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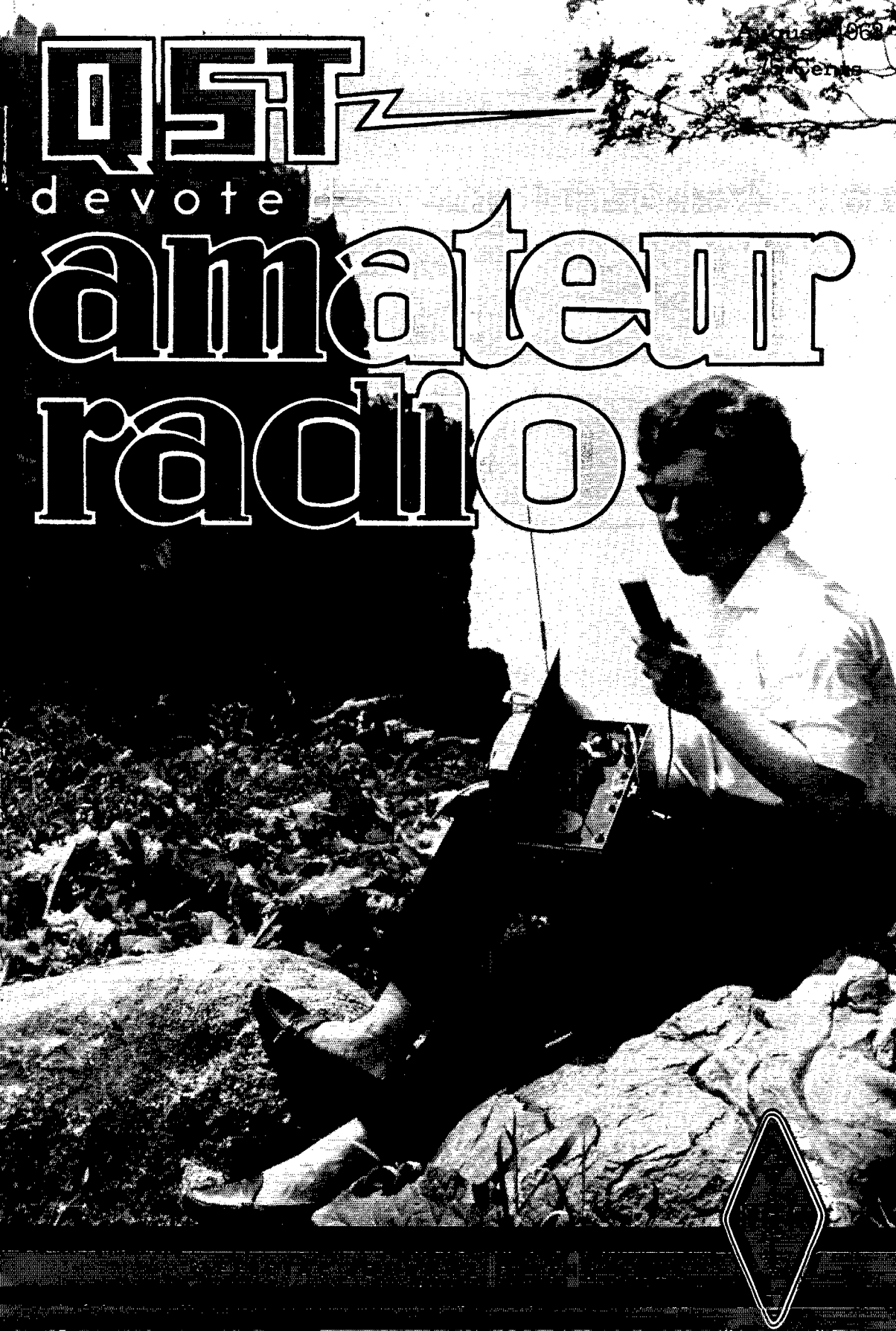

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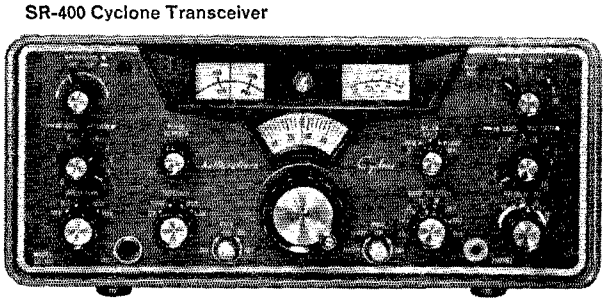

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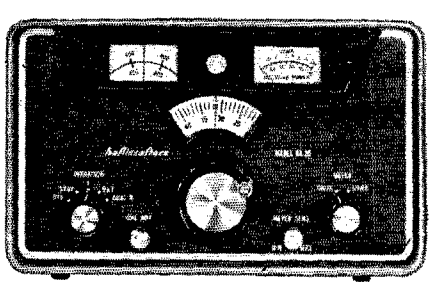

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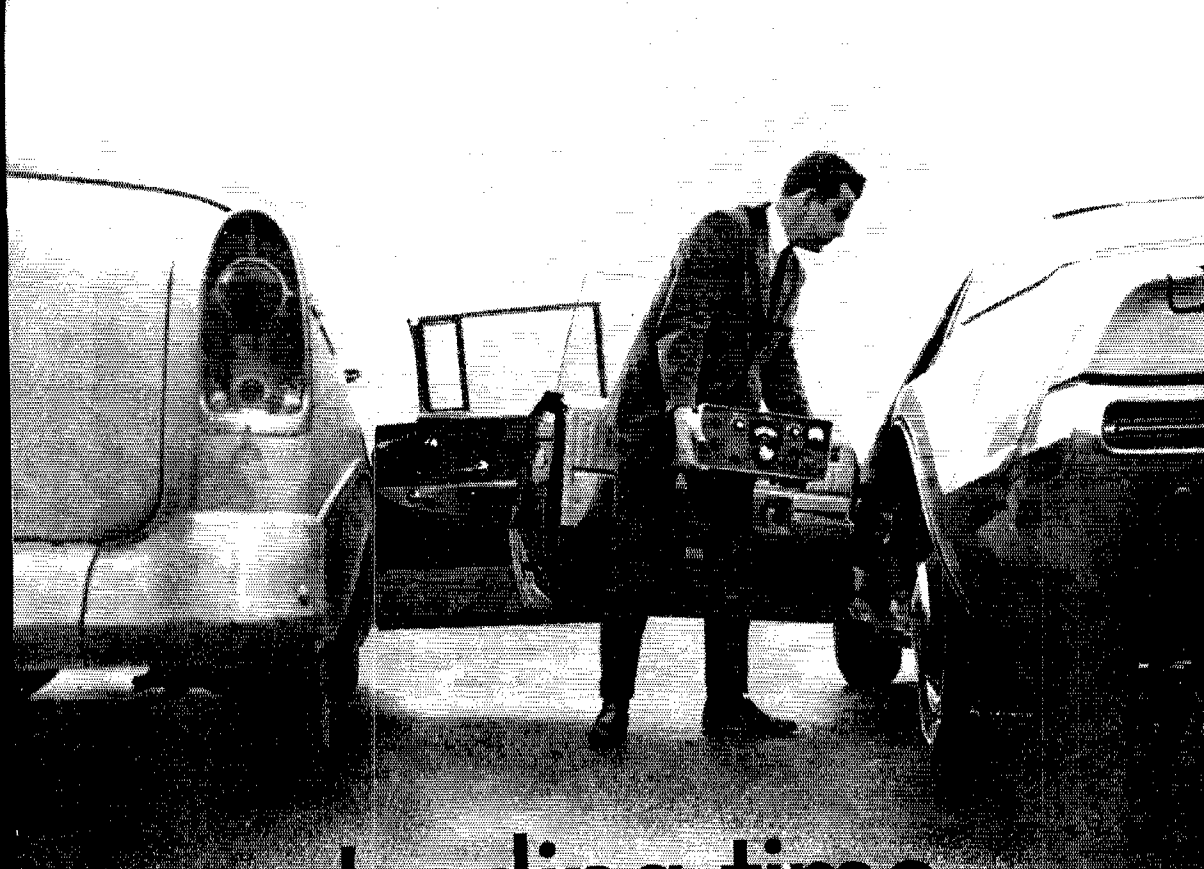

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OUR COVER

Jean DeMaw, W1CKK/W8REI, also a Hq. staffer, does some 2-meter hill-topping with the OM's transceiver described on page 11. Meriden Mountain (Conn.) is the site.

