys, but you may enjoy it more!

Our thanks go to John Rehnstrom, WA7-HQG, for his patience in providing signal reports during development of the transmitter in its early versions, and for the first contact on the completed unit.

**QST**

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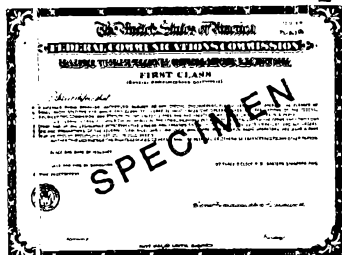
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PIN, BUTTON, CUT or RUBBER STAMP

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XC, VE6PL, VE6AFQ, VE6AFR. ORSs: VE6BR, VE6ATH, VE6ATG. OPSs: VE6HM, VE6SS, VE6ATH, VE6AFQ. OBS: VE6FM, VE6TY, VE6AIF. OBS: VE6AIF. Our SEC reports that ECs are not reporting very well so, fellows, get your reports in. There was very good support in all summer activities. The Lethbridge College is having a course in amateur radio and the Southern Alberta Amateur Radio Club will assist in code practice only. VE6ABS is busy building a new all-band s.s.b. rig of his own design. The Border Area Radio Club's new officers for the coming year are VE6VE, pres.; VE6ASL, vice-pres.; VE6ANK, secy.-treas. The club would like to see a Provincial QSO Party start-up. The Vulcan County Club is very quiet these days. The CARA is busy with lots of activities. No word was received from the NARC and the Medicine Hat Club. What gives these days, fellows? This is my last report and VE6FK will take over until a new SCM is elected. We wish Don every success in his venture. Even our PAM missed the traffic count this month.

**BRITISH COLUMBIA**—SCM, H.E. Savage, VE7FB—VE7BLO received his 25-w.p.m. certificate; he holds the stick and writes with his teeth. VE7BAV reports the VE7W Contest was great for his new s.s.b. rig. Point Grey ARC's new officers are VE7AXQ, pres.; VE7CD, secy. VE7OT is doing well and back on the air. VE7BDM reports summer activity with an SB-401 at Smithers and Fort Nelson. VE7QQ's code and theory class has six prospective amateurs. VETAAL's new home is in Coquitlam and he has an SB-101 hooked to a 18AVQ. VE7BAF left for a year in Spain. VE7AFJ is busy with W/TV shop and 432 Mc. Chilliwack ARC's new officers are VE7BHG, pres.; VE7AHN, vice-pres. Major activity is on 147.33 Mc. VE7BWD reports the way to win friends while camping is to run a gas generator at nights while DX is good. VE7BOZ is back home after a year in Victoria. VE7GG reports concrete has been poured for the tower and the TH9 beam. VE7AC reports the orchards are set for the winter and he is set for hamming. The Boy Scout Jamboree, B.C. section, was fair to good. BCEN's winter schedule is on 3650 kc. at 0300 GMT daily and 302 checked into the BCEN in Oct. Traffic: (Oct.) VE7ZK 88, VE7ASY 87, VE7AC 37, VE7ZK 106, VE7BLO 50, VE7AAJ 6.

**MARITIME**—SCM, William J. Gillis, VE1NR—Asst. SCM: R. P. Thorne, VO1EL, SEC: VE1HJ. Regrettably we record the passing of VE1UR and VE1JD. VO1s EL, TA, FN and EC rendered valuable aid in locating two lost hunters, using 75-meter s.s.b. and the St. John's 2-meter repeater. VE1TG, VE1WL, VO1DI and VO1EC were recent visitors to VP7DX. VE1XG and VE1NZ recently attended the RSO and CARF meetings at Brantford, Ontario. The report on CARF meeting is included in the newsletter. APN reports QNT 157, QTC 43, sessions 31. For the New Year—rate DX, lots of traffic and enjoyable operating for all. Traffic: VE1AUD 44, VE1AMR 26, VE1AKQ 7.

**ONTARIO**—SCM, Roy A. White, VE3BUX—Your SCM was guest speaker at the Peterborough ARC meeting during Oct. The Quinte ARC had a turnout of 85 at its Oct. meeting when VE3EGO demonstrated slow-scan TV. Congrats to VE3BMR, Ontario winner of the 1968 New York QSO Party. VE3CJ was a visitor to the Windsor ARC during Oct. QSL cards, et cetera, from Canada could take a beating with the increase in postal rates Nov. 1. VE3QMO now is running an HW-12 and VE3NO is building a new color TV. VE3CUZ is active

### MANUFACTURING SUPERVISOR

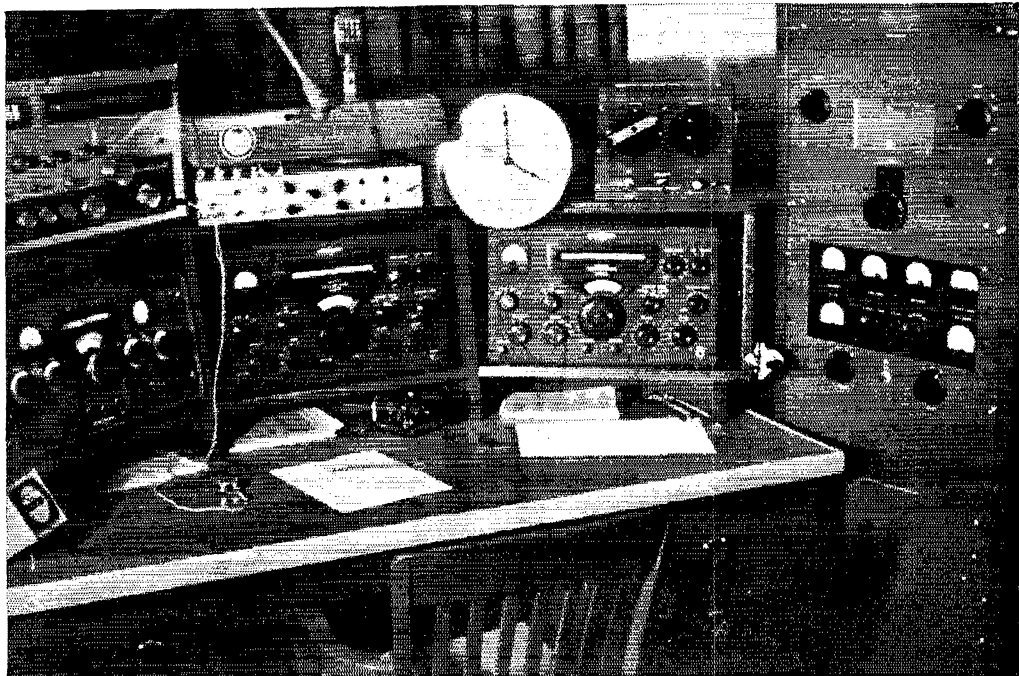
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■ offered a choice of really steep skirted selectivities? ■ let you slice off adjacent-channel QRM or set the audio passband to your taste with a single control? ■ tuned anywhere in the band independent of the transmitter?

### AND THE TRANSMITTER

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Of course, hardly anyone who's enjoyed the convenience of transceiving on sideband is likely to give it up, and none of us really want to wrestle ninety-pound desk-crushers. But is it necessary to sacrifice performance and convenience features that were readily available a decade ago?

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again after an absence of 30 years. In 1926, as VE3EL, he made the headlines with a Toronto to Australia contact on 40 meters using but 5 watts. VE3EFX is trying to get the North-West Ontario Net going again. He says the boys would really appreciate it if other stations would avoid 3750 kc. for about half an hour from 0015Z. It seems signals from the south really pound in and clobber them. VE3XF is foot-loose around S. America and is leaving a ball visiting hams there. VE3EPR lost his KV2000A in a train-wreck near Toronto but all is OK now. *The North Shore ARC Bulletin* says VE3WQ has one of the biggest erections in Bowmanville, an 80-ft. tower with a six-element tri-band quad. VE3CSB is now the proud owner of an FTDX-100. VE3ECN is back in Ottawa after a three-year stint as VU2FN. Many Ontario amateurs hosted groups of Scouts during the Boy Scout Jamboree week end and many of the lads showed great interest. The Ontario Phone Net has as many as 50 stations checking in these nights. VE3OE and VE3ART are back from a quick trip to Europe. Le is nursing a busted foot right now! Did you know that approximately 75% of Canadian amateurs hold an Advanced Class certificate? In line with opinions expressed, only traffic reports exceeding 100 will be listed herein although this office will continue to keep a detailed record.

**QUEBEC**—SCM, J. W. Ivey, VE2OJ—A very Happy New Year to all. Recent endorsements were signed for VE2ANH, VE2BDU, BE2BKA, VE2BRO, VE2BYS and VE2DDG. Don't forget to send your certificate for endorsement. VE2BWS relinquished his EC appointment and VE2DFE has taken over. He will also take over the area of Notre Dame de Grace from VE2CA, who continues with the rest of his area. VE2CRT has a preparation course for aspiring amateurs. Jan. is the month for the SET; let us show what we can do. VE2ADE got very good experience along with VE2DJB, VE2DFE, VE2EV, VE2BOP, VE2CU, VE2AVP, VE2ALE, VE2ZA and VE2BU in handling over four hundred messages for a recreation club car rally. Nomination forms are available at this address for the contest and the v.h.f. repeater section to the Advisory Committee. Le Radio Club de Québec a tenu sa première assemblée pour la saison 1968-1969 et l'exécutif suivant a été élu: VE2AAH, prés.; VE2ASU, vice-prés.; VE2LG, secy.; VE2DBR, trés.; VE2DRR, VE2BUB, VE2AYN, VE2AJS, VE2DEJ, dir. VE2BEP est maintenant à son nouveau QTH à Ste-Foy et se propose d'installer un beam de 20 mètres dans un avenir rapproché. VE2DEX, VE2DHZ, VE2DIE, VE2DIB, VE2DII, VE2DID et VE2DJK sont des nouveaux amateurs de la région de Québec. Traffic: VE2ADE 903, VE2BRD 62, VE2BVY 61, VE2DR, 51, VE2ALE 48, VE2AJD 33, VE2OJ 22, VE2EC 20, VE2PJ 16, VE2CP 14.

**SASKATCHEWAN**—SCM, Gordon C. Pearce, VE5HP—The reports received from VE3CJ and our local delegate, VE5BU, give hopes that we may look forward to further consideration of the licence fee increase. The unity amongst Canadian hams was evident in the strong case placed before the meeting with the DOT officials. Our Saskatchewan Amateur Traffic Net, ably headed by VE5PX, meets each evening on 3680 at 0230. Norm insists that "No operator is too slow for this net (some may be too fast)." Our new QSL Manager in Saskatchewan is VE5JI, 2323 Grant Road, Regina. Lloyd asks everyone likely to have cards come to him, to send in an SSA Envelope (remember the increase in postage rates). Once again we ask all our Saskatchewan hams to please send your SCM news so we can keep this column full of interesting items. Traffic: VE5BO 32, VE5LQ 12, VE5PX 9, VE5VO 8, VE5UB 3, VE5KZ 2, VE5PZ 2, VE5SC 2, VE5BD 1.

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# Great things

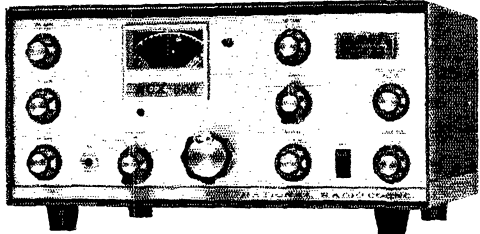
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### NCX-500

Here's the potent 5-bander with a 500-Watt punch. Check the terrific features on this low-priced performer:

- 500-Watt PEP input on SSB, grid-block keying on CW and compatible AM operation.
- Sidetone monitor, plus built-in code practice oscillator.
- Receive vernier, with tuning range greater than  $\pm 3$  kHz.
- Separate AM and product detection.
- Fast-attack/slow-release AGC in all modes.
- Crystal-controlled pre-mixing with single VFO for effective frequency stability, plus identical calibration rate on all bands.
- Crystal lattice filter for high sideband suppression on transmit, and rejection of adjacent-channel QRM on receive . . . plus solid-state balanced modulator for "Set-and-Forget" carrier suppression.

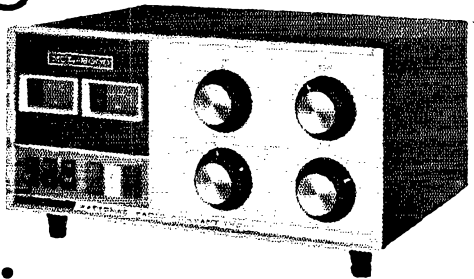


## the Rockcrushing Linear

### NCL-2000

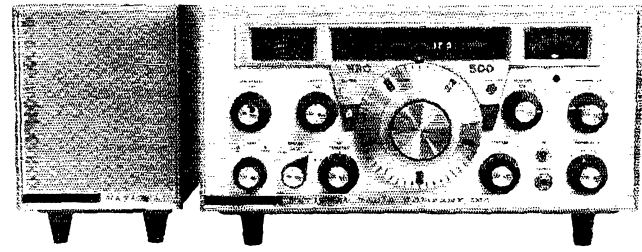
Check this full legal power, completely self-contained desk-top linear amplifier for the 80 through 10 meter bands. 2000 Watts SSB PEP. The NCL-2000 can also be operated on CW, AM, or RTTY at 1000 Watts DC input.

- Built-in power supply and cooling fan.
- Equal power output on all bands, 80 through 10 meters.
- Most complete safety and overload protection, including 1-minute time delay relay, overload relay, lid interlock, and automatic shorting bar.