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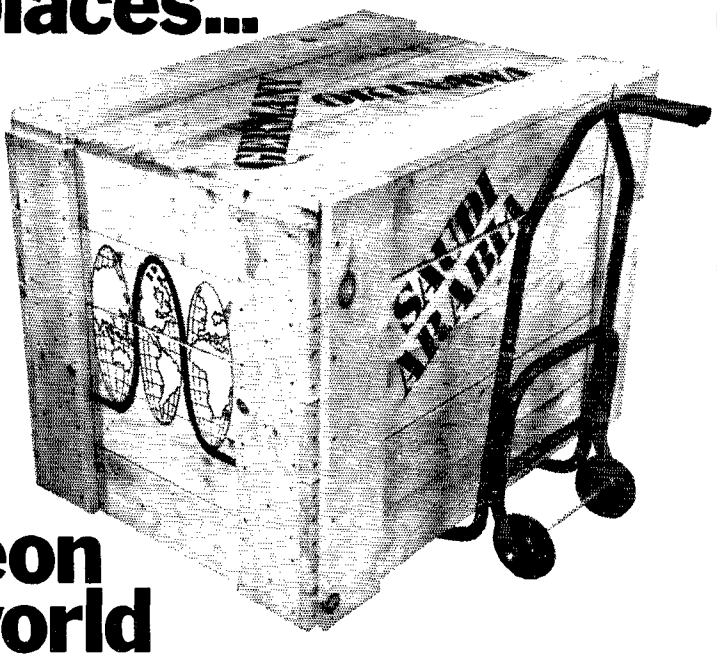

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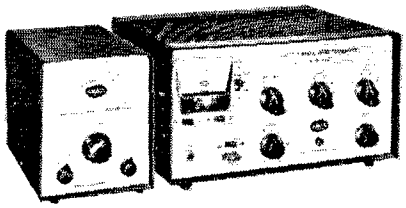

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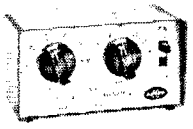

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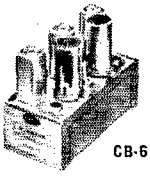

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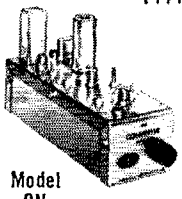

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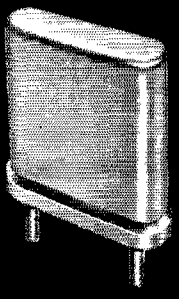

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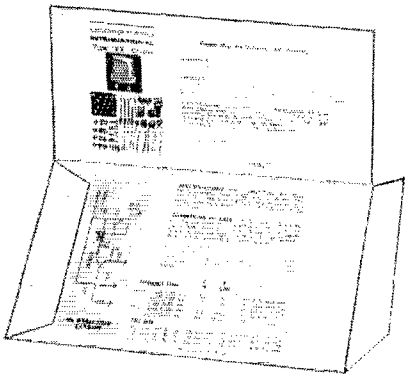

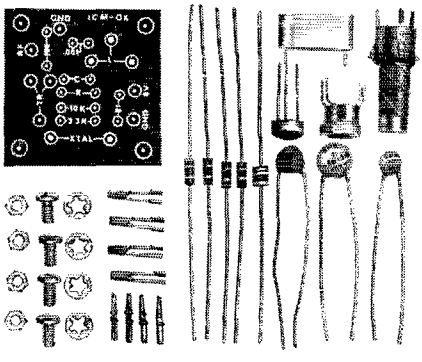

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Vice-Director:

*Member Executive Committee

"It Seems to Us..."

ANOTHER FREQUENCY CONFERENCE

For some years now amateur radio has been concerned — along with some commercial services — over the likelihood of another world conference of nations to examine and revise the table of frequency allocations. The blossoming of many new countries, largely in Africa, in the membership of the International Telecommunications Union has caused considerable doubt as to just what are current world viewpoints toward the various users of the h.f. spectrum.

While such a conference is still not on any definite schedule, in a related area the Administrative Council of ITU has called for a worldwide session on space communications during the latter part of 1970. Specifics such as duration, exact site, and detailed agenda, would be determined later. It has, however, been the custom recently to hold such meetings in Geneva, and one of this nature might require a month or more for completion. As to the agenda, it is likely that — as occurred during the 1963 space conference — frequencies above about 200 MHz. will receive primary attention. Believe it or not, allocation of the spectrum around 2000 MHz. is rapidly becoming a serious problem, with overload a possibility in the reasonably-near future. Indeed, activity in the entire u.h.f. and microwave area of the spectrum is in the throes of great expansion.

Space communications is basically a governmental activity, and intra-agency discussions in Washington have been going on for some time looking toward the conference which is now taking shape. One of a number of possibilities for re-allocation would affect amateurs — the 21,000-Megahertz band might be shifted to 23 GHz., to be shared with the radio-location service. (Note: we said 21,000 *megas*, not kilos; i.e., we're not talking about the 15-meter band.)

At some point, if previous procedures still apply, non-government users of the spectrum will be invited to participate in preparatory sessions. As always, the League will be present to represent the amateur service in any matters which may come up affecting our operations.

(To educate the editor of one of our contemporaries who becomes irked when we say "the League" does this or does that, let us make it plain that "the League" is not the 70 paid employees in Newington, but thousands of members spread throughout Canada and the U.S. — indeed, the rest of the world. ARRL officials and Hq. staff urge high standards and objectives, coordinate activities, and collect the records of performance to present to appropriate authorities. But it is *your* record of public service, increased technical and operating ability, better utilization of our existing assignments, and careful watch on intruders, which strengthen the position of amateur radio and make possible more effective representation at international conferences. Truly, then, our accomplishments are indeed the net result of all of us in the League. So much for that.)

If other customs also hold up, it is almost a certainty that one or more foreign countries will propose dipping into the amateur bands to solve some spectrum allocation difficulty. Here, however, we shall likely have a strong ally in Uncle Sam himself, in that our bands in this portion of the spectrum are shared domestically with radiolocation, and a proposal to shift band usage would affect that service as well. As to Canada, at the 1963 space conference she was as strong as any nation a supporter of the amateur movement, so we should not have great concern on that score either.

But enough of speculation. Certainly, problems will arise. The League, through officials in both our nations, will see that the interests of amateurs are adequately represented both before and during the 1970 space communications conference. As the result of continuing efforts the past several years, a much stronger IARU will be in a better position than ever before to seek favorable viewpoints of other nations in the spectrum evaluation.

All of which points up once again the importance of — indeed, the necessity for — full support of the League and other national societies by their respective constituents around the world. QST

League Lines . . .

EIA's amateur section hopes to alleviate problem of interference from amateur overload of solid-state devices such as organs, masthead TV amplifiers, etc., through improved protective circuits at time of manufacture. Those of you who've had such problems and solved 'em could be most helpful if you would furnish a case history -- especially instances showing inadequate design and/or fabrication.

After three years of trying, FCC has now obtained Congressional authority to regulate potential interference devices (e.g., motors, neon signs, heat-treating machines, etc.) at the point of manufacture and sale, rather than to solve individual cases of interference after they occur, as now. "An ounce of prevention . ." still holds true. See "Haps" this month for details.

Hoax admitted -- May QST (p.81) reported a lawsuit by DXpeditioner W9WNV against the League alleging defamation and seeking $550,000 damages. ARRL's first formal step in defense was deposition of Dr. Miller, occupying 3 days in June. Replying under oath to questions by League's attorney, W9WNV admitted 1966 operation as PYØXA was not at all on St.Peter & Paul's Rocks as previously claimed, but from a boat 1800 miles to northwest in sight of YV coast. He further admitted various statements concerning PYØXA made by him in person to ARRL directors in May 1967 were not true. Miller has agreed to withdraw his suit. Further report in a later QST.

Telephone company tariffs which -- strictly speaking -- outlaw interconnections such as amateur-type "phone patches," received a setback with a recent FCC decision labeling them unreasonably restrictive. This action doesn't automatically okay all patches but points toward likely eventual acceptance.

Some amateurs who should know better are still perpetuating (e.g. LIDXA bulletin) the myth that Awards Committee actions concerning Dr. Miller had origins in personalities and vendettas. The record -- including sworn testimony during depositions -- shows the Committee acted on facts, not emotion, in full determination to protect integrity of DXCC.

Speaking of myths, let's not go overboard in concluding that because the average age of amateurs is still slowly climbing, we aren't getting any youngsters in the game. What causes the increasing average age is we old-timers sticking around year after year because we love the game so much. A couple hundred thousand of us old goats living just one more year pushes the average age up as much as ten thousand teen-age newcomers would push it down. Similarly without logic are comparisons with the average age of the population; a 6-months-old helps keep that figure down, but should hardly be considered an amateur candidate for at least a few years.

Members in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf divisions will soon be making their choices for representation during the 1969-1970 term. See "Haps"this issue for first call for nominations in the autumn director elections.

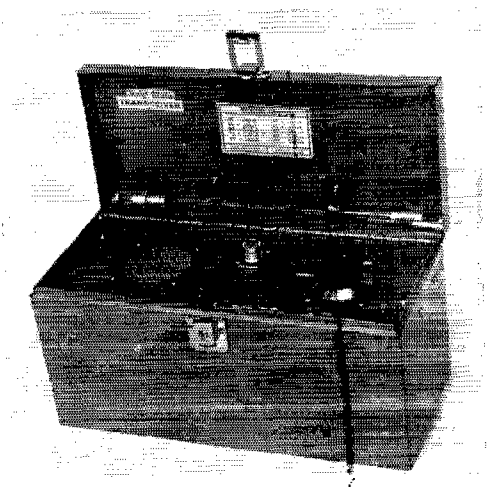
Newspaper clippings of Field Day activities, plus tapes or other indications of b.c. programs, are rolling in at Hq. along with logs. A first-rate job of p.r., guys and gals. Now let's do it regularly, not just once a year.

"The Connecticut Bond Box"

A Solid-State Transceiver for 144 Mc.

BY DOUG DeMAW,* W1CER

Here's a v.h.f. transceiver that's truly portable, is easy to build, and is capable of spanning many miles when used with a good antenna. It can be operated from its internal 12-volt flashlight-cell pack, from the cigar lighter of any 12-volt negative-ground car, or from an a.c.-operated 12-volt d.c. pack. The transmitter and the two-stage FET superregenerative receiver are assembled on etched-circuit boards to simplify construction. The audio section is a prewired "import" — also on a circuit board.



The 2-meter transceiver is housed in a legal-bond box. A home-made dial-calibration chart for the receiver is pasted on the inside of the lid. Two plastic cable clamps serve as holders for the two-section ¼-wavelength whip antenna (inside lid) when the unit is not in use. The antenna is held together at the center by a home-made ¼-inch diameter threaded coupling.

BECAUSE of the popularity of the so-called "Benton Harbor Lunchbox" it seemed like a worthwhile idea to build a similar unit, but one that was completely transistorized so that it could be operated from a dry-battery pack as well as from other 12-volt power sources. After some months of circuit testing, the collection of modules used here was chosen for the final product. The "Bond Box" does not run as much power output as the "Twoer," but is only about 8 db. lower in output than the commercial unit. The audio is clean and crisp, and the receiver is sensitive, and somewhat more selective than most "supergennys." A 0.3-μv. signal with 30 percent 1000-cycle modulation is plainly audible with this receiver and it can be tuned in without the operator knowing where to look for it on the main tuning dial (a good practical test for any receiver). The selectivity is such that sixteen 1000-μv. 30-percent-modulated signals can be equally spaced across the 4-Mc. tuning range without overlapping.

Most superregenerative receivers, even those with an r.f. amplifier stage between the antenna and the detector, radiate an interfering signal. This can cause a great deal of QRM to other operators in the area, sometimes to those who are several blocks away. Tests on this transceiver indicate that no perceptible radiation existed even when the equipment was operated into an antenna which was 20 feet from the antenna of a neighboring receiver. In fact, the radiated signal could barely be heard when the two antennas were placed one foot apart. The common-gate r.f. amplifier offers good isolation for this detector, and the receiver is well shielded — an additional aid. Furthermore, the detector is operating at a very low power level (approximately 7 volts at 1 ma.), helping to minimize the radiation output level. Most vacuum-tube superregens operate with at least 150 plate volts and draw up to 10 ma. during normal operation, hence radiate a much stronger signal.

Because of the foregoing features, this transceiver can fill the bill for most low-power 2-meter portable, fixed, or mobile work. It is ideal for emergency and civil-defense operation as well.

Receiver-Section Circuit

Two FETs are used in the simple receiver circuit of Fig. 1. A JFET (junction field-effect transistor), Q_4, operates as a common-gate r.f. amplifier and offers a fair amount of detector isolation while providing a few decibels of gain. Its output is coupled to the detector, Q_5, through C_{19}, which is a "gimmick" capacitor. The latter consists of three turns of insulated hookup wire wrapped around the ground end of L_8. The opposite end of the wire is soldered to the drain end of L_7. A junction-type FET is used at Q_4 to make it less subject to r.f. burnout than would be the case if an IGFET (insulated-gate FET) were used.

An IGFET is used as the detector, Q_5. Since it is isolated from the antenna circuit there is little chance of its being harmed by strong r.f. fields.[1] The IGFET was chosen over the

*Assistant Technical Editor, *QST*.

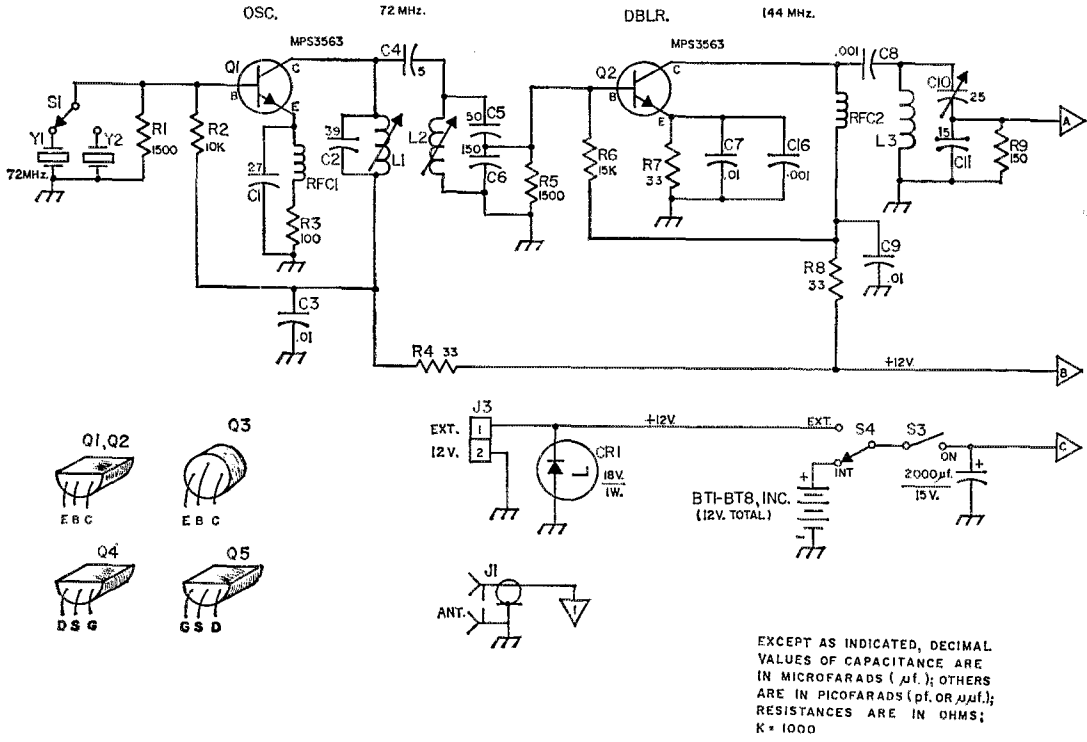


Fig. 1—Schematic of the 2-meter transceiver. Fixed-value capacitors are disk ceramic except those with polarity marking, which are electrolytic. Resistors are ½-watt composition. Component numbering is for identification of parts on the circuit-board templates. Significant parts are listed below in the usual manner.

AR_1—200-milliwatt audio module (Round Hill Associates Model AA-100*).

BT_1, BT_8, Inc.—Eight 1.5-volt size-D flashlight cells, series-connected and mounted inside box by means of four Keystone No. 176 dual-battery clips.

C_{10}, C_{12}—5 to 25-pf. ceramic trimmer, Erie 822-CN or equiv. (Midget 3 to 30-pf. mica trimmer also suitable.)

C_{15}—8 to 50-pf. ceramic trimmer, Erie 822-AN or equiv. (midget 8 to 60-pf. mica trimmer also suitable.)

C_{19}—Gimmick-type capacitor. See text.

C_{20}—15-pf. subminiature variable (E. F. Johnson 160-107).

C_{22}—5-pf. min. variable (Hammarlund MAPC-15B all but one rotor and one stator plate removed).