## the Classic Receiver

### HRO-500



No other amateur receiver can come close to the performance of the HRO-500, with the widest frequency range and greatest performance of any general coverage receiver ever built:

- 5 kHz through 30 MHz frequency range, in five main bands (60 500-kHz sub-bands) with 1 kHz calibration accuracy on 1/4 inch per kHz dial.
- Passband tuning for SSB and CW operation.
- All solid-state for high reliability, portability, low power requirements, and absolutely cool operation.
- Phase-locked frequency synthesizer for superior stability and overall calibration.
- AGC threshold control to knock out background QRM.



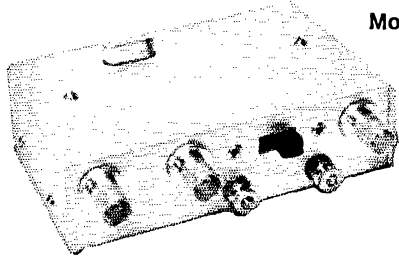
For complete details and specifications, write:

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**NRCI**

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... THE BEST  
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 CONVERTER**



Model 407  
**\$34.95**  
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50-52 MHz in, 28-30 MHz out  
 or 52-54 MHz with a second crystal.

A full description of this fantastic converter would fill this page, but you can take our word for it (or those of hundreds of satisfied users) that it's the best. The reason is simple — we use three RCA dual gate MOSFETs, one bipolar, and 3 diodes in the best circuit ever. Still not convinced? Then send for our free catalog and get the full description, plus photos and even the schematic.

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• Please send me information on Amateur Radio training.

• Name \_\_\_\_\_ Age \_\_\_\_\_

• Address \_\_\_\_\_

• City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

• **ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL**

**A Helping Hand—Present and Future**

(Continued from page 68)

United States today. The need for technicians and engineers grows daily, and there is a very definite possibility that some of today's hard-core poor — untrained in any skill — may be given the know-how to help meet this need. Just last month the Labor Department contracted for the training of several hundred jobless men from the ghetto areas of four major cities to be TV repair men. This can be a very constructive program, both for the men and for industry, for I know from my own company's experience, the TV industry can use every qualified service man it can find. Obviously, therefore, an introduction to electronics through ham radio could very well lead to a future job for a youngster from an underprivileged background.

I came upon an interesting statistic the other day: One out of every three Americans alive today is under 15 years of age. Undoubtedly, the ratio is even higher among the underprivileged, the ghetto poor. This means that a vast segment of our population will be reaching employment age in the next five or six years. It means that someone has got to try to steer them into the right channels of interest, toward constructive lives and careers.

We hams can do our part. We have a natural tool to capture the interest of these kids. I urge all of you, either individually or through the many ham clubs that exist throughout the country — formal organizations or informal groups — to contact your school superintendents, your police departments, your civic groups, and offer your services in introducing these kids to the adventure of radio. It will do them — and the community — and the future society of America — a tremendous amount of good. And we hams can have a lot of fun ourselves — and get a good deal of satisfaction — in doing it.

**QST**

**SWITCH  
 TO SAFETY!**



**RADIO OFFICER  
 TRAINEES**

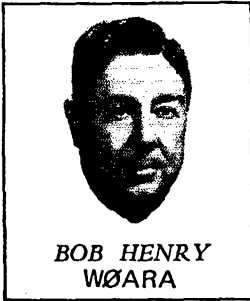
A limited number of openings are available to men willing to train for the interesting and well-paid career of Marine Radio Officer aboard U. S. Flag merchant vessels. An F.C.C. 1st or 2nd Class Commercial Radiotelegraph license is required. These openings will be particularly appealing to younger men who have completed their military obligations. Write to The Radio Officers' Union, AFL-CIO, Room 1315, 225 West 34th Street, New York, N.Y. 10001.



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W6UOU

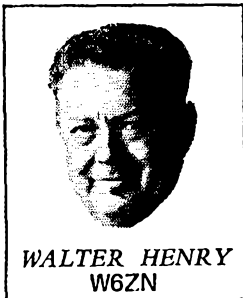
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**SATISFACTION:** Henry Radio has satisfied thousands of customers since 1927. Ask any ham about us.

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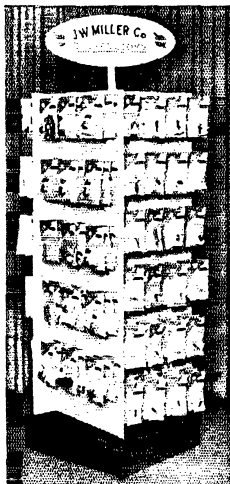
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See your local distributor for the full line of RF and IF coils, chokes, filters and transformers.

## Transistorized A.G.C. And Squelch Circuits

(Continued from page 41)

voltage of  $Q_8$  to  $-9$  volts.  $Q_8$  is now biased into the conduction region and it functions as an ordinary emitter follower passing a.f. signals from the detectors to the audio amplifier with approximately unity gain.

The turn-off action is similar. When the a.g.c. voltage drops back past the trigger level  $V_1$ , the collector voltage on  $Q_7$  rapidly switches back to  $-12$  volts. This cuts off  $Q_7$ , but capacitor  $C_4$  still has  $-12$  volts across it.  $C_4$  discharges through the  $Q_8$  base-bias resistors  $R_{20}$  and  $R_{21}$  with a long time constant. This long decay in the base voltage holds the squelch open for an additional two seconds. For the reception of a.m. and f.m.,  $C_4$  may be switched out of the circuit.

This squelch circuit has the advantage of complete absence of the characteristic "pop" when the squelch opens or closes as is encountered in many squelch circuits. I have found this arrangement to be very useful when monitoring 50.1 MHz. for 6-meter openings. I hope that other amateurs will find this discussion and these circuits to be enlightening. [QST]

## SET Announcement

(Continued from page 68)

active part of your locality's (town, city, county or whatever) emergency preparedness program.

See You Jan. 25-26!

There will be lots of traffic floating around. Red Cross chapters, this year, have been asked to file their inter-chapter and chapter-to-area traffic into the regular amateur traffic nets. Local ECs and ROs are being asked to file traffic to headquarters. All amateurs participating are being asked to file traffic to someone, the farther away the better. The object is to load the nets, especially NTS, with traffic to keep them busy and test their efficiency during peak traffic conditions. No matter how much traffic we simulate, it's not likely that we can fully simulate the load that would exist during a real nationwide emergency.

So, if you are a net member, plan to be active during this weekend, you will probably be needed. See you then! — W1NJM.

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.



## Radio amateur's tool for figuring like a "pro"

Radio engineers call this slide rule a "computer in a case." It has four special scales for solving complicated resonance problems in 20 seconds or less. No pencil and paper—no rough calculations. It even locates the decimal point. Ideal for adjusting your rig, designing test circuits, figuring db's, operating frequencies and power ratings, and for accurate match of antenna to final. Even if you've never used a slide rule before, you'll quickly master this time-saving electronics tool. Comes with 4-lesson course that teaches you everything you need to know. Mail coupon for details.

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Please send me FREE Electronics Slide Rule Booklet. ALSO FREE if I act at once: a handy pocket-size Electronics Data Guide.



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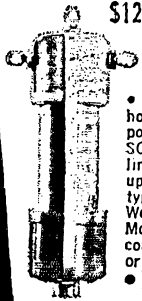
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**SUPEREX HAM HEADPHONES**

Full comfort even after many enjoyable hours of continuous use. Superb comfort even for eyeglass wearers. Crisp, distortionless reproduction and high sensitivity allows you to single out that weak signal and hard to reach station. 600 ohms impedance, completely adjustable head harness.

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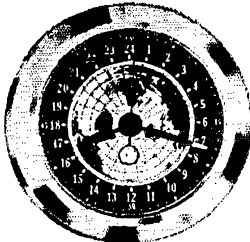


**\$12.95 W2AU FOUR PURPOSE BALUN \$12.95**

**BALANCE YOUR ANTENNA • STOP YOUR COAX FROM RADIATING • HELP ELIMINATE TVI • IMPROVE YOUR RADIATION PATTERN PLUS F/B RATIO**

- Broad-banded 3-32 mc. • Center hang-up hook for inverted Vees • Handles full legal power, 2KW PEP • Built-in lightning arrester • SO239 RF connector for coax transmission feed line eliminates center insulator • Withstands up to 600 lb antenna pull • For use with all type antennas fed with unbalanced coax line • Weighs only 6 1/2 oz. 1 1/2 diam. 6" long • 2 Models: 1:1 matches 50 or 75 ohm unbalanced coax to 50 or 75 antenna load. 4:1 matches 50 or 75 ohm unbalanced coax to 200 or 300 ohm.
- W2AU Super Vinyl jacketed 2 element 10-15-20 meter quad. Complete quad \$64.95
- W2AU Super-Fiberglas 2 element 10-15-20 meter quad. Complete quad \$99.95

**24 HOUR METAL WALL CLOCK**



24 hr. chrome plated, 8" metal wall clock. Inner dial with South polar projection map of world indicates time around world. Polar projection dial adjustable for various time zones.

Model 191 \$8.95

Also 12" dial, white, red sweep, Model 2405C \$21.95

actual size

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The newest in the line of fine tuning aids from Jackson Bros. Direct/Slow Reverse (5:1 ratio) Vernier Drive. Easy fixing — requires only one 3/8" hole. High torque, low back lash, smooth and permanent movement, coaxial spindles, 3/4" shaft dia.

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New Ameco License Guides contain simple, detailed, easy-to-understand answers for FCC study questions, plus a sample FCC-type exam, using multiple-choice questions.

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**LEARN CODE & THEORY FAST**

No. 1—Junior Code Course. Consists of 10 recordings (alphabet through 75 WPM). Includes typical FCC type code exams. Free instruction book on learning how to send and receive code the simplest, fastest way; plus charts to check your receiving accuracy. **\$5.95**

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No. 104-33 Extra Class Code Course. Increases code speed from 13 to 22 WPM in ten lessons. Prepares for Extra Class Code examination. Sample FCC-type examinations given. (33 RPM, 1 LP) **\$3.95**

No. 105-33 General Class Supplementary Code Course. Gives concentrated code practice between 12 and 15 WPM. This serves as additional code practice for the General Class code examination (33 RPM, 1 LP) **\$3.95**

No. 106-33 Extra Class Supplementary Code Course. Gives concentrated code practice between 19 and 24 WPM. This serves as additional code practice for the Extra Class code examination. (33 RPM, 1 LP) **\$3.95**

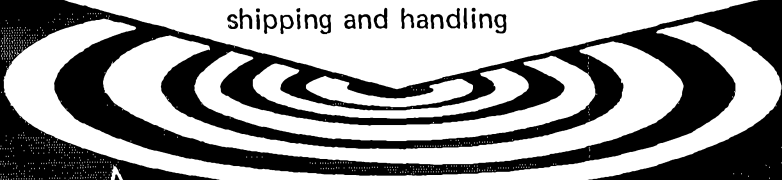
**SOLID STATE CODE PRACTICE OSCILLATOR**



Solid state, 2 transistor, code practice oscillator, built-in speaker. Tone control and headphone jack. C-cell powered, CW: 2 monitor optional. Size: 6 1/4" x 3 3/4" x 2 1/2". Wt.: 2 lbs.

	Net	with CW Monitor
OCPK (kit) ...	\$ 7.95	OCPK ..... \$ 9.95
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Include \$.75 with order for shipping and handling



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YOU CAN'T SAY "QUAD" BETTER THAN "CUBEX"

## Novice Roundup Rules

(Continued from page 67)

3) *QSOs*: Contacts must include certain information sent in the form as shown in the example. QSOs must take place on the 80-, 40-, 15-, or 2-meter bands. Crossband contacts are not permitted. C.w. to phone, c.v. to c.w., phone to c.v. contacts are permitted. Novices work any amateur stations; non-Novices work only Novices. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your number and section and receipt of a number and section. A station may be worked only once, regardless of band.

A Novice may operate in the Novice portion of the competition until he receives his General Class License, then must operate as a non-Novice entry.

4) *Scoring*: Each exchange counts one point. Only one point may be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (see page 6 of this *QST*) worked during the contest is the "section multiplier." Yukon-N.W.T. (VE8) also counts as a multiplier. A fixed scoring credit may be earned by entrants who hold ARRL Code Proficiency certificates. If an entrant does not hold a CP award he can apply for credit by attaching to his Roundup report a copy of qualifying run from W6OWP, January 2 or February 5, or from W1AW, January 11 or February 11, CP credit equals the v.p.m. speed indicated on the latest certificate or sticker held by the entrant. The final score equals the "total points" plus "Code Proficiency credit" multiplied by the "section multiplier."

5) *Reporting*: Contest work must be reported as shown in the sample form. Reporting forms and a map of the United States will be sent free upon request. Indicate starting and ending times for each period on the air. All Roundup reports become the property of ARRL and must be post-marked not later than March 1, 1969.

6) *Awards*: A certificate award will be given to the highest-scoring Novice in each ARRL section. Multioperator stations are not eligible for awards.

7) *Disqualifications*: Failure to comply with the contest rules or FCC regulations are grounds for disqualification. ARRL Contest Committee decisions are final. QST

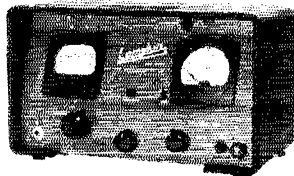
## Notes on The Heath Gear

(Continued from page 16)

cause of loading effects. Even when such peaking was done, the heterodyne oscillator signal going to the transmitter on 20 and 15 meters was only marginal. Only a simple modification in the SB-300/SB-301 is required to eliminate this problem. By replacing the hook-up wire from the 20-meter heterodyne oscillator coil  $L_{14}$  to the bandswitch connection BS2R11, and the hook-up wire from the 15-meter heterodyne oscillator coil  $L_{16}$  to the bandswitch connection BS2R1 with RG-174 coaxial cable, sufficient heterodyne oscillator output voltage was obtained. QST

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LAMPKIN 205-A  
 FM MODULATION METER

Check these specs —

Indicates instantaneous PEAK deviation of voice or tone modulation, on fast-attack, slow-decay, analog meter.