CR_1—18-volt 1-watt Zener diode (used for transient protection during mobile operation).

J_1—SO-239 coax fitting (chassis mount).

J_2, J_3—Two-terminal single-contact audio connector (Amphenol 75PC1M or similar).

L_1, L_2—3 turns No. 22 enam. wire spaced to occupy ½ inch on ¼-inch dia. ceramic slug-tuned form (J. W. Miller 4500-4*).

L_3—4 turns No. 20 bare wire, ½ inch long, 5/16-inch inside diameter.

L_4—6 turns No. 20 bare wire, ½ inch long, 5/16-inch i.d.

L_5—Same as L_3.

L_6—8 turns No. 20 bare wire, 1 inch long, 5/16-inch i.d. Tap 5 turns from source lead of Q_4.

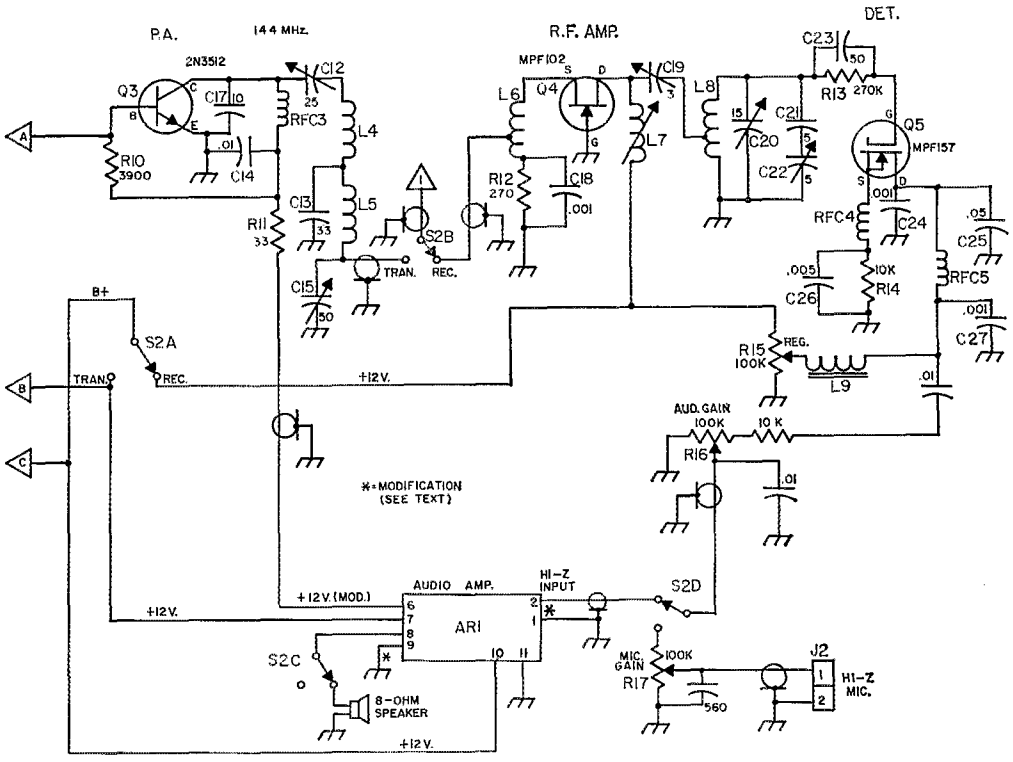
JFET because of its lower value of input capacitance.

Quench-frequency voltage is provided by R_{14} and C_{26} in the source lead of Q_5. Feedback for the detector is between gate and source, making it necessary to keep the source above r.f. ground by means of RFC_4.

A.f. output from the detector is taken from the drain through a quench-frequency filter consisting of C_{24}, C_{25}, RFC_5, and C_{27}. The filter prevents the quench voltage from reaching the audio amplifier. L_9 isolates the a.f. signal from the B-plus line, and R_{15} varies the drain supply voltage to control supperregeneration. R_{16} is the a.f. gain control.

A word of caution at this point: When soldering the IGFET, Q_5, into the circuit, be sure to connect a clip lead between the tip of the soldering iron and a good earth ground. This will help prevent damage to the gate of the MPF157 should static charges be present. Also, *do not handle* the leads of Q_5. The leads should be removed from their shorting collar by means of a nonplastic or nonmetallic tool. A wooden toothpick is recommended for this, and for spreading the leads apart. Once Q_5 is soldered in place, it should be quite safe from static-charge damage.

[1] IGFETs have extremely thin dielectric material between the gate and drain-source junction. Static charges or excessive gate voltage can easily puncture the insulation and destroy the transistor.



L_7—5 turns No. 22 enam. wire, close-wound on ¼-inch dia. ceramic slug-tuned form (J. W. Miller 4500-4).

L_8—4 turns No. 10 bare copper wire, 1 inch long, ⅜-inch i.d. (The tap shown is not a physical one; see text discussion of C_{19}).

L_9—Total primary winding of 500-ohm c.t. transistor output transformer. 8-ohm secondary winding not used. (Argonne AR-164 or similar.)

R_{15}, R_{17}, inc.—100,000-ohm audio-taper carbon control.

RFC_1—Miniature 50-μh. choke (Millen 34300-50*).

RFC_2-RFC_4, inc.—Miniature 2.7-μh. r.f. choke (Millen 34300-2.7).

RFC_5—Subminiature 10-mh. r.f. choke (J. W. Miller 73F102AF).

S_1, S_4—S.p.d.t. slide switch.

S_2—4-pole 2-pos. phenolic single-section rotary wafer switch. (Mallory 3142J).

S_3—S.p.s.t. slide switch.

Y_1, Y_2—72-Mc. overtone crystal (International Crystal Co. in HC-6/U holder.*).

* Round Hill Assoc., Inc., 325 Hudson St., N. Y., N. Y. 10013

* J. W. Miller Co., 5917 S. Main St., Los Angeles, Cal. 90003

* International Crystal Co., 10 N. Lee St., Okla. City, Okla. 73102

* James Millen Mfg. Co., 150 Exchange St., Malden, Mass. 02148

Transmitter Circuit

Referring again to Fig. 1, the transmitter section starts out with a Colpitts oscillator, Q_1, which uses 72-Mc. overtone crystals.[2] C_1 and the internal base-emitter capacitance of Q_1 control the feedback. RFC_1 keeps the emitter above r.f. ground. Bandpass coupling is used between Q_1 and Q_2 to reduce harmonics in the driving signal to Q_2[3]. A capacitive divider, C_5 and C_6, is used to match the collector of Q_1 to the low base impedance of Q_2. The high value of capacitance between the base of Q_2 (C_6) and ground helps to further reduce harmonic energy in that part of the circuit. Both Q_1 and Q_2 are low-cost Motorola transistors designed for amplifier or oscillator use at frequencies up to 500 Mc. They have a beta spread of 20 to 200, and have a collector dissipation rating of 500 milliwatts. Other transistors can be substituted pro-

[2] The cost of 72-Mc. overtone crystals is considerably more than crystals of lower frequency, but the added number of stages needed for 8-Mc. crystal operation would bring the overall cost up to about the same level. Also, there is less battery drain, and less chance for harmonic radiation, when using the 72-Mc. crystals.

[3] Transistors are particularly troublesome where harmonic generation is concerned. This is due partly to normal envelope distortion, but parametric harmonic generation compounds the problem when bipolar transistors are used. The collector-base junction capacitance varies in a nonlinear fashion during the sine-wave cycle, causing the harmonic output to increase markedly. Unwanted harmonic energy contributes to the driving signal, sometimes causing excessive dissipation in the driven stage. It is wise to reduce the harmonics through the use of bandpass circuits or filters.

vided they have similar specifications. It is quite likely that 2N706As would work satisfactorily in these two stages. Resistors R_5 and R_6 establish Class A bias for Q_2, making it easier to drive with the low output of Q_1.

An RCA 2N3512 is used in the power amplifier, Q_3. It was selected because of its low cost ($1.82) and high maximum dissipation rating of 4 watts. It is designed for high-speed switching applications and has an f_T of 375 Mc. Its h_{FE} rating is approximately 10. The low h_{FE} makes it easier to stabilize than would be the case if a high-beta transistor were used.[4] Other transistors can also be used at Q_3; a 40280 and a 2N3553 were tried and performed as well as the 2N3512, but are more costly. To assure good heat dissipation at Q_3, a heat sink is clipped to the transistor body. A Wakefield Engineering NF205 costs 27 cents and is ideal.[5]

A capacitive divider, C_{10} and C_{11}, matches the output of Q_2 to the base of Q_3. C_{10} tunes L_3 to resonance. Forward bias is used on the base of Q_3 to establish Class AB conditions. This provided greater output from Q_3 than resulted with Class C operation, as is usually the case when the driver stage has low output. The collector tank of Q_3 is a combination L and pi network. The L network, C_{12} and L_4, matches the load to the collector. The pi network is used for harmonic reduction, a necessary provision when clean output is desired from transistorized transmitters.[6] C_{12} tunes the p.a. tank to resonance; C_{15} serves as a loading control.

The power leads of the stages are decoupled by means of C_3, C_9, and C_{14} in combination with R_4, R_8, and R_{11}. The three resistors also serve as current-limiting devices to protect Q_1, Q_2, and Q_3.

The Audio Section

The audio channel, AR_1, can be purchased for approximately $8.[7] It has a 200-milliwatt output rating at 9 volts, but by increasing the operating voltage to 12, and adding heat sinks to the two output transistors, slightly more than 300 milliwatts of output is available. This was done in the circuit of Fig. 1.

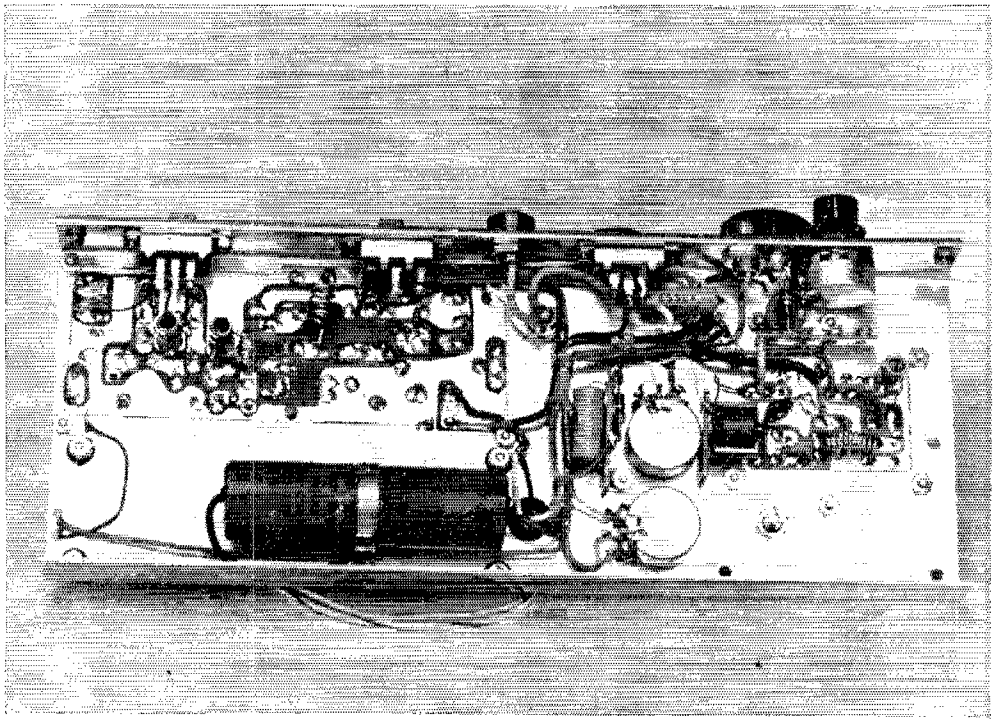
AR_1 has two input impedances — 50 ohms and 100,000 ohms. Two output impedances are available, providing a 500-ohm transformer winding for modulator service, and an 8-ohm winding for driving a loudspeaker. The high-impedance input connects to the microphone gain control, R_{17}, during transmit, and is switched to the receiver gain control, R_{16}, during receive. The 50-ohm tap is not used.

[4] High beta means current high gain. The higher the gain, the more prone the stage to random oscillation, especially at low frequencies.

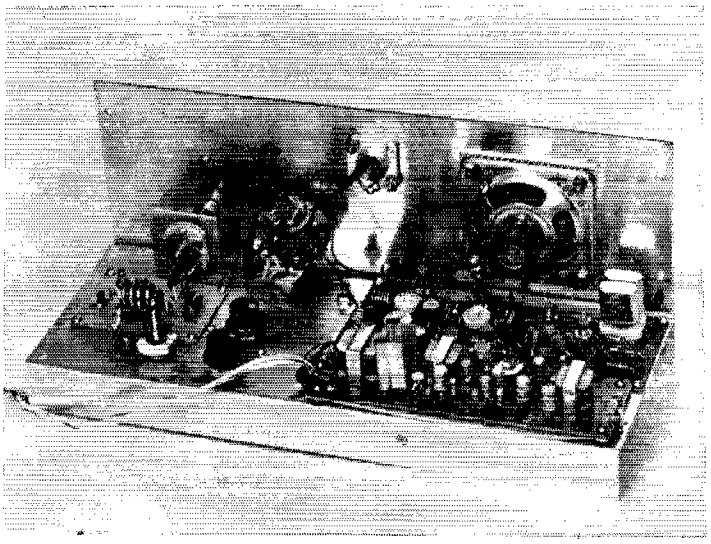
[5] Available through Allied Electronics, 100 N. Western Ave., Chicago. Ill. 60680.

[6] Reduced harmonics means less TVI and less apparent reflected power in s.w.r. readings. Also, see footnote 3.

[7] Round Hill Associates. See parts list in Fig. 1 for address.



Bottom view of the chassis. The receiver board is at the right. The transmitter board is at the upper left. A 2000-μf. 15-volt electrolytic is mounted near the rear lip of the chassis.



Top-chassis layout of the transceiver. The receiver section is at the left. Controls for regeneration and modulation are in the foreground near the center of the chassis. The audio module is at the lower right, and the transmitter board is near the panel, directly under the loudspeaker. The homemade heat sinks are visible at the left end of the audio board.

Because the module is designed for a positive-ground bus (p-n-p transistors are used), it is necessary to "float" the entire assembly above chassis ground to prevent short-circuiting the power supply. Information on the mounting techniques and some modifications to the board is given later.

During receive the output from the speaker is ample for normal fixed or portable operation. In mobile service wind noise and rumble may be loud enough to make it difficult to copy weak signals on the receiver. If a considerable amount of mobile operation is planned it would be wise to consider using a 5-inch-or-larger external speaker with the unit. This will effectively increase the audio level from the receiver.

Building the Transceiver

The packaging of this circuit can be up to the builder. In this instance an office-supply store provided the enclosure for the unit. A standard legal-bond box was chosen. It measures $5 \times 6 \times 11\frac{1}{2}$ inches, has a durable paint job, and can be locked when desired. The handle makes it easy to carry from place to place. This particular box is available in this area for $2.85 top price, and as low as $1.25 in the discount stores. Alternatively, a lunch box could be used. Because of the modular construction of the transceiver, lead lengths are not a prime consideration; therefore, the layout can be modified to suit the builder.

The chassis and panel are made from 16-gauge aluminum sheeting. An aluminum cookie tin from a hardware store can be the source of the panel and chassis stock. Many are made of heavy-gauge material and are large enough to assure that there will be excess stock. The chassis measures $11\frac{1}{4} \times 4 \times 1$ inch. The panel is $11\frac{1}{4}$ inches by $4\frac{3}{4}$ inches. After the panel holes are drilled, a coating of zinc chromate should be sprayed on it. Then, after thorough drying, a coat of spray-can enamel or lacquer can be added for the final touch. The zinc chromate helps the finish coat of paint adhere to the aluminum sheeting. Both paints are available in spray cans from most hardware stores.

The receiver and transmitter are built on etched-circuit boards, but point-to-point wiring could be used if done neatly and with short connections. Etched-circuit templates are available from the ARRL if desired.[8] They are to scale and show where the various parts are mounted.

AR_1 is insulated from the main chassis to prevent short-circuiting the power supply. It has a plus-ground bus; the rest of the transceiver circuit uses a negative ground. A piece of cardboard is mounted between the circuit board and the chassis to prevent accidental contact between AR_1 and the chassis. AR_1 is bolted to the chassis at four points. The four mounting holes in the main chassis contain small rubber grommets, each serving as an insulator. Terminals 1 and 9 of the audio board are common to its plus-ground bus. These terminals must be disconnected from the ground bus by removing the thin copper connecting strip which joins the circuits. A pocket knife works nicely for this job; the copper can then be peeled off.