Oscilloscope output jack for VISUAL monitoring, using your shop 'scope. A low-cost, highly effective test set combination.

Weight less than 10 pounds — a two-finger load. Size 7" x 10" x 7".

Continuous tuning, 25 to 500 Mc.

Meets FCC requirements for all mobile-radio services.

Proven design — thousands in use.

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Fairchild No.	EACH	1c MORE
<input type="checkbox"/> 900	Buffer .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 902	R-S Flip Flop .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 903	3 In. Gate Nand/Nor .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 903-903*	3 Input gate Nand/Nor .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 904-904*	Half adder .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 910	Dual Two Input Gate .....	1 for 1.29 2 for 1.30
<input type="checkbox"/> 914-914*	Dual Two Input Gate .....	1 for 1.29 2 for 1.30
<input type="checkbox"/> 915	Dual 3 Input Gate Nand/Nor .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 923	JK-Flip Flop .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 923-923*	JK Flip Flop .....	1 for 1.69 2 for 1.70
<input type="checkbox"/> 925	Dual 2 Input Gate, Expander .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 927	Quad Inverter .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 930	Dual 4 Input Gate Nand/Nor .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 933	Dual Input Gate, Expander .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 944	Dual 4 Input Power Gate .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 945	Clocked Flip Flop .....	1 for 1.69 2 for 1.70
<input type="checkbox"/> 946	Quad 2 Input Gate Nand/Nor .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 948	Clocked Flip Flop .....	1 for 1.69 2 for 1.70
<input type="checkbox"/> 950	AC Binary .....	1 for 1.98 2 for 1.99
<input type="checkbox"/> 952	Dual 2 Pininput Inverter Gate .....	1 for 1.29 2 for 1.30
<input type="checkbox"/> 954	Dual 4 Input and Gate .....	1 for 1.29 2 for 1.30
<input type="checkbox"/> 955	8 Input and Gate w 2 output .....	1 for 1.29 2 for 1.30
<input type="checkbox"/> 956	Dual 2 Input Buffer .....	1 for 1.29 2 for 1.30
<input type="checkbox"/> 957	Dual Rank (hold) Flip Flop .....	1 for 1.98 2 for 1.99
<input type="checkbox"/> 961	Dual 4 Input Gate w/expander .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 962	Triple Gate .....	1 for 1.49 2 for 1.50
<input type="checkbox"/> 963	Triple Gate .....	1 for 1.49 2 for 1.50

\* Two identical IC's in one package

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**CIRCUIT**  
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PIV	3A	6A	12A	55A
50	<input type="checkbox"/> .06	<input type="checkbox"/> .16	<input type="checkbox"/> .20	<input type="checkbox"/> .50
100	<input type="checkbox"/> .07	<input type="checkbox"/> .22	<input type="checkbox"/> .25	<input type="checkbox"/> .75
200	<input type="checkbox"/> .09	<input type="checkbox"/> .30	<input type="checkbox"/> .39	<input type="checkbox"/> 1.25
400	<input type="checkbox"/> .16	<input type="checkbox"/> .40	<input type="checkbox"/> .50	<input type="checkbox"/> 1.50
600	<input type="checkbox"/> .20	<input type="checkbox"/> .55	<input type="checkbox"/> .75	<input type="checkbox"/> 1.80
800	<input type="checkbox"/> .30	<input type="checkbox"/> .75	<input type="checkbox"/> .90	<input type="checkbox"/> 2.30
1000	<input type="checkbox"/> .40	<input type="checkbox"/> .90	<input type="checkbox"/> 1.15	<input type="checkbox"/> 2.70

### MICROMINIATURE SILICON RECTIFIERS

1. Actual Size

**AMP**

PIV	Sale	PIV	Sale
50	<input type="checkbox"/> 5¢	600	<input type="checkbox"/> 19¢
100	<input type="checkbox"/> 7¢	800	<input type="checkbox"/> 21¢
200	<input type="checkbox"/> 9¢	1000	<input type="checkbox"/> 32¢
400	<input type="checkbox"/> 12¢	1200	<input type="checkbox"/> 45¢

### SCR'S SILICON CONTROLLED RECTIFIERS

PRV	3A	7A	20A
50	<input type="checkbox"/> .35	<input type="checkbox"/> .45	<input type="checkbox"/> .70
100	<input type="checkbox"/> .50	<input type="checkbox"/> .65	<input type="checkbox"/> 1.00
200	<input type="checkbox"/> .70	<input type="checkbox"/> .95	<input type="checkbox"/> 1.30
300	<input type="checkbox"/> .90	<input type="checkbox"/> 1.25	<input type="checkbox"/> 1.70
400	<input type="checkbox"/> 1.20	<input type="checkbox"/> 1.60	<input type="checkbox"/> 2.10
500	<input type="checkbox"/> 1.50	<input type="checkbox"/> 2.00	<input type="checkbox"/> 2.50
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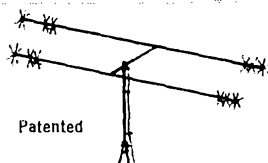
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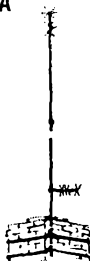
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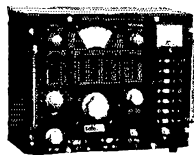
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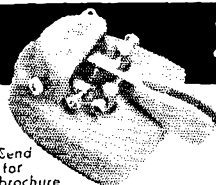
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## Measurement of High Capacitances

(Continued from page 33)

imum capacitances in microfarads that can be measured with any combination of voltmeter resistance and voltage range (e.g., 100  $\mu\text{f.}$  for a 1K/volt meter on its 10-volt range, 0.5  $\mu\text{f.}$  for a 20K/volt meter on its 100-volt range, etc.). On the other hand, an excessively long timing period is undesirable, unless one has a lot of patience. To find the maximum capacitance in microfarads that can be checked within 100 seconds (1 minute, 40 seconds), multiply each factor in the table by 100 (e.g., 200  $\mu\text{f.}$  for a 10K/volt meter on its 50-volt range, 40  $\mu\text{f.}$  for a 50K/volt meter on its 50-volt range). The capacitances that can be measured in longer time periods can be similarly determined by multiplying the table factors by the time periods in seconds. For voltage ranges and meter resistances not included in Table I, the multiplying factor may be determined by taking the reciprocal of the meter resistance in megohms. (Example: The meter resistance for a 1000 ohms/volt meter on its 1.2-volt range is  $1000 \times 1.2 = 1200$  ohms = 0.0012 megohm. The reciprocal is  $1/0.0012 = 833$ .)

## Electrolytics

In measuring electrolytic capacitors, the leakage resistance should be taken into consideration, since this resistance will tend to reduce the time constant, making the capacitance indicated less than the actual capacitance. The procedure I used was to measure the leakage resistance with the v.o.m. switched to read resistance, and then to make sure that the voltmeter resistance used to make the capacitance check was not over 10 percent of the measured leakage resistance. In making the resistance measurement, the capacitor must charge to the ohmmeter battery voltage through the ohmmeter resistance, so it is necessary to wait until the ohmmeter deflection settles down before taking a reading. Be sure that the positive terminal of the ohmmeter is connected to the positive side of the capacitor.

New electrolytics, or those that have not seen service for some time may require "reforming." If successive measurements show an increase in capacitance, the capacitor should be reformed by applying rated voltage through a 5000-ohm resistor for a few minutes. After reforming, be sure to discharge the capacitor before handling.

1057

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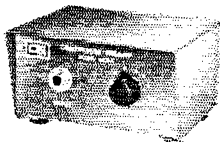
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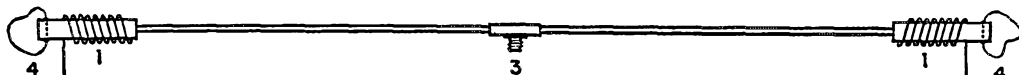
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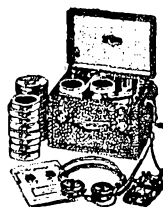
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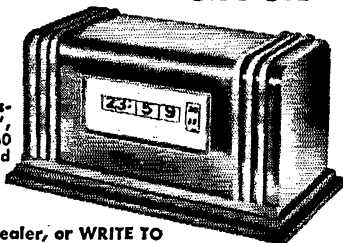
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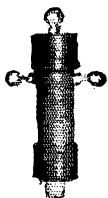
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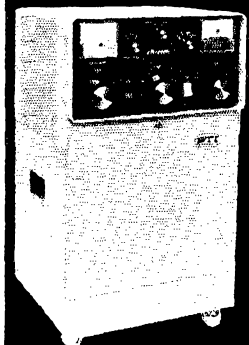
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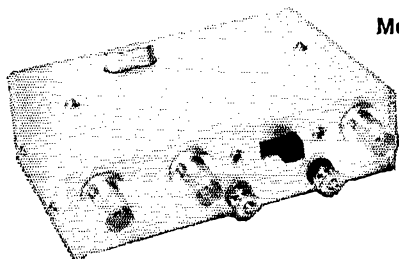
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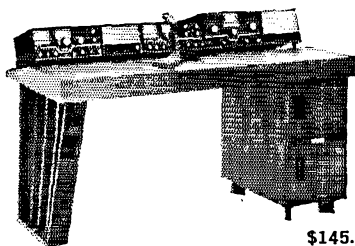
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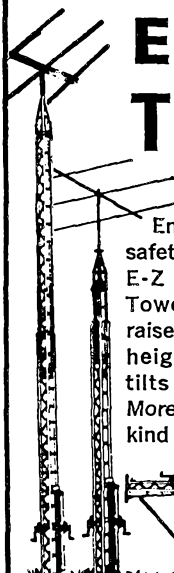
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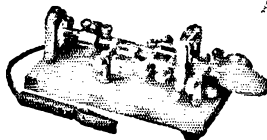
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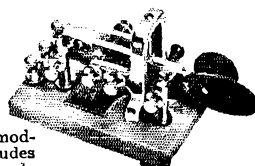
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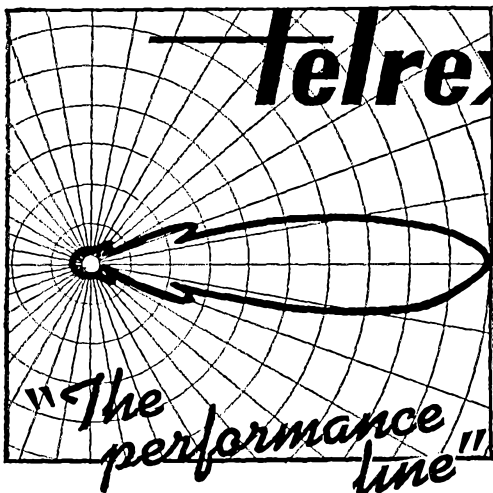
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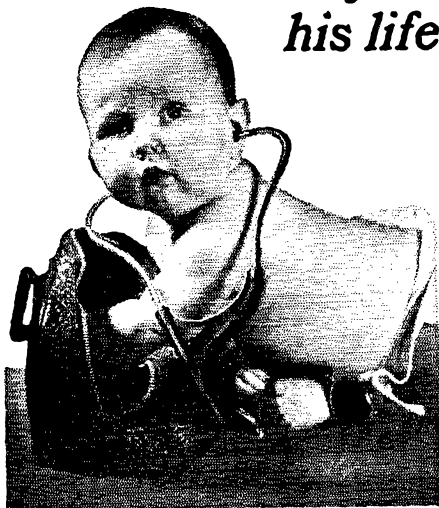
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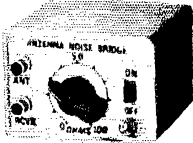
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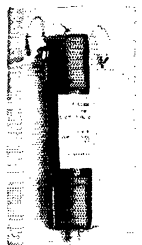
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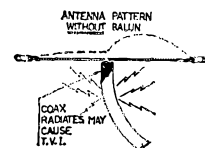
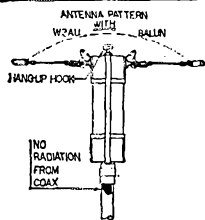


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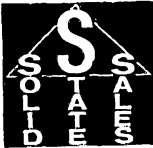
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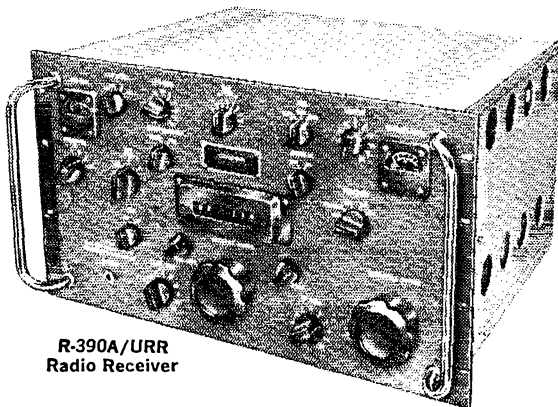
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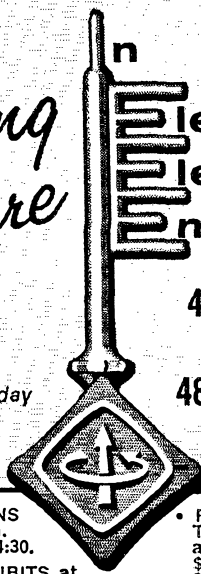
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THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS 1-69

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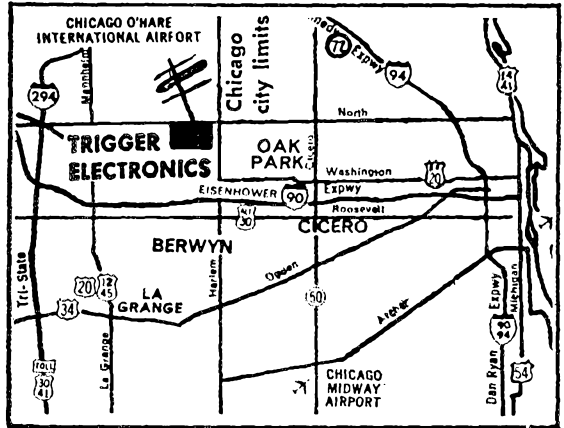
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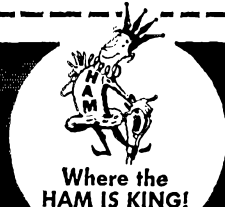
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(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

*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.*

HAM-AUCTION, Feb. 16, 14th Annual by Toledo Mobile Radio Ass'n at the Lucas County Recreation Center, 2901 Key St., Maumee, O. \$1.00 Registration, open table sales, map and further info. write Ron W8STA, 1939 Cone, Toledo, O. 43606.

"SEE your picture and a thumbnail sketch of your life in wireless along with many of your old buddies in *Spark Gap Times* magazine published by the Old Old Timers Club. Charter membership is offered to all pre World War I operators, regular membership to any operator licensed 40 years or more ago. Be a recognized pioneer, join the Old Old Timers by writing the Secretary, 572 C. Berkey, Gamble, 402 Beck Building, Shreveport, Louisiana 71101."

INVITATION: New York Radio Club invites New York Area hams and SWLS to regular monthly meetings on second Monday of each month at the Hotel George Washington, Lexington Ave. and 23rd St. at 8 PM, W2ATT, New York Radio Club.

QCWA—Quarter Century Wireless Association is a non-profit organization founded 1947. Any amateur radio operator licensed 25 or more years is eligible for membership. Write for information, A. J. Girona, W2JE, 1417 Stonybrook Ave., Mamaroneck, N.Y. 10543.

DAYTON Hamvention, April 26, 1969: Sponsored by Dayton Amateur Radio Association for the 18th year. Technical sessions, exhibits and hidden transmitter hunt. An interesting Ladies Program for NYLs. For information, watch ads or write Dayton Hamvention Dept., Box 44, Dayton, Ohio 45401.

A.W.A. Historical Radio Meet for old time amateur and commercial operators, historians and collector. Smithsonian, Washington, D.C., Oct. 5th. Write W2QY for details.

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.

RTTY Channel filters, octal mounted, 2125/2975, \$5.95 pair. Special filters for TTL/2, SASE for information, 88 Mb. toroids, uncased, 5 for \$2.50. Herman Zachry, WA6JGI, P.O. Box 845, Apple Valley, California 92307.

WELCOME To Maritime Mobile service net, 14313 Khz, daily 2130Z. Amateur Radio's service to the Fleet. Vic Barry, RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

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

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

WANTED: Military, commercial, surplus, airborne, ground, transmitters, receivers, test-sets, especially Collins Airborne. We pay cash, and freight. Ritco Electronics, Box 156-Q567, Annandale, Va. Phone: 703-560-5480 collect.

WANTED: 2 to 12 304TL tubes, Callanan, W9AU, 625 West Jackson Blvd, Chicago, Ill. 60606.

MANUALS for surplus electronics. List 15¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual \$3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

QSL Cards?? America's Finest! Personalized made-to-order. Samples, 35¢. Deluxe, 50¢. Religious, 25¢. (Refunded). Sakkers, W8WED, Box 218, Holland, Michigan 49423.

C. FRITZ—QSL that you're proud to send, bring greater returns! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252.

QSLs "Brownie" W3CII, 3111 Lehigh, Allentown, Penna. 18103. Samples 10¢. Catalog 25¢.

QSLs stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md. 21733.

QSLs—SMS. Samples 25¢. Malko Press, Box 375, 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.

QSLs. Neat, professional. 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio 43935.

QSLs, SWLS: Rubber stamps, address labels, and envelopes. Quality with service. Samples 25¢ (refundable). R. A. Larsen Press, Box 45, Fairport, N.Y. 14450.

QSL, SWL, cards that are different. Quality Card stock, Samples 10¢. Home Print, 2416 Elm Ave., Hamilton, Ohio 45015.

CREATIVE OSL Cards. Personal attention. Imaginative new designs. Send 25¢. Receive catalog, samples, and 50¢ refund coupon. Wilkins Printing, Box 787-1, Atascadero, Calif. 93422.

RUBBER STAMPS \$1.15 includes tax and postage. Clints' Radio, W2UI0, 32 Cumberland Ave., Verona, N.J. 07044.

OSLS. Neat, quick, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio 43935.

OSLS, finest YLRL's. OMS samples 10¢. W2DJIH Pres, Warrensburg, N.Y. 12885.

QSLs: 100, \$1.25 and up, postpaid. Samples, dime. Holland, R3, Box 649, Duluth, Minn. 55803.

QSL cards. Finest quality. Economical prices. Fast service. Free samples. Little Print Shop, Drawer 9848, Austin, Texas 78757.

QSLs, SWLS, NYL-OMS (Sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, sedate, fabulous, comic, DX-attractive, prototypal snazzy, unparagoned cards (Wow!), John Patterson carries on in the spirit of the late Warren Rogers, K0DAB, adding his own. Patterson Printing, 961 Arcade St., St. Paul, Minn. 55108.

QSLs. Radio Press, 15008 Orchard Ave., Poway, Calif. 92064.

3-D OSLS—The modern concept that makes all others old-fashioned. Samples 25¢ (refundable). 3-D OSL Co., Monson 2, Mass. 01057.

QSLs, SWLS, WPE Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

QSLs. Free samples, attractive designs. Fast return. W7IIZ Press, Box 2378, Eugene, Oregon 97402.

QSLs, samples, 10¢. Fred Leyden, WINZJ, 454 Proctor Ave., Revere, Massachusetts 02151.

QSLs 300 for \$4.35, samples 10¢. W9SKR, George Vesely, Rte #1, 100 Wilson Road, Inglestic, Ill. 60041.

RUBBER STAMPS, 3-line address \$1.50, J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLs 3-color glossy 100, \$4.50. Rubfers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Millford, N.J. 08848.

OSLS-100 3-color glossy \$3.50; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

QSLs by K1FF, \$2.00 for 100. Others at reasonable prices. Samples 25¢ (deductible). K1FF OSLS, Box 33, Melrose Highlands, Mass. 02177.

QSLs. When you're number 28 you try real hard, so try us. Samples 10¢. Alkanprint, Box 5494, Minneapolis, Minn. 55408.

PICTURE QSL cards of your shack, etc. from your photograph, 50¢. \$12.00, 1000 \$15.25. Also unusual non-picture designs. Generous sample pack, 20¢. Half pound of samples 50¢. Raum's, 4154 Fifth St., Philadelphia 19140.

QSLs. Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE/W3COP, 905 Fernald, Edgewater, Fla. 32032.

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

QSLs. Free samples. Cut Catalog 25¢. Raised lettering OSLS. Ace Printing, 6801 Clark Ave., Cleveland, Ohio 44102.

NAMEPLATES. Call Letters, wall pressure-sensitive, \$2.00; desk type, \$2.50. Kronenberg, 1492 High Ridge Road, Stamford, Conn. 06903.

LOW-PRICED QSLs!! Free samples!! K.L.L. Press, Box 258, Martinsville, N.J. 08836.

QSLs by Jansen, K2HVN, custom made, rainbows, pictures, maps, large variety backgrounds. Special offer, 300 glossy, \$3.00. Samples 25¢. 860 Atlantic St., Lindenhurst, N.Y. 11757.

3-line engraved badges, any color, \$1.25. Special rates to clubs. Fallert's Engraving, 121 N.C. St., Hamilton, Ohio 45013.

RUBBER STAMPS. Return mail delivery, postpaid. Basic price, \$1.00 first line, 60¢ each additional line. Request type style chart. Fulton Rubber Stamps, Route 216-A, Fulton, Maryland 20759.

HEATH SB-101, HP23A, SB-600, 3 months old, factory aligned, \$390.00. HDP-21A, \$18.00; HM-10A, \$18.00. Elco scope 435-K, \$65.00. R. Mavro, 1512 Spruce, Philadelphia, Penna. 19102.

**CANADIANS!** The best selection of new and used gear in stock at all times. Drake, Swan, Yaesu, Hy-Gain and others. It will pay you to check our deals. The Ham Shack, 1566A Avenue Road, Toronto 12, Ontario (Tel. 416-789-1239).

**CANADIANS**—National NCX-5 MK2 with NCX-A P.S./Spkr. Like new, in original cartons, \$75.00; RCA AR88/LF Revr. in cabinet, good cond. \$100.00. Ameco Converters CN-50W and CN-144W, 30.35-34.51F, brand new and unused \$50.00 each. Will ship F.O.B. VE6KD, 5303—114 St. Edmonton 70, Alta (403) 434-4140.

**TELETYPE:** Model 19, \$150.00. Zach, WB2AEB, Pike Place RFD 4, Mahopac, N.Y. 10541.

**SELL:** Gonet G-66 mobile receiver with 6/12DC-120AC supply, G-77 mobile AM xmt with homebrew modulator and dynamo motor power supply. Extras: good condition. Make an offer. Boivin, K2SKK, 319 So. Orange Ave., Livingston, N.J. 07039.

**HEATH SB-400 transmitter, \$235.00; 75A2 receiver w/cal., no mods, \$200. Both are in xclnt condx. Will sell as package for \$445.00. K1ZDI, 174 Andover Road, Billerica, Mass. 01821. Tel: (617)-667-1639.**

**TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.**

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

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

**WE buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y.**

**CASH Paid for your unused Tubes and good Ham and Commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, N.Y., N.Y. 10012. Tel: (212) 925-7000.**

**WANTED:** Tubes and all aircraft and ground radios. Units like 17L, 51X, 618T or S. K388, 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.

**INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.**

**RTTY gear for sale. List issued monthly, 88 or 44 Mhy to roids, five for \$2.00 postpaid. Elliott Buchanan & Assoc., Inc. Buck, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.**

**1000 PIV @ 1.5 amp. epoxy diodes includes disc bypass, caps and bridging resistors, 10 for \$3.75. Postpaid USA. With diode purchase, 125 Mf. at 350 volt electrolytic capacitors, 50¢ each. Postpaid USA, no limit, East Coast Electronics, 123 St. Boniface Rd., Cheektowaga, N.Y. 14225.**

**BRAND New factory-sealed cartons. Hallicrafters SR-160, \$250.00; P-150-DC, \$90.00. All above F.O.B., H D H Sales Co., 170 Lockwood Avenue, Stamford, Conn. 06902.**

**SELL Or trade: QST, CQ, Electrical Experimenter, Radio, Modern Electronics Wireless Ace and Callbooks, any quantity. Wanted: Old radio gear, books and magazines, Ery Rasmusen, 164 Lowell, Redwood City, Cal. 94062.**

**DISCOUNTS for January: Drake T4XB \$399, R4B \$379, L4B \$650, Galaxy-V Mk-III \$359, AC-400 \$79, 2000B Lin Amp \$379, Swan-500 (demo-only one) \$459. Antennas—12% off list. Ham M \$99, TB-44 \$89. All prices F.O.B. Two great stores to serve you: West—L.A. Amateur Radio Supply, 3302-B Artesia Blvd, Redondo Beach, California 90278. Ph 213-376-4455 (Hours 9 to 6, Mon & Fri to 8, Closed Thursdays) Midwest—Evansville Amateur Radio Supply, 1311 N. Fulton, Evansville, Ind. Ph 812-422-4551 (Hours: 9-6; Monday and Friday to 8, Closed Thursdays.)**

**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? ARL, 225 Main St., Newington, Conn. 06111.**

**TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.**

**WANTED:** Model #28 Teletype equipment, R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101.

**TOROIDS. 88 mh uncased, \$/2.50. Postpaid, Humphrey, WA6FKN, Box 34, Dixon, Calif.**

**WANTED:** Military and commercial laboratory test equipment. Electronicraft, Box 13, Binshampton, N.Y. 13902.

**SAVE. On all makes of new and used equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts. 617-598-2530 for the gear you want at the prices you want to pay.**

**ESTATE Liquidation. SSAE brings list quality equipment. Paradd Engineering, 284 Route 10, Dover, N.J. 07801.**

**3000 V @ 3mf brand new GE Pyvano oil capacitors, \$3.00 each. Can mail, 3-lbs. each shipping weight. FOB P. Wandell, RD #1, Unadilla, New York 113849.**

**TELETYPE Gears, shifts, keytops, typebars, motors, forks, typeboxes, typewheels, punchlocks, nonoverliners, CR-LFs (Re. TVs, KSRs, ASRs, ESCs, toroids, fresh paper, testsets, SRT subchassis. Buy, too! Typetronics, Box #873, Ft. Lauderdale, Fla. 33312.**

**FREE: Lesson Book "Mathematics for Electronics". Please include 20¢ postage. Free lists: Tech manuals, textbooks, lessons, etc. Jim Cooper, PDR 73, Paramus, N.J. 07652.**