To operate AR_1 at 12 volts it is necessary to add heat sinks to the two transistors nearest the output transformer, T_3 of Fig. 2. The sinks can be fashioned from pieces of thin brass, copper, or aluminum. They are $1\frac{1}{2}$ inches long and each is formed by warping the stock around a drill bit which is slightly smaller in diameter than the body of the transistor. A sketch of the homemade heat sink is given in Fig. 2.

All interconnecting r.f. leads are made with

[8] Scale templates with parts layout for the boards are available for 25 cents from ARRL. Send s.a.s.e. Harris Co., 56 E. Main St., Torrington, Conn. supplies etched-circuit boards for *QST* projects. Also, write John Bolinger, 215 Fairfield Ave., Michigan City, Ind. 46360, for estimates on finished boards.

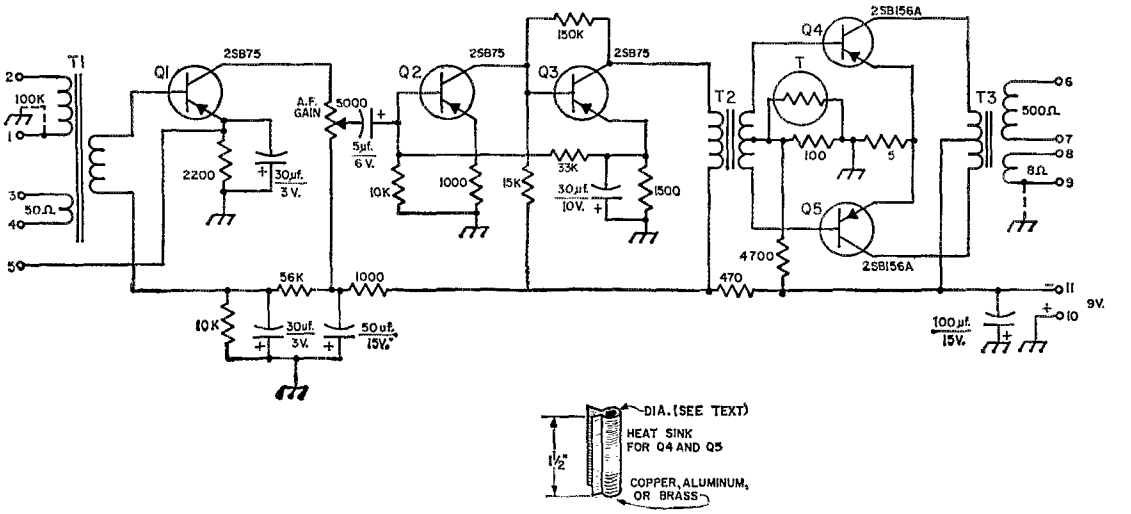


Fig. 2—Schematic of the Round Hill AA-100 audio board. Ground connections shown in dotted lines must be removed by cutting away copper strips on the circuit board (see text). Sketch at inset shows details of homemade heat sinks used on Q_4 and Q_5 of AR1 when 12-volt operation is planned.

subminiature coax cable, RG-174/U (Belden 8216). Shielded audio cable should be used for all a.f. wiring which is more than a couple of inches in length. A bargain-house import is used for the receiver tuning dial. No slippage was noted with the 2-inch-diameter model used here. The next smaller model is not recommended because it will not handle the torque of the tuning capacitor specified in Fig. 1.

A 2½-inch-diameter loudspeaker is used. Its protective grille can be made from perforated aluminum, or a chrome-plated sink-drain strainer can be purchased from the hardware store for this purpose. The latter is inexpensive and makes an attractive speaker port.

Two 3-inch-long brass angle brackets, each with ¾-inch sides, are used as mounts for the panel-chassis assembly inside the box. Two 6-32 hex nuts are soldered to the bottom side of each bracket, directly under No. 10 access holes. Four 6-32 × ⅜-inch screws hold the transceiver in place. The brackets are attached to the sides of the box with 4-40 hardware.

About Substitutions

If the builder has some different field-effect transistors on hand, it is quite possible that they can be used at Q_4 and Q_5. The important consideration here is the maximum frequency rating of any substitute FET; it should be higher than the operating frequency of the equipment. An RCA 3N128 will work nicely at Q_5 or the builder may wish to use a junction-type FET there. An MPF102 was tried and it worked well with the values shown in Fig. 1. L_8 had to be made somewhat smaller, however, because of increased circuit capacitance. Other JFETs can be used at Q_4, but should have similar transconductance and frequency ratings as the MPF102 — 2000 to 7500 µmhos up to at least 200 Mc. Also, substitute FETs should be the N-channel type.

If the constructor wishes to use one of the other bargain-priced audio boards that are available, it will be necessary to add an input transformer, T_1, as shown in Fig. 3. Also, a modulation transformer, T_2, must be added. It is possible that 9-volt rated boards can be used at 12 volts by adding heat sinks, or by changing the values of the bias resistors, but such experiments will have to be done at the builder's risk. If battery-only operation is planned, the module could be fed from a 9-volt tap on the battery string. An RCA CA3020 integrated circuit might be used as the audio channel by using a hookup similar to that of Fig. 3. If so, a stage of preamplification would be needed between the microphone and the IC. The same stage could be used as a preamplifier between the detector and the IC.[9]

[9] An example of an audio amplifier using a CA-3020 is given in *QST*, June 1968, page 11.

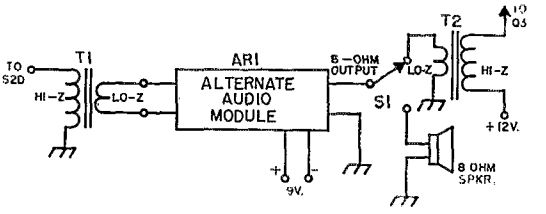
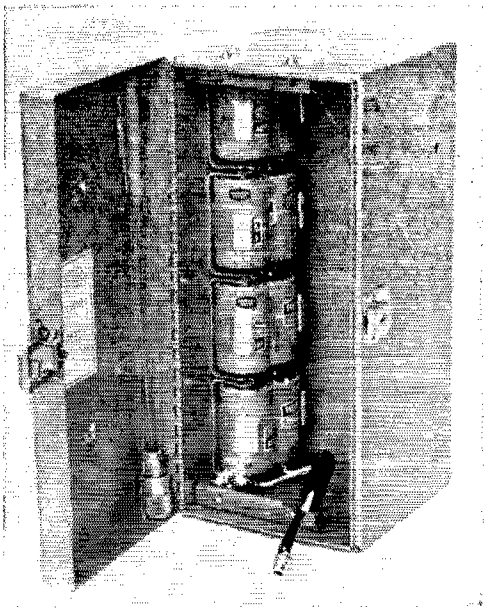


Fig. 3—Hookup that will permit other types of audio boards to be used. S_1 is used to switch in an outboard modulation transformer, a transformer connected back-to-back with the one supplied with the module. T_1 is an outboard transformer which matches the low-impedance input of the audio amplifier to the high-impedance microphone, and to the output of the detector during receive (see text.)



Eight size-D cells are series-connected to provide 12 volts. They are mounted in Keystone holders on the back wall of the bond box. The ¼-inch diameter hole in the front of the cabinet (upper right of photo) permits final calibration of the receiver (C_{20}) after the installation is completed. The hole is opposite the shaft of C_{20}.

Tune-Up and Use

The receiver should be tested first. With an antenna connected to J_1, apply operating voltage and adjust R_{15} until a rushing noise is heard in the speaker. Do not advance R_{15} beyond this point as the sensitivity of the receiver will decrease. Next, tune in a weak signal from another ham station (or from a signal generator) and tune L_7 for a peak response. Chances are that when the peak is reached, the detector will stop oscillating. If this happens, advance R_{15} until the hiss returns. If it does not, detune L_7 slightly until a compromise is reached (L_7 usually loads the detector somewhat when it is tuned to the operating frequency). Alternatively, a 1000-ohm swamping resistor can be connected across L_7 to reduce its effect on the detector. Trimmer C_{20} is used to set the tuning range of C_{22}. The turns of L_8 can be spread or compressed for additional frequency adjustment. The receiver should tune the entire 4-Mc. of the 2-meter band, or nearly so.