**OFFER \$10 for May 1913 Elec. Experimenter, \$3, Oct. 1914; \$2 May 1919; \$5 1919 issues Radio Amtr. News; \$10 any 1908 Modern Electrics; \$10 gov't. amtr. Callbooks 1922-26. Less for later dates, or poor condition. For historical library, none sold. Wayne Nelson, W4AA, Concord, North Carolina 28025.**

**SELL: New Yaesu FT-DX-400 Transceiver, W8AO, 2912 River-view Blvd., Silver Lake, Ohio 44224.**

**WANTED Lampkin mod. 105B frequency meter and modulation meter model 205. XE2O, L. R. Agraz, P.O. Box 554, Hermosillo, Sonora, Mexico. Tel: 3-54-46.**

**NOVICE Crystals: 40-15M, \$1.33, 80M, \$1.83. Free list. Nat Stinnette, Umatilla, Fla. 32784.**

**SIX Meter SSB, like new, Heath 110A transceiver with SWR bridge and extras. Cash only, \$225.00. F.o.b. W41WA, 21 Lancaster Terrace, Hampton, Virginia 23666.**

**HT32, \$189; SX101A, \$189; manuals included. Both units in excellent condx. Ed O'Brien, W2LJF, 132-38 84 St. Ozone Park, N.Y. 11417.**

**R-388 COLLINS Receiver wanted, must be in very good mechanical and electrical condition. Will pay \$225.00 cash. Bill Smitherman, WA4YFI 919-699-3139, Rt. 2, East Bend, N.C. 27018.**

**DRAKE—R-4A, T4—X. AC-4. Power Supply matching speaker. Used only 25 hours, mint condition. First \$700.00 plus freight charges takes them. Reason—Going mobile. W1VW.**

**SELL Excelnt condx. HT-32A, Turner 454X mike, Johnson low pass filter and 1-R switch, all for \$225.00. SX-28 rcvr, \$120.00. Dave Schwankl, Ex-K01VI, 107 2nd St., N., Cold Spring, Minn. 65023.**

**TR-4, \$495.00; AC-4, \$84.00; DC-3, \$115.00; R-4B, \$370.00; T4-XB, \$380.00; MS-4, \$18.00; RV-4, \$84.00; L-4B, \$630.00; W-4, \$44.00. Factory sealed boxes, fully guaranteed. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. 27404. Tel: 919-299-8767.**

**POLICE—FIRE Radio Station Directories. All areas. Call signs! Frequencies! Communications. Box 56-T, Commack, N.Y. 11725.**

**SELLING My old radio books, magazines, catalogs and parts send stamped addressed envelope for price list. Elmer A. Piercy, W6CID, Box 666, Victorville, California 92392.**

**PROP Pitch rotor, WV2, small, excellent, \$45.00 Link, 1081 Aron St., Cocoa, Fla. 32922.**

**NORTHERN California hams: best deals, new and reconditioned equipment. Write, call or stop for free estimate. The Wireless Shop, 1305 Tennessee, Vallejo, Calif. 94590. Tel: 707-643-2797.**

**FOR Sale: Tektronix Scope 310A \$500.00. New this year perfect condition, factory carton with probe and two instruction books included. Frank A. Hayes, K2VVL, Middletown, New Jersey 07748.**

**WANTED for personal collection: Early WE, BTL broadcast condenser microphones. Also desk type mountings for early carbon microphones such as Palmerton and WE Universal. M. L. Gardner, W3OJD, 223 Welch, Ames, Iowa 50010.**

**FOR SALE: Collins 12S3, 75S3, 30L1 and AC Power supply 516F2, \$1500.00. WA6GDD, 1519 Randall, Glendale, Calif. 91201. Phone: 246-1595.**

**SELL: Gonet GSB-201 linear amplifier, mint condition, PEP 2000 watts, manual, \$200.00 V2CMD, 2206 Smith Street, Merrick, N.Y. 11566.**

**SELL Swan Mark I Linear Amplifier \$325, plus transportation. Dr. Patrick, Box 100, Caldwell, Idaho 83605.**

**DX-40 VF-1 and Knight self-powered VFO. All good condx. For \$59.00 dollars. Bob Barnell, 100 Gateway Rd., Yonkers, N.Y. 10703.**

**SELL: Hallicrafters SX-115, Drake SW-4A. Both excellent condition. C. F. Williams, 2473 Sunrise Blvd, N. 101, Rancho Cordova, California 95670.**

**SELL: DX 80A \$65.00; Heath HQ10 VFO \$25.00; Valiant II \$175.00; Drake 2B, speaker and crystal calibrator \$165.00; SX99 with Q Multiplier \$70.00. All in excellent condition. R. B. Guthrie, WB4APP, 811 Southall Place, Sanford, N.C. 27330.**

**WANTED: Johnson desk KW AM and CW amplifier unit with or without Ranger exciter. Will pay \$300-\$350 depending on condition. Also need Johnson Viking 500 AM-CW transmitter. \$225 cash. Bill Smitherman, WA4YFI, East Bend, N.C. 27018. Tel: 919-699-3139.**

**WANTED: HQ180AX, HQ170VHF1, HR0500, 51J, 51G-1, 105B. Lesson course on electronics, and textbooks. State condition and price. John Waskowitz, 541 Marcy Ave., Brooklyn, N.Y. 11206.**

**SELL: Microwave test set "X" hand frequency meter, Signal Generator, power meter, TS-147A with manual, \$85.00, RTTY page-printer paper, 3 ply, \$7.50/cass. W82PLV, Box 207, Princeton Jct., N.J. 08550. Tel: (609)-452-9038.**

**WRT-152 used gear has trial-terms-guaranteed! Galaxy 300 \$139.95; Galaxy 919 \$249.95; Galaxy 919 \$299.95; Swan 50—\$299.95; SR150 \$299.95; HW22 \$89.95; HT140 \$49.95; VHF62 \$89.95; HX500 \$269.95; Galaxy 2000 & PS-\$149.95; SB300—\$249.95; hundreds more. Free blue-book list. WRL, Box 919, Council Bluffs, Iowa 51501.**

**Ham Transformers rewound, Jess, W4CII, 411 Gunby Ave. Orlando, Florida, 32801.**

**1000 PIV @ 1.5 amp. epoxy diodes includes disc bypass, caps and bridging resistors 10 for \$3.75. Postpaid USA. With diode purchase, 125 Mf. at 350 volt electrolytic capacitors, 50¢ each. Postpaid USA, no limit, East Coast Electronics, 123 St. Boniface Rd., Cheektowaga, N.Y. 14225.**

**TOUCHSTONE desk telephone wanted. Robert Young, 319 Wyatt Rd., Harrisburg, Pa. 17104.**

**WANTED: Loudenbomer Antenna Rotator and control box in good condition. W2GON, 114 Phyllis Court Elmont, N.Y. 11003 Tel: 516 HU 8-3555.**

**COLLECTORS: Sell 390 issues QST 1920-1959, and 81 COs 1945-1955—\$70.00 plus shipping. SASE for list. W6BFB, Norm Finley, 9415 Mesa Terrace, Lamesa, Calif. 92041.**

**WANTED: 40 Meter Coil and G.C. Dial for HRO-60, desperate! Kurt Wehle, OC Div, USS Power DD-839, PPO San Francisco, Cal. 96601.**

**FOR Sale: Heath HW-32A 20-M Transceiver, HP-23 Power Supply, accessories: Like new \$140. Bill, W6BZVI-2, NASON 323B, RPI, Troy, N.Y. 12181.**

**COLLINS, KWM-2** with 516-F ac supply and 312B-5 Station Control. Mint condition. To settle estate. \$750. Mrs. I. Ernest Smith, 54-A Charles River Road, Waltham, Mass. 02-134. 617-899-6396.

**GENERAL RADIO 6 volt lab type 213 Audio Oscillator \$40. Surplus RT-7/APN-1 Aircraft Altimeter \$4; meters; tubes; X-formers; many electronic parts; send SAs for list, sell or trade for 6M or 2M gear. K8UXQ, 1120 Meadowbrook, Ann Arbor, Mich. 48103.**

**FOR Sale: RME-4350A receiver, mint condition. \$100. WA0KNP, 902 15th St. S., Benson, Minnesota, 56215.**

**IDEAL Novice or General station. SX111 Revr. DX60A xmt. HG10 VFO. All in mint condition. Package Deal only. \$200. WA1E3B, 3 Rayfield, Marshfield, Mass. 02050.**

**FOR Sale: Johnson 250-39 TR switch in excellent condition. \$16.50 postpaid. Stanley Sadowski, WN2FOQ, 236 Lord St., Dunkirk, N. Y. 14048.**

**VALIANT F/W new finals \$110.00 Drake 2-B W/O mult. \$170.00. WA0UAG P.O. Box 97 Bird Island, Minn. 55310.**

**SELL-Swan 175 xcvr and homebrew power supply \$115. Viking Ranger with p.t.t. \$75. Both in xcint condx—Larry Hammel K.F.D. 2 Sparta, Illinois 62286.**

**GREAT BUY—Hammarlund HQ-110AC & Spkr. Mint cond. like new. Complete with org. cartons, manual and matchbox. Contact Fred Kron, 100 Ocean Parkway, Brooklyn N.Y. 11218. Tel. (212) 633-9364.**

**SELL: Complete desk top KW SSB and CW Transmitter \$350.00, Eldico SSB100A Exciter, and Eldico SSB 1000 Matching Linear. Excellent condition, with instruction manuals. Sell together only. W2HH, 89 Vanhorn, Demarest, N.J. Tel: 201-768-8379 Zip 07627.**

**PL-172 Tube wanted. Please state price and condition. K4RRG, 3120 Shannon Dr., Winston-Salem, N.C. 27106.**

**WANTED: Hallicrafters SX122; Hammarlund HQ180A, or other high quality general coverage receiver. Must be in good condition. S. E. Hyatt, WA4YVY, Canton, Georgia 30114.**

**HALLICRAFTER SX101-A Viking Valiant II transmitter. Johnson SSB adapter. All in mint condition. Just \$300 takes them. R. Day W8YAA Phone 423-2356, 301 2nd St., Findlay, Ohio. 45840.**

**WRITE, phone or visit us for new or reconditioned Collins, Drake, Swan, National Galaxy, Gonset, Hallicrafters, Hammarlund, Hy-Gain, Mosley, Waters, SBE, Henry linear, BTI linear, towers, rotators, other equipment. We meet any advertised cash price on most equipment. We try to give you the best service, best price, best terms, best trade-in. Write for price lists. Henry Radio, Butler Missouri 64730.**

**GONSET 903-A, 500 Watt, two meter linear amplifier, mint condition, 15 hour actual use, \$150.00, you pay shipping. Richardson, 1109 Dakota S.E. Albuquerque, N.M. 87108.**

**WANTED: HAMMARLUND HQ-180 receiver with manuals. Give condition, and lowest price. Walter Jandro 473 Success Ave. Bridgeport, Conn. 06610.**

**ANTIQUE QST'S—1926-1949 not complete. Oldies, \$2.00 copy, 40's, \$1.00. Prefer swap all for gear. List, SASE, Horton Presley, 1126 S. Hickory, Ottawa, Kan. 66067**

**GALAXY V Mark II mobile mount, mobile power supply, calibrator, speaker, band-spacer, all band mobile antenna with bumper mount, spring and connecting cables, like new. All for \$425.00 FOB Austin, Texas, Phone CL-3-0858 WAST-DTC.**

**SP6001X, exclnt condx. \$400.00 or best offer. Will ship from Virginia. Mullins, Box 5061 Cristobal Canal Zone.**

**RME-6900, matching speaker, excellent every respect—\$150.00 will ship. W1WJO, 12 Lonview Dr., Simsbury, Conn. 06070: 203-658-9182.**

**WANTED: HRO-50 rack front panel, panel mounting parts. A coil set. Frank Schwella, 1071 Foothill Blvd., Santa Ana, Calif. 92705.**

**NOVICE Station: Hallicrafters HT-40 75-watt xmt and SX-140 revr. Both in exclnt condx. Manuals included \$100. WNSWAE, 618 Mundough, Lubbock, Texas, 79409.**

**STUDENT: Selling out! Mint TR-4/AC-4 with Turner 254C (\$550 or best offer); TH6DX, 60' RG-214U, W9AU Balun-pkg deal (\$115). Let's talk! WA3CAO, Joe 4964 Curry Road, Pittsburgh, Pa. 15236 (412-882-9212).**

**WANTED: Hallicrafters S-30 radio compass, and early Hallicrafters receivers without modifications. Condition and best price in first letter please. Howard Hoagland Junior, 639 North Sierra Bonita Avenue, Los Angeles, California, 90036.**

**SELL: Johnson KW Matchbox, Model 250-3, mint condition, \$100.00 f.o.b. W2CMD.**

**ESTATE W1BXU—Sell complete Collins station. 75A1 w/ calibrator; 32V3 w/35C-2 L.P. Filter; 312A-1 Station Control w/1kw. r.f. Wattmeter; 1 kw. Johnson Matchbox; I-104 mike w/p.t.t. All instruction manuals. Excellent condition. Best offer over \$500. Homebuilt 1 kw xmitter in enclosed cabinet: 800 p.p.s. Final, 810 Modulators Varic control. Best components. Would consider \$300. Pick up deal only. Mrs. William Goldthwaite, 24 Franklin St., Concord, N.H. 03301.**

**ANTENNAS—Telrex TC99 Tribander-575, Telrex 503-3 Element Optimum spaced 20 meters \$60. Hy-Sant 153-3 element full size 15 meters \$20. Telrex 2M5C-5 element 2 meters \$5. Sorry no shipping! Pick up. W. Heckman, 92 Lagoon Blvd. Massachusetts. L.I. N.Y.**

**WANTED: Comanche tuning scale. WA6QAY, 15008 Orchid Ave., Poway, Calif. 92064.**

**SX-140 SSB Revr. 6-80 MTR ± Crystl Cal. ± Sneaker—\$60.00 14 A.V.C. Vertical Band Antenna 15.00; Royal Office typewriter \$30.00; WA9F1W, 1129 N. Knight Avenue, Park Ridge, Ill. 60068.**

**NEW Singer Metrics Model PTT-1/5 transmission measuring set with RF-1 Response Platter and SP-1 Spectrum Analyzer—Instruction manual \$230.00 or trade for Scope model 8301 RF Power meter with bolometer. \$42.00 A. R. Eggenberger, 101 Christie St., Tenafly, N.J. 07670 Phone 201-568-1267.**

**SELL: All excellent Yaesu-Musen FL2000DX Linear Four Spare Finals \$190, Drake 14X \$300, R4A \$300, AC-3 \$70, MN-4 \$65, Johnson KW Matchbox with SWR \$115, Want late KWM2A with DC and AC supply. Swan 500C Drake TR. WB6RQK, Box 433, Sausalito, California 94965.**

**TRADE or sell Complete Military model 14 teletype for SSB transmitter. Make offer. Sell pair 8135 with filament, transformer and sockets. \$35 delivered. W7CRP, 55 east Eighth, Snerdan, Wyoming, 82801.**

**FOR Sale: Swan 350 with transistorized homebrew power supply, recent model \$300. Excellent Clegg 99er \$65, Knight Kit 6 & 2 meter VFO \$20, Heathkit HA-14 and HP24 A.C. Supply 6 months old \$130. Dwight Reese, M.D., 747 Madison Avenue, Charlottesville, Va. 22903.**

**FOR Sale: Lafayette HA-225 receiver, Multi-Eimac AF-6 AM-CW-NFM 160-10 meter transmitter with VFO. Mint condx. Brand new Power Supply All cables. \$225.00 takes all. Nick WB2EWS, 23 Laclède Ave., Trenton, N.J. 08618.**

**SELL: TH-3 MK II Hy-Gain beam w/Balun \$55.00, 6 M Mobile Halo new \$100.00; 3 etc. hM beam new \$15.00; Bud adjustable low-pass filter \$10.00; TR-44 Rotor new w/ \$20.00. Need cabinet for SP6001X, Larry Vines WA4WIA 916 So. 16th Place; B ham, Ala. 35205 871-4628-Days.**

**SWAN MK1 200 w P.E.P. Linear, xnt condx (less than 50 hrs) \$350. Will ship REA collect. WKIDD, 272 Edgewood Dr., Torrington, Conn. 06790.**

**WANTED: Frequency meter-Gertsch, General or equal W8UCG, 630 Glenwood, Muskegon, Mich. 49445.**

**FOR Sale: Collins K-W-1 transmitter \$600.00 picked up; \$700.00 disassembled and crated GPR-90 receiver with GSB-1 sideband adapter \$250.00. Prices firm. Paul Halbacher W9ASO, Box 217, Hartland, Wisc. 53029.**

**1)RAKE R4AW/MS-4 \$325; 1)4XW/AC-3 \$375; Swan MK1, \$375; All in brand new condition. Also EV 604G w/stand \$40; Astatic 10D w/G-Stand \$25. K2MRB, 491 Mayhew Ct. So. Orange, N.J. 07079.**

**VIKING II w/VFO \$85. Heath 6 meter Seneca \$100. HQ 170 revr \$175. All in best operating condx. BC779 revr w/ supply \$30. H. Fortin W1RXJ, 274 So. Worcester, Norton, Mass. 02766.**

**85 Foot self-supporting triangle leg tower—12' spread at base \$250. best offer. Stamp stamps, K3DJC, 868 S. Albarne St. York, Pa. 17406.**

**WANTED: Collins 75S-33, 312B-4, 516F02AC. Will consider complete station. Quote best price. Ed. Billig 18139 Osborne St. Northridge, California 91324.**

**WANTED: Plate xformer for 3051, Collins part 662-0351-00, CSTC 29087. Reasonable offers. Write Mildred France, WASCFB, 121 Seal Drive, Arabi, La. 70032.**

**DX Awards Log—This 150-page book just published giving number and type of contacts needed for over 100 major awards for hams and SWLs by clubs world-wide includes cost and how and where to apply. Individual logs provided for each award to keep complete record of contacts and confirmations. Priced over two years to prepare. Most complete and up-to-date source of DX Awards available. \$1.95 postage paid \$4.95 foreign). The McMahon Co. (W6IZE) 1055 So. Oak Knoll, Pasadena, California 91106.**

**HRO-50T, excellent unmodified condition. Seven coil sets, BC thru 15 MHz, plus 15 and 10 meters. \$150. Heath Mohican transistor SWL receiver, BC thru 32 MHz. \$45. William Scott, 10 Villare, Carmel Valley, Calif. 93924.**

**SELL SX122 with xtal calibrator \$150.00. Good condition, no modifications. WN0TFG RR 23 Box 234 Kansas City, MO. 64151.**

**SALE: RME6900 receiver—80 thru 10 plus VVW—Xtal Calif. 118, LSB, CW, AM. Excellent condition. Manual included. DXer's favorite \$125. FOB—John S. McDaniel 3rd. RD 4, Box 23A, Easton Md. 21601.**

**CHRISTIAN Ham Fellowship is now organized for Christian fellowship and witness among licensed amateurs. Free xpsel tracts and information on the organization is available. A Christian Ham Calbook listing members for \$1 donation. Write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan 49423.**

**ATTENTION Southwestern Hams! Congratulations! You now have your own volume discount ham store! Now before heard-of cash savings on new Drake, Swan, Hallicrafters (Galaxy, National and BTI equipment. Also new Tri-Ex Mosley, Hy-Gain. Get our quote before you buy. Write or phone today. Valley Discount Ham Shack, 4109 N. 39th Street, Phoenix, Arizona, 85018. Tel: (602)-955-4850.**

**SELL Drake RA4 and T4X, mint condx; \$600 total. W8VF R. B. Stewart, Box 266, Yellow Springs, Ohio 45387.**

**SPECTRUM Analyser, Heath SB-620. Unused, aligned to SH-101 I.F. Will convert to ur I. F. \$100. Lappin, 4047 Sky land, Kingsport, Tenn. 37664.**

**FOR Sale: Heath HX-20, Upper and lower SSB and CW, & 400 10. Perfect—beautiful, no scratches. Not using it. Nice switch. Perfect for getting SSB and standby rig. With complete station power supply and books \$99.95. F.O.B. Fort Worth W5BLU, 1721 Tierney Rd., Fort Worth, Texas 76122.**

**MINT Polycym 6 mtr Transceiver, mobile mount and mtl \$135. National self-powered 6 & 2 & 1 1/4 mtr VFO. \$21. E cellent RME 6 & 2 mtr transmitter, 50 watts plate modulate \$55. Eico 753 with WRL supply \$135. KIYYC, 14 Ton Circle, Norwalk, Conn. 06855, (203) 838-6058.**

**WANTED: Electronics Instructor. General indispensable. Theory and workshops. Science Camp, Lake Placid, N.Y. Wri Epstein, Apt. 48, 44 Westend Ave., N.Y. 10024.**

**HAM Band Rig—Comanche and Cheyenne with A.C. Pow supply. Also Johnson speed-x bug and Heath 1D-22 Elec switch. Perfect for all separate. Duane Brummet, 27 Gregory St., Madison, Wis. 53711.**

**WANTED: An opportunity to quote your ham needs, 30 year a ham gear dealer. Collins, Drake, Swan and all others. At \$20,000.00 inventory used gear! Chuck, W8UCG-Electron Distributors, 1960 Peck, Muskegon, Mich. 49441.**

25 Year collection electronic sound equipment, tape recorders, speakers, microphones, parts, technical magazines, collectors items, Anna Lindam, 1406 S. Catalina, Los Angeles, Calif. 903-8718 after 8 PM.

**HALLICRAFTERS HT-37.** Good condition, with manual. \$190.00. Ronald Wright, 4868 Aster Drive, Nashville, Tennessee 37211. Tel: 615-832-3668.

**SELL:** WW1 collectors item. "Marconi Victor Course in Wireless Telegraphy" set of six phonograph records. Best offer. WIER, 40 Groveland, Auburndale, Mass. 02166.

**WANTED:** Collins 75A4 with 500 KC filter; 30L-1 or 30S-1. V6EAWJ, 7503-139 St. Edmonton 51, Alberta, Canada.

**SELL:** OST, Aug. 1953 thru Dec. 1967, complete. Best offer. WUZF, Dick Kerr, 12070 S.W. 119, Tigard, Oregon 97223.

**USED-RCA Jr. Velocity Factory** reconditioned \$25.00 Roache, Canterbury, Conn. 06331.

**HALLICRAFTERS SR-42A** (2 meter transceiver) A-1 condition, \$169.00 or swap for good receiver. Don Daniel, 18350 San Jose, Northridge, California 91324.

**COLLINS 75S-1** with Waters rejection \$275. 32-S-1 with S16-F-2 supply \$395, 312-B-4 control \$100. Complete station mint condition \$725. W9BHX, 215 Carter, Goshen, Indiana 46526.

**SELL:** Excellent HT-37 \$225 or trade for linear amplifier. Johnson T-R switch \$15. HD-10 \$35. Rick St. John, R4 Allegan, Mich. 49010.

**SELL LM 18** Frequency meter plus power supply and calibration book \$59. SONY 660 Stereo tape recorder \$299. Millen GDO extra coils \$39. Sorry, no ship. Bill Hanberry, 1340 Mountain View, South Pasadena CA 91030. Phone 254-2344.

**FOR SALE:** Hallcrafters SX-101A with speaker. Mon-Key Electronic Ken Johnson T-R switch. All mint condition. OST, Q. Radio, R/9 from 1926-600 magazines in Binders. Best offers. Gene Simring, K2TD1, 33 Greenwich Ave., N.Y.C. 10014. Tel: 212-242-1975.

**COLLINS KWS-1** transmitter with factory installed 4X250 tubes. Very good appearance and good operating condition, serial No. 511. Complete with co-ax relay, 10D mike and full manual. Sacrifice for \$465.00 for quick sale. Milt Krauthoff, W9HTO, N89 W16800, Cleveland Ave., Menomonee Falls, Wisconsin, 53051.

**DX-60, HG-10, \$75; NC-140/xtal** calibrator—\$90. Both for \$150 with antenna relay and keys. All in good condition with manuals. WB2AFG, Ken Slater, 173 Archer Ave., Mt. Vernon, N.Y. 10550.

**DRAKE R4B \$340.00; Communicator IV 2 meters \$185.00; Communicator IV 6 meters \$165; Communicator VFO \$55; Heath deluxe VTUM IMW13 with H.V. Probe \$35; Heath SB810 Monitorscope \$65; SCM Electra 210. Electric type writer \$90; SCM Figurmatic electric adding machine \$35; Craie 212 Recorder \$25. Ed O'Brien, W2IWW, 86-10 34 Ave., Jackson Heights, N.Y. 11372.**

**NEW Gonset GSB-6** 6 meter Sidewinder Transceiver with DC supply \$315. Also DC supply \$75 (Gonset 500 Watt, 6 meter Linear \$235 WRL Transmitter (300A) 500 watts AM & CW \$135. You pay shipping. Thomas Dittrich, 249 Meadow Lane, Vestal, N.Y. 13850.

**SERVICE** bound, must sell: HT-37 \$175; HO-110A \$100; Norelco 101 portable tape recorder \$50; 6'er \$30; Will consider reasonable offers. Tom Fitzpatrick, WB4FOT, 1923 Oxford Cir., Lexington, Ky. 40504.

**WRL Duo-bander 84 \$95.00; DX-150 \$85.00, plus postage.** WA0JH, 1006 N. 76 St., Omaha, Neb. 68114 (402-397-5720)

**FOR Sale or trade:** 75S3 w/manual, Johnson "thunderbolt" w/manual; Nece 3253, w/S16F2 w/manual, W3EZN, W, W, W, Branly, 62M, McArthur Blvd., Washington, D.C. 20016. Tel: (301) 652-3355.

**SELL:** HT37, \$160; HO170, \$120. Both clean, Greening, W9KHS, Tremont, Ill. 61568.

**HRO-50T** with B. C. D. AD, AA coils, xtal calibrator, manuals, \$135. Bob Carlson, K6TXA, 306 Pirate Rd., Newport Beach, Calif. 92660.

**DRAKE TR-4, AC-4, MS-4** purchased January, '68; \$475 F.O.B. WASTNW, Route 2, Box 167, El Reno, Oklahoma 73036.

**SELL:** EICO 720-\$30.00 Gud Condx; Heath HA-10 KW Linear \$125.00 Like new, WA4UGP, R. K. Mitchell, 104 Starling Ave., Martinsville, Va. 24112.

**DRAKE IA** receiver, looks like new: \$90.00. Swan 140 transceiver, very good, \$80.00. BC221T frequency meter with a.c. supply, \$55.00. Collins ARR-15 receiver as is, \$20.00. Philip Schweiber, W9GCG, 4536 N50 St., Milwaukee, Wisconsin 53218.

**TRADE or Sell:** Lab Meters, Panel Meters, ETC., Stamp for Hist. Samkofsky, 201 Eastern Parkway, Brooklyn, N.Y. 11238.

**HALLICRAFTERS HT44, PS500, SX117, LF/MF** Mint condition. \$500. Will separate and ship. SP44 Panadaptor, (455Kc) \$30. Drake IA Receiver \$95; Galaxy 300, with PSA300 Console, \$180. W2FNT, 18 Hill Crest Terr., Linden, N.J. 07036. Phone 486-6917.