A No. 49 pilot lamp makes a suitable dummy load for visual tune-up of the transmitter, though somewhat reactive at 144 Mc. First, determine that the oscillator, Q_1, is operating by coupling a wavemeter (or grid-dip meter in the diode-detector position) to L_1 and look for an indication of output. Adjust the slug in L_1 for maximum output, then turn the transmitter on and off a few times to make sure the crystal always kicks in. If not, detune L_1 slightly toward the high-frequency side of resonance until the oscillator does start each time. Next, peak L_2, C_{10}, C_{12}, and C_{15} for maximum indication on the bulb. There will be some interaction between the circuits, so the foregoing steps should be repeated a few times to assure maximum output. Final adjustments should be made with the antenna connected, and with an s.w.r. indicator in the line.[10]

[10] A highly sensitive s.w.r. indicator is needed at this power level. One of the Monimatch indicators with a 4-inch-or-longer line (air-dielectric element type) can provide full-scale readings if a 100-μa. meter is installed. Alternatively, see *QST*, August 1967 for a low-power bridge. Also, see the "Monimatch Mark II," *QST*, Feb. 1957.

Tune all circuits for maximum forward power indication, then adjust C_{10} for the setting that gives steady output during modulation. Downward modulation may occur at some setting of C_{10}. Alternate adjustment of C_{12} and C_{15} should be made to obtain maximum output. C_{12} should be used for obtaining tank resonance, and C_{15} for loading.

The microphone gain-control setting will depend upon the mike used. R_{17} can be set for best signal quality by making on-the-air tests with a nearby ham station.

Results

Several QSOs have been had with the Bond Box. While using a quarter-wave whip (screwed directly into J_1), many contacts were made with stations as far away as 15 miles. In all instances, the signal report from the little transceiver was "Q5 and S9 plus." With an attic-installed 8-element Yagi, good signal reports have been received from stations as far away as 30 miles, even over mountainous terrain. Signals from neighboring states have been received with the Bond Box, many of them completely silencing the receiver hiss noise. Selectivity is good enough so that as many as five different QSOs have been copied when the stations were all operating between 145 and 145.4 Mc. The signals were of medium strength, and no QRM resulted. Strong local signals, of course, will seem to occupy more spectrum with this type of receiver.

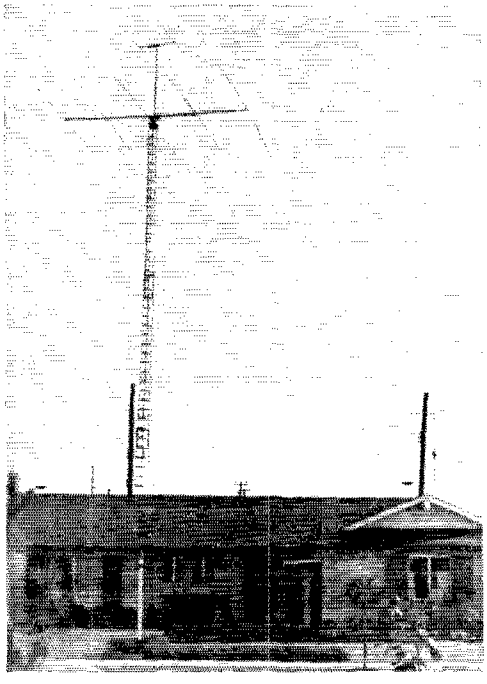
Battery life should be quite long if the receiver is turned off when not in use. Maximum peak drain on transmit should be approximately 250 ma. During receive, with a medium-strength signal tuned in for room-volume listening, current drain is on the order of 65 ma. The p.a. stage runs approximately ¼ watt input at 12 volts. Slightly more power input results during mobile operation because of higher battery voltage — approximately 13.5 volts. QST

A 65-Foot Crank-Up

Low-Cost Tower Construction

BY L. JACQUES FILION,* VE2AES/W6

To many readers, home construction of a telescoping tower may seem impractical. However, this second article on the subject within recent months [1] shows that there are some who do not agree. Several towers of the type described here have been built successfully, and have proved their worth through extended use in the California area.



The tower at VE2LO/W6, built as described in the article, carries a five-element Yagi on a 26-foot boom. The two-element 15-meter antenna above is 78 feet above ground level.

It is well known that Texas is the land of big things. But, after moving from VE2 Land to the West Coast, I have decided that W6 Land cannot be far behind when it comes to antennas and towers. Here in California, not only does one operate 2 kw. p.e.p. to work that rare DX (as well as to chew the rag across town, in many cases!), but a visitor finds that the antenna systems are the latest thing, in most instances 100 feet or more in the air. More than once I have come across a 6-element 20-meter beam on a 70-foot boom nearly scraping the clouds, it would seem.

The advantage of such height may be doubted by some, but the truth of the matter is that owners of such systems seem to hear and work more stations. On many occasions, I have observed that these operators seemed to be having one-way conversations, since the band appeared to be dead so far as I was concerned. What a shocking experience it was one night when I hurried to the shack of one of these friends and found him actually working the South Africans he was talking to — and piled up on each other at that! He was the only one from this area getting through.

Then it became obvious to me that I was losing out, and by quite a margin. The only answer was to get my antenna up there. The problem was how to do it on a thin wallet. The only solution seemed to be to try a home-brew approach.

So, armed with an arc welder, some steel tubing, and no small amount of courage, two towers were built. Yes, *two* of them were assembled — mine and one for VE2LO/W6. Help here was greatly needed, and the best way to obtain it was to form a partnership.

Materials

After searching around, we found that we could get galvanized 1⅜-inch o.d. steel tubing with an 0.08-inch (approximate) wall in lengths of 24 feet at a reasonable price. (This tubing is known, at least locally, as "fence tubing," since it is used in the manufacture of chain-link fencing.) We decided, therefore, to make each

* 2226 North Spruce St., Santa Ana, Calif. 92706.

[1] Brooks, "Ninety Feet for One Hundred Dollars," *QST*, March, 1967.

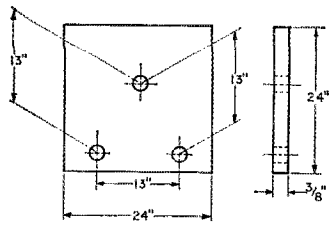


Fig. 1—Six jigs made of ⅜-inch plywood are used to hold the legs in position while welding the crossbraces. Sides of the jigs should be perfectly square, and it is best to clamp the six pieces together, and bore all at the same time.

tower in three 24-foot telescoping sections. Three lengths of this tubing form the legs for each section. The legs are joined by welding on horizontal crossbraces made of 3/16 × 1½-inch mild steel bar, spaced along the legs at 16-inch intervals.

Welding

The first step was to become familiar with the borrowed 50/100-ampere welder. How does one know when he is welding rather than "gluing," or simply building up blobs? And how do you avoid burning holes in the tubing? So, I read everything I could find on the subject. After several hours of practice, I welded two pieces of steel together to evaluate my progress. With everything I could find, except a cutting tool, I could not break the weld. I felt quite confident that my welding technique was adequate, but to be doubly certain, I showed the sample to a garage mechanic, who confirmed my opinion.

Top-Section Assembly

Before starting the assembly, a study of the photographs will save many questions. The job was started by cutting 57 crossbars to a length 13 inches, and making 6 jigs from ⅜-inch plywood, as shown in Fig. 1. The lengths of tubing were slipped into the jigs, and the jigs placed at equal intervals along the lengths of the legs. The most level surface possible should be selected for the assembly. We used my garage floor, and part of the driveway. (One drawback here is that you'll have more "sidewalk superintendents" than you bargained for!) The jigs should be kept at exact right angles to the legs. As the jigs are squared up, they can be held in place by nailing long strips of wood across the edges. Care should be taken to see that the ends of the legs are exactly even.

With everything squared up, we plunged into welding on the crossbars. These bars should be only spot-welded at each end at first, because the heat of welding tends to distort the assembly, and it may be necessary to go back and break some of the welds with a hacksaw to correct this distortion, as the welding progresses, until all crossbars are in place. Breaking a full weld can result in some painful moments for the saw as well as the operator.

Great care must be taken to maintain everything in proper alignment, since the top section will become the master for the center section, and the center section the master for the bottom section. It is advisable to weld the crossbars on in pairs at the same level on the two accessible sides of the section, rather than to weld them all on one side, then all on the second side. After the two sides have been spot-welded, the section can be turned over to make the third side accessible. After all crossbars are in place, and the section given a final inspection for alignment, the welds can be completed, and the jigs cut away.

Center and Bottom Sections

The sections telescope on slides, as shown in Figs. 2 and 3. These slides are 6-inch lengths of ¾ × ¾ × 1/8-inch iron-angle stock. A total of 12 of these slides is needed. One of these slides is welded, with the vee of the angle facing outward, to each leg of the top section, near the bottom end. Care should be used to make sure that the angles are centered squarely on the legs.