**SBE-34, 100KC Cal. Coadapter** Mike L.N. \$290. W3WIA, 63 Connecticut Ave., Massapequa, N.Y. 11758.

**SWAN 350, Calibrator, A.C. supply** w/spkr in cabinet, mint condition, \$325.00. K4GSR, 3724 Princeton Road, Montgomery, Alabama 36111. Tel: 205-288-6187.

**SELL HP 522B** Digital Counter 120KHZ. Excellent condition, book, \$175 F.O.B. D. Bohart, 1610 Shasta Drive, Colorado Springs, Colorado 80910.

**HW32A-Seldom** used second rig, excellent condition, professionally built, \$100 delivered. WA5OIP, 2812 Georgia Northeast, Albuquerque, New Mexico 87110.

**SELL:** Collins 32V2, 80-10M, 120W Phone and CW, excellent for CW, fine condx. \$84, plus shipping. R. Rickett, 7390 Sawmill Rd., Worthington, Ohio 43085.

**HOWARD Radio:** 75A4-\$375.00; Drake 2B-\$179.00; NC300-\$149.00; SW140-\$109.00; SW117-\$50.00; KVM2-\$795.00; HT44-\$179.00; PS150-\$50.00; SW240-\$179.00-189.00; HW12-\$89.00; HP13-\$35.00 and HP-23-\$22.50. Free List. Howard Radio 4335 North 1st St., Abilene, Texas 79603. Tel: 915-677-1335.

**HO-170, \$150; HT-46, \$150; HG-10 VFO, \$15; Vanguard 6M converter, 10 Meter output, \$35; Johnson T-R Switch, \$20. Barry Mitchell, Box 1187, Stevens Tech, Hoboken, N.J. 07030.**

**SELL:** New Collins 30L-1 in warranty, including spare set 811A's, \$370. Also SBE-34 with 100KC Cal and VOX, used two weeks, mint, \$250. Prices firm. F. L. Fantastic, WADLX, 613 S. Susana, Redondo Beach, Cal. 90277. Phone: 372-7543.

**"DON and Bob" New Year specials.** TRIEX W51 Tower, Ham-M rotor, TH610XX package, \$589.95; freight paid on tower, Galaxy VMK3, AC supply, VOX, speaker, calibrator, \$499.95; Sony 222A Station recorder, \$89.95; Waters codax keyer, \$79.95; Waters Reflectometer, \$109.95; New guaranteed surplus Jennings Vacuum variables UCS5010KY \$30.00; Telex HMY-2000 Stethoscope headset, \$3.95; 3/4" X 5 1/2" Brown ceramic insulator, 40 cents; 1-82 indicator with driver, transformer, \$595; ANB 6000HM Military Headset, includes cord, plug, band, cushions, \$8.95; Collins 75A-4, \$375.00; KWM-1 with noise blander, \$250.00. F.O.B. Houston, Warranty Collins repair plus other major lines. Write for list to, KSAAD, Bob, WASUUK, Madison Electronics, 1508 McKinney, Houston, Texas 77002. 713-CA2668.

**TEST Equipment wanted:** Any equipment made by Hewlett-Packard, Tektronix, General Radio, Stoddard, Measurements, Bonton. Also Military types with URM(-), USM(-), TS(-), SG(-) and similar nomenclatures. Waveguide and coaxial components also needed. Please send accurate description to Tucker Electronics Company, Box 1050, Garland, Texas 75040.

**HAM Radio,** the magazine with something different. Write for sample. Ham Radio, Greenville, N.H. 03048.

**LAFAYETTE HA-350** receiver; \$75. New Knight T-60 novice transmitter with key, crystals; \$35. WABVTD, 776 S. Broadmore Blvd., Springfield, Ohio 45504.

**HEATHKIT HR-10** Receiver—3 years old, mint condx. with HRA-10-1 xtal calibrator and homebrew FET 20-10 Meter Pre-selector. Want SX-100, or equivalent receiver. Byron Tatum, WA4TSH, Box 506, Alvin, Texas 77511.

**SELLING SR-160** Tri-Band, \$150. Heath SR-260 Spectrum Analyzer specific to this band. In good condition. \$19.99. Like new with manuals FOB. Boone, W0ERS, 1108 Sioux Drive, N.W. Cedar Rapids, Iowa 52405.

**DRAKE TR-4** recently factory realigned. Excellent condition! First certified check or money order for \$400.00 takes it! Also have Johnson 250-39 T-R switch, \$10.00. Items FOB, Steinke, W9CH, 1916 Sando Rd., Woodstock, Ill. 60098.

**HEATH HW-16** c.w. transceiver, \$90; HW-32 transceiver with speaker and mike, \$85; HR-10 receiver, \$45. Wanted: Viking II or Pacemaker. Wayne Brown, W2TPV, Box 545, Vails Gate, N.Y. 12584.

**NOVICES:** Lafayette HE-30 receiver with built-in code practice oscillator, \$50. W2FNT, 57 Colonial Pkwy., Manhattan, New York 10130. Tel: 516-627-6719.

**SELL:** Valiant 1, F.W. \$125; Polycom 62B, \$175; both excellent. Richard Stannard, 18 Circle Drive, RDI, Voorheesville, N.Y. 12186.

**SBE-34** with SB2 microphone. Both excellent, \$265. Also SX-140, good condition, \$50. WB4HOI, 2532 Jimmy Winters Rd., Richmond, Va. 23235.

**FOR Sale:** HT-32, \$225.00; HT 33A, \$250.00; SX 101, \$175.00. Or best offer. R. Tomlinson, P.O. Box 136, Mt. Vernon, Indiana 47620.

**SELL:** BC610E Complete with Speech Ampl, coils and manual, good condition, \$75.00. Lawrence Lanze, W9UAN, 1240 W. 90th St., Chicago, Illinois 60620.

**DRAKE 2C** receiver with speaker, \$165. Used very little. W7FEG, 216 173rd Place, N.E., Bellevue, Washington 98004. Tel: (206) 746-8632.

**FOR Sale:** 73s, 1960-1965 in Binders, 1966-1967; OST 1961-1967 excellent condition. Knight Model 4020 tape recorder. KIAPA, 3 Sunny Acres, Brattleboro, Vt. 05301.

**COLLINS KWM-2** with Noise Blanker, and Waters Rejection Tuning, \$715.00; S16F2, \$50.00; 312B-5 Console, \$15.00; 30L-1, \$15.00; E.V.505 Meter, PTT Band \$10.00. All excellent condition. FOB W0GSQ, 1030-20th Street, West Des Moines, Iowa 50265.

**VHF, Ameco TX-62, VFO,** like new, \$125; Ameco converters, CN-144, \$25 w/ps; CB-2, CB-6, each \$18. HA-230 gen cov rcr, \$60. DX-40, VFO, \$55; HR-10, \$45. Steve, WA2BUF, 116 Hudson Ave., Haverstraw, N.Y. 10927. Tel: 914-429-9007.

**COLLINS 75S3-B, 325-3, 312B-4, D-104, Henry 2K, Drake TR-3** Transceiver with AC and DC supplies and mobile antennas. Rohn 50 ft HD self-supporting motorized crane-up tower with Ham-motor sacrifice. Make offer, will ship. K4BMH, 2717B Claydon Dr., N.W., Huntsville, Ala. 35810.

**PROTECT** your mobile gear and auto. Scare thieves with "Protected by Siren Theft Alarm" stickers. Two for \$1.00. D & S Photo, Box 938, Rantoul, Ill. 61866.

**CRYSTALS Airmailed:** MARS, Marine SSB, Nets, CD, 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, \$1.45). 1700 to 3495, and 8601 to 20,000 \$2.95 overtones supplied above \$10.00. 10,001 to 13,500 fundamentals \$2.95. Add 50¢ each for .005%. Add 75¢ each for HC-6/ metal miniatures above 2000. Crystals, singles and groups for ARRL-QST, Handbook, SSB Manual, old and new issues. Be specific. Write for order-bulletin. Crystals since 1933. Airmailing 10¢/crystal, surface 6¢. C-W Crystals, Marshfield, Missouri 65706.

6 Meter Tecraft Converter 7-11 IF, built in power supply, cost \$54.95, asking \$35.00, never used. K3GWM George W. MacCool, 4151 A Ridge Avenue, Philadelphia, Pa. 19129.

SELL: Kilowatt Linear with two new PL-172A's, \$250; Paco wide band S-55 Scope, \$60; New 4-1000A, \$35; Chimney, \$10; metal socket, \$10; Eico 145 multigang tracer, \$15; Knight 400A tube checker, \$16; Bud G.Mix \$3; CVM-3 modulation xfmr, \$5; 6 MFD 4000V capacitor, \$10; 3AP1's, \$3 each; Du Mont 2 meter FM receiver, \$10; 1-72H Signal Generator, \$15. Sase bins Goodie list. Want (Buy or trade) slide projector, Lapidary Equipment, WA4RGL, 1507 White Oak Ct., Martinsville, Va. 24112.

CLEANING House. Sell Heath audio amplifier A9C, \$10. Two Heath audio amplifiers A7, at \$5. Heath a.m./f.m. tuner AJ-30 and AC-11 multiplex adapter combination, \$85. Eico HF-20 audio amplifier, \$10. Heath mono tape recorder and amplifier, \$15. Scott Model 350 f.m. stereo tuner \$9. Heath 4X-20 and HR-20, with matching 12-volt and a.c. power supplies by Heath (5-band s.s.b. rig) \$225. All f.o.b. Hartford. Send s.a.s.c. for list of smaller stuff WIKKE, 26 Ridge Road, Simsbury, Conn. 06770. Phone: 203-658-7307.

NOVICES: HQ-110 w/speaker; DX-60 transmitter w/relay. Mint. WAZDGD, Larry Greindinger, 89-15 Shore Parkway, Howard Beach, N.Y.C. 11414. Telephone 848-5443.

SALE: Hallicrafters HT-44 and SX117 combination, complete with factory power supply, all manuals and interconnecting cables. Will not separate. \$480 firm. You pay shipping. Richard Rodkin, 4030 Medford Drive, S.E., Huntsville, Alabama 35802. Phone: 205-881-5405.

SELL-URR389, 390, 390A, 11J4, 7544, 75S3A, NC101X (a classic), HRO-7, HRO-5011, other, and other gear. List for SASE, W2ADD, 129 Midland Ave., Glen Ridge, New Jersey 07028.

FOR Sale: 2K-3, spare 3-500-Z, 625 KWM-2, 516F-2, 870, R-888, \$300, 36-1, \$325, P & H "Spotfire", Linear (New) \$75, Vacuum Variable, 20-1500 mmfd at 7 1/2 KV, \$65, James Craig, 29 Sherburne Ave., Portsmouth, N.H. 03801. Phone: 603-436-9062.

TRANSMITTERS/receiver, all excellent condition and operating order: HT-40, \$40. DX-40, \$30. Lafayette KT-320/matching speaker, \$35; new Ameco 6M converter, \$10; manuals; will ship. Earl Drizide, WB2BGR, 14 Duryea Place, Lynbrook, N.Y. 11563. (516) LY9-3440.

FOR Sale: SR-42 two meter transmitter, mike and manual, \$85. John Stiles, K7DGV, Sweetwater, Montana 59484.

COMPLETE Station: Heathkit HR-10B receiver with calibrator; DX-60B transmitter, HG-10B VFO, HM-15 SWR meter, Eico 730 modulator, Dow-Key relay, Selectoject, preamp-TR switch, code oscillator and monitor, much more. \$275. Eric Strydom, 34 269 St., New Hyde Park, N.Y. 11040. (212) 347-5712.

FOR Sale: SX-117, perfect condition, \$200. Spencer Adams, WB2RJJ, 52 Further Lane, Riverhead, N.Y. 11901.

HEATH HW-100, HP-13, HP-23 for sale as package, \$350.00. Ivan Hersh, K2KNL, 98 DeHaven Drive, Vonkers, New York 10703.

516F-2: Has new power transformer, installed by Collins, never turned on. \$95.00. Whitsett, 1207 Locust Ave., Huntsville, Ala. 35801.

SELL: Like new, Lafayette HA350 Receiver, 80-10 AM-CW-SSB. Calibration Crystal, matching speaker, manuals, \$95.00. Joe Rotunni, WA2CKM, 1816 Parkview Avenue, Bronx, N.Y. 10461.

SBE-34 with matching mike, \$325.00; Hallicrafters R-47 SSB Speaker, \$10.00. All in mint condx. H. J. Nadley, W3MO, 307 Woods Rd., Glenide, Pa. 19038.

WA4YDT Estate Sale: Drake TR-3, \$360; MS-4, \$70; Johnson Thunderbolt Linear, \$215; Hallicrafters HA-1 to Keyer, \$44.95; Inticograph, \$20; All in mint condition shipped collect. Mrs. Lloyd Shelton, 2523 Woodfin Avenue, Chattanooga, Tenn. 37415.

GONSET 2M 500W Linear, \$185; Johnson 6N2 Transmitter, \$85; 6N2 Thunderbolt, \$295; National HFS Receiver 37-255 MHz, \$95; Freq. Meter 100-10,000MHz, \$95; HA-144 2M Transceiver, \$110; 220MHz Amp Midplane Adaptor, \$50; RBY-1 Panoramic Receiver 500Kc-43MHz, \$125; misc. instr. stamp. WA4PI, Box 4095, Arlington, Va. 22204.

GONSET Communicator II 12V/115V, two meters, w/three power cables, whip antenna, manual, \$79.00. Eico CO-2A two meter coaxial vertical wire mast, ceiling, \$9.00. Mark Heliwhip HW-6 w/HWM-1 mount, \$10.00. Mosley TD-3-Jr. dipole, \$9.00. Eric Landau, WA2KER, 415 E. Olive Street, Long Beach, N.Y. 11561.

PROBLEMS? Let the communications specialist handle them for you—kits wired services—RRTY type terminal units. I-1 Electronics, Canterbury, Conn. 06331.

COLLINS S/Line for sale. 75S-3, 32S-3 and 516F-2 P.S. All in immaculate condx with all necessary cables. John Richardson, K8SQM, 321 Aurora St., Hudson, Ohio 44236. Phone 216-653-5350.

COLLINS: 75S-receiver. Used very seldom due to illness. Excellent condition. \$285. Matching speaker available. Please call W1FA (617) 631-0755, 33 Lee St., Marblehead, Mass. 01945.

SELL: Commercial built Eldico Eapt. 2-30 MC 100 watts PEP xtal control AM-CW-SSB Trans., 295. Matching eqpt; Antenna tuner, \$35. Receiver, \$35. Electronic tunable filter, \$35. HSK Keyer, \$20. Buy all units in bud cabinet for \$200. Model 15 teletype V.V. xtal condx. \$69. SX-28A as is, \$10. Jim Collins, WSODO, Box 361, Sour Lake, Texas

SELL: Hallicrafters HT-37, \$210; Heath SB-300 with AM-CW filters, \$65; SBA-300, six meter converter, \$10. All excellent condition. WA0OCW, 210 Carolyn Court, Lincoln, Nebraska. 68510.

DRAKE 2-B with xtal calibrator, \$150, excellent condition, original shipping carton. Call or write Richard Lyman, 609-452-7404, 30 N. Edwards Hall, Princeton, New Jersey 08540.

PREPARE For new FCC exams! You need Post-Check. Multiple choice questions, diagrams, explained answers, 18N sheets for self-testing. Same form as FCC exams. General Class, \$2.25; Advanced Class, \$3.00; Extra Class, \$3.75; 295 to 300 questions or diagrams in each. Each complete for a specific exam. Basic questions duplicated if they apply. Third class postage prepaid. Add 26¢ per copy, for first class mail; 54¢ for air mail. Send check or money order to Post-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322.

SELL Fast: Hammarlund HQ-170AC with 24 hr. clock, mint condition, \$100; Lafayette HE-45 (a) 6-meter transceiver, good condition, \$50; Globe transmitter HG-303 80-100 m. FM mint Ask \$38; matching VFO Globe V-10 \$60; 110V.A.C. self-contained new-used only 3 hrs. asking \$25. Same day answer on all inquiries. Write R. Alan Hill, 120 No. Arlington Avenue, East Orange, New Jersey 07011.

SALE: Heath DX-100B, excellent condition, best offer. W. GHV, 135 N.W. PAFB, Fla. 32925.

SB-100, HP-23, \$310; SB-200, \$180; SX-110, matching dual-tone speaker, \$80. No bugs or scratches; better than Pr wiring of SB-100. K3MTG, Box 277, Oxford, Pa. 19363.

TOROIDS, 8" & 4mhy, Unpotted, center-tapped, 5/20.0. Postpaid, 11/16" oiled report tape, 33/box. Teletype Model 28ASR complete, \$800; Model 32KSR complete, \$325; P&S printer paper, \$5.50/case; Eico 720 Transmitter, \$40; Johnson 6N2 and matching VFO, \$100; Motorola P33 5 watt FM transceiver with ni-cad supply, complete, \$95; Heath two'er (turbocob) \$30. Wanted: Back covers for Model 33 (measurements) \$10 for Collins 113 (70E15). Drake HB-2B0, KV linear, Hi-band FM mobile transmitters. Stamp for list. Van W2DLT, 302Z Passaic Stirling, N.J. 07980.

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SELL: Collins 310B-1 40W CW xmr, \$100; Knight R-10 revr, \$60; Saturn 5 hale w/hw, \$10; Polycom CB transceiver, \$50. Will deliver in N.Y.C. area. Nathan Keiss, 344 Westerville Ave., Staten Island, N.Y. 10301.

HAMMARLUND: HX500 xmitter in good working condition. Complete with manual \$200.00. Tom Thornton, Rt. 2, High Ridge, Mo. 63049. WA0KZS.

SWAN 500 & 117XC AC PS. Used 5 hours; in original cartons. Sacrifice for \$399. No trades. K0CXL/6 1281 I Ocean No. 8, Long Beach, Cal. 90803. A.C. 213, 434-0663.

FMERKS-Motorola FM Transceivers-5 watts-Model P33 with nickel-cadmium batteries, complete, \$95. Model H23-1 watt with nickel cadmium battery, \$85. Complete description and photo for stamp. Contact Barry Baum, 1501 West Allentown, Philadelphia, Pa. 19132.

CENTRAL 100V, \$385; SX-101 Mark 3, \$140; Mosley Class 33, \$100; HAM-M, \$95; DX-60A, \$55; HC-455A, \$15; many accessories. Must sell complete station. Send for details. Dave Paskin, WA9SJU, 1201 E. Fairview, South Bend Ind. 46614.

OPERATION forbidden in college student housing. Selling SR-160, DC supply, Bandspanner, Top condition, \$180. WB4XW, Wendell Morrill, 278-7 Corry Village, Gainesville, Florida 32601.

NC-300 for sale \$130.00. G. E. Kraus, 1822 S. 17th, Grants Forks, N.D. 58201.

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COLLINS: 51JA w/3 K. C. filter, in exclnt condx, \$700.00; KW-1 transmitter, in exclnt condx but needs bias transformer available from Collins for \$53.00, \$700.00 Shipping paid. Paul Reid, 405 4th Place, Merritt Island, Florida 32952.

DX-100 NC-125 in exclnt condx, manuals. Make offer. W6ZOL, 4707 Burnet, Sherman Oaks, Calif. 91403.

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HQ-170 with speaker, perfect, \$165.00. Philip Margulies, 133 No. Wood Ave., Linden, New Jersey 07036. Tel: 925-6500.

WANTED: Manual and/or schematic to purchase or reproduce for "Phasemaster II" transmitter manufactured by Lakeshore Industries, Manitowoc, Wisconsin. Alan, WNØVIX, 7337 Lynn, St. Louis, Mo. 63130.

FOR SALE: Hammarlund HX-50, \$170.00; GSB101 Linear, \$140.00; HQ-170-AC \$200.00, plus shipping. James Benjamin, WØJPM, 1210 East Ninth, Winfield, Kansas 67156.

MUST Sell, mint condition, TR-4, AC-4, \$75.00 or R4-B, T4-X, AC-4, \$675.00. Also MS-4, \$15.00. DC-3, \$75.00. Polycomm-6, \$125.00 Seymour Schlitt, W2BBV, 49 Frum Ave., Yonkers, N. Y. 10704.

PEN Recorder wanted: Used single or multiple speed pen recorder wanted for propagation experiments. Write stating specifications, condition and price. WA1JLV, Dr. Dimitri Bugnolo, 71 Canonchet Dr., Portsmouth, R.I. 02871.

WANTED: 4D32 tubes for my old Collins 32V1. Used OK, but must be reasonable. Eric Firth, W6EAY, 1012 Coronado Terrace, Los Angeles, Calif. 90026.

SWAN 240 with Swan A.C. supply, speaker built-in and E-V 727 mike: \$250.00. W1ERX, F. Harrington, Jr., 117 Highland Ave., Rowayton, Conn. 06853.

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WANTED: HA-2 Transverter. John Feistamel 0-106 Begole S.W. Grand Rapids, Michigan 49504.

DX-100, SB-10 and manuals. Excellent condition. \$100 or you make offer. W3MFL, 101 Forsythia Dr., Newark, Delaware 19711. Tel. (302)-737-2373.

WANTED: A Courier 95 FM transceiver or counterpart. Ralph J. Cramer, K3CKY, P.O. Box 307, R.D. #2, Huntingdon, Penna. 16652.

WANTED: Hy-Gain 18HT "Hy-Tower" vertical antenna and Collins 3020-1 directional wattmeter. W7KE, 1109 South 2nd, Hamilton, Montana 59840.



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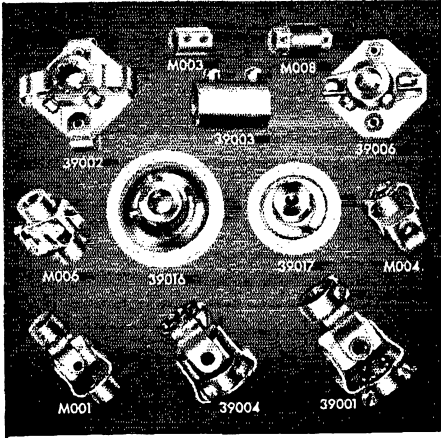
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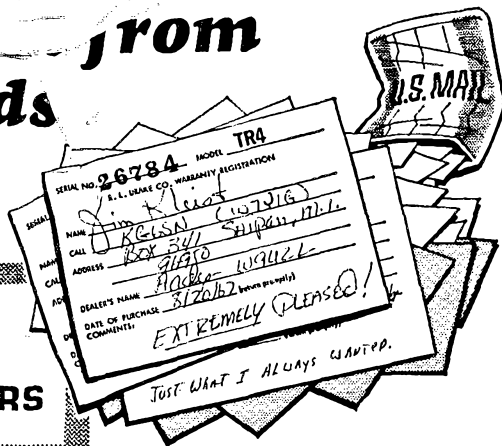
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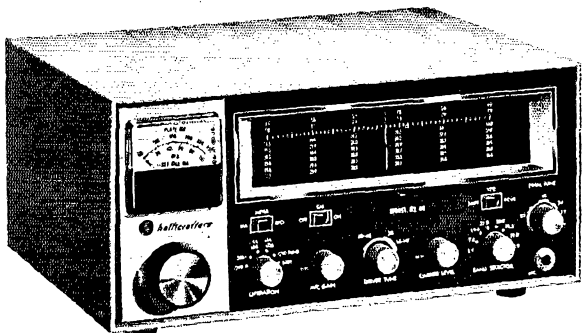
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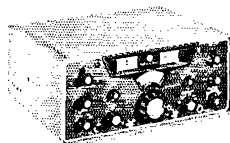
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- Easy assembly with circuit board-wiring harness construction

ahertz). Frequency stability: Less than 100 hertz per hour after 30 minutes warmup from normal ambient conditions. Less than 100 Hz for ±10% line voltage variations. Modes of operation: Selectable upper or lower sideband (suppressed carrier) and CW. Dial calibration: 5 kHz. Calibration: 100 kHz crystal. Audio frequency response: 350 to 2450 Hz. Front panel controls: Main tuning dial, Driver tuning and Preselector. Final tuning, Final loading, Mic and CW Level control, Mode switch, Band switch, Function switch, Meter switch, RF Gain control, Audio Gain control. Side controls: Meter Zero control; Bias; VOX Sensitivity; VOX Delay; ANTI-TRIP. Internal controls: Carrier null; neutralizing. Tube complement: OA2 Regulator (150 V); 6AU6 RF amplifier; 6AU6 1st receiver mixer; 6AU6 Isolation amplifier; 6AU6 1st IF amplifier; 6AU6 2nd IF amplifier; 6B8N Product detector and AVC; 6AU6 VFO Amp.; 6CB6 2nd transmitter mixer; 6CL6 Driver; 6EA8 Speech Amplifier and cathode follower; 6EA8 1st transmitter mixer; 6EA8 2nd receiver mixer and relay amplifier; 6EA8 CW sidetone oscillator and amplifier; 6GW8 Audio amplifier and audio output; 12AT7 Heterodyne oscillator and cathode follower; 12AT7 VOX amplifier and calibrator oscillator; 12AU7 Sideband oscillator; 6146 Final amplifiers (2). Diode complement: 6 Germanium Diodes: Balanced modulator, RF sampling, and crystal calibrator harmonic generator; 9 Silicon Diodes: ALC rectifiers, anti-trip rectifiers, and DC blocking; 1 Zener Diode: cathode bias. Transistors: MPS105 FET-VFO; 2N3393 — Voltage regulator. Rear apron connections: CW Key jack; 8 Ω output; ALC input; Power and accessory plug; RF output; Antenna; Spare. Power requirements: 700 to 850 volts at 250 ma with 1% maximum ripple; 300 volts at 150 ma with .05% maximum ripple; —115 volts at 10 ma with .5% maximum ripple; 12 volts AC/DC at 4.76 amps. Cabinet dimensions: 14-13/16" W. x 6-5/16" H. x 13-3/8" D.



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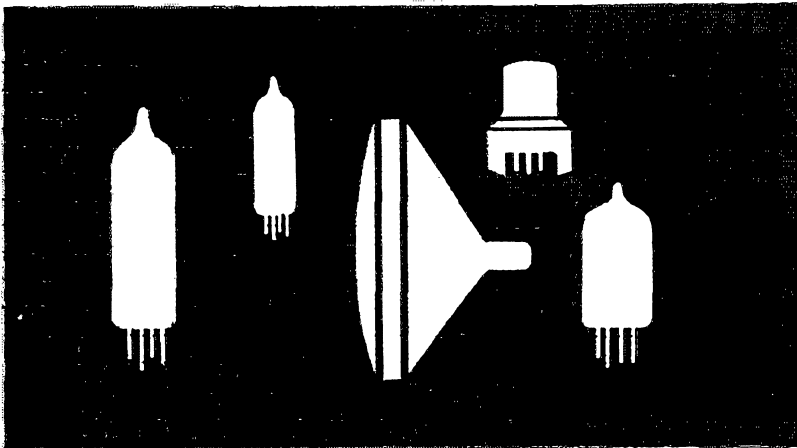
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