The top section when completed is used as the "jig" for the center section. Before starting assembly of the center section, the angle-iron slides should be welded to each leg. This section requires slides at both ends, those at opposite ends being oriented 180 degrees apart, with the slides at the top end facing inward, and those at the bottom end facing outward.

When this welding is finished, the legs of the center section are placed in the positions that they will occupy when the two finished sections are completely telescoped, that is, with the top and bottom ends of both sets of legs even. The bottom ends of the center-section legs should rest in the slides of the top section, and the inner slides of the center section, at the opposite end, should rest against the legs of the top section. Shims 1/16 to 3/32 inch thick should be inserted

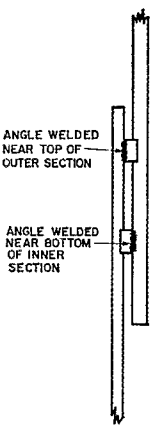


Fig. 2—The sections telescope on angle-iron slides welded to the legs. One set of slides is placed near the top of the outer section, while the other set is placed near the bottom of the inner section. The middle section requires slides at both ends, the top and bottom sections requiring only a single set.

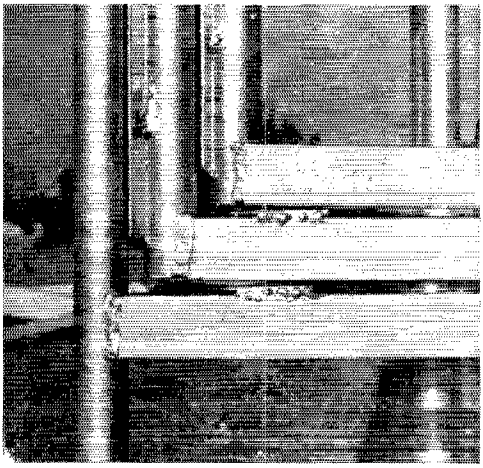


Fig. 3—Detail view showing the welding of the crossbraces to the legs. This view also shows the steel-angle slides of the top and middle sections. The welds visible between the tower sections are at the ends of diagonals (same material as the crossbraces) which serve as rests for the two top sections when the tower is completely telescoped.

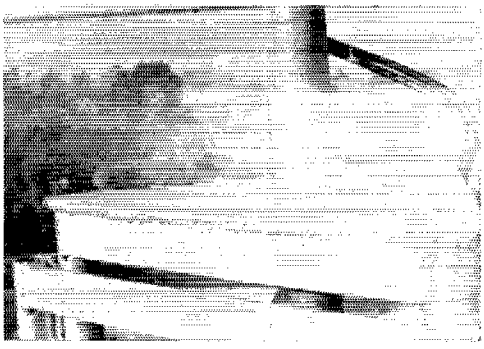


Fig. 4—Top plate (¼ inch thick) welded to top section. The bearing is a section of pipe making a loose fit to the mast.

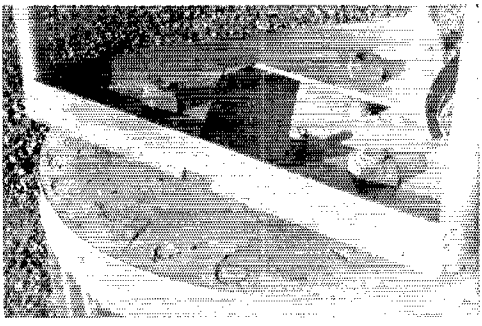


Fig. 5—The base plate for the tower can be made the same as the top plate, or gussets may be used as shown here. Believe it or not, in this instance the tower is mounted on top of a 10-foot column of reinforced concrete extending from the ground to 2 feet above roof level!

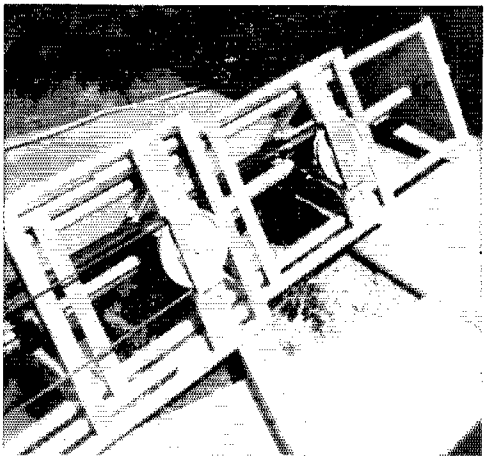


Fig. 6—Pulleys for raising the tower are provided at the tops of the bottom and middle sections.

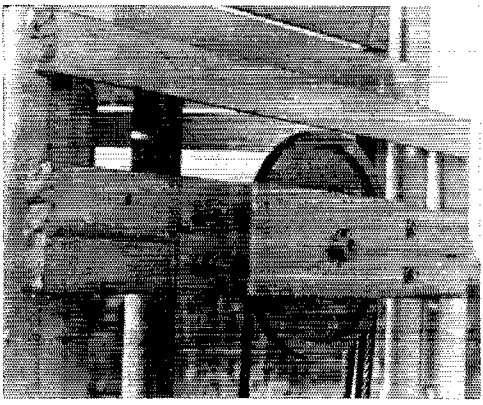


Fig. 7—The pulley mounting is made of ⅜-inch steel. In this instance, the mounting bar is a double length of 1½-wide stock, but it can be made of a single piece 3 inches wide. If a shoulder is not provided on the pulley shaft, washers should be used between the pulley and the sheath to provide clearance for the pulley. The pulley shaft should be not less than ¾ inch in diameter.

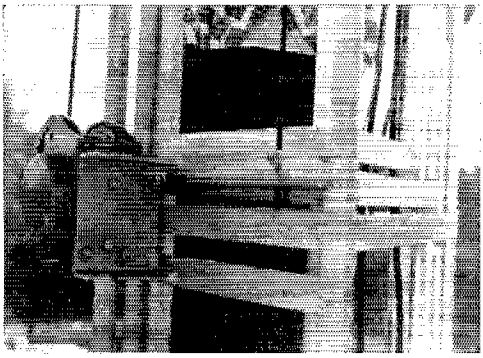


Fig. 8—The winch is bolted to a bracket of ¼-inch steel which, in turn, is welded to a pair of ⅜-inch thick crossbraces on the tower. The winch shown has outboard gears, and is not a recommended type. See text.

between the mating slides to provide a sliding clearance between the two sections. (Aluminum or iron angle of this thickness can be used for the spacers.)

After the spacers have been inserted, the legs of the middle section should be clamped securely to those of the top section, using C clamps. It is also advisable to use spacers of suitable thickness clamped between the legs at several points along the lengths of the legs to keep the legs parallel. The center-to-center distance between the legs of the center section should then be measured carefully, and 57 crossbars cut to this length.

The same welding procedure described for the top section should be followed in making the center section. However, before completing the welds, it is advisable to remove the spacers and, by trial, make sure that the top section will slide out readily. Reinsert the top section, and replace the spacers and clamps before making the welding permanent.

The bottom section of the tower is made in the same manner, using the center section as the "jig."

Finally, after the completion of the last section, came our great moment. What a relief it was, after a lot of pushing and pulling, to find that the entire contraption could be expanded or telescoped as planned! It should be mentioned that at this stage one is playing with 300 to 500 pounds of deadweight (it felt like tons to us), and sliding the sections in and out will surely build up one's muscle, if not one's signal!

Detail Construction

The top plate with collar bearing (Fig. 4), base (Fig. 5), pulley assemblies (Figs. 6 and 7), and the winch (Fig. 8) were welded on next. A look at the pictures will reveal the details. The pulleys should accept a good-sized shaft, as considerable weight will be impressed on them as the tower is cranked up. I obtained a surplus 7-inch aircraft pulley (the larger the diameter, the easier the cranking) that took a 1¼-inch shaft. The shaft was turned down to ⅞-inch diameter at the bearing ends. One can improvise here, and it should be easy enough to find the right things at moderate prices.[2]

The winch, rated at 1600 pounds, was purchased from Sears (Cat. No.-62415.) It has a gear ratio of 5.1 to 1, making raising and lowering quite easy. Winches having outboard reducing gears or those having more than two gears should be avoided. Such types have given trouble in the cases where they have been tried.

Before erecting the tower, all parts not galvanized were given a good coat of zinc-base anti-rust paint. (Aluminum-base anti-rust paint has not stood up well.)

Mounting the Tower

The tower, with all sections telescoped, can be raised to a vertical position by means of chain falls, or a husky block-and-tackle set, if a suitable anchorage can be found. If the base of the tower is placed properly before raising, it should be possible to maneuver the base, as the tower is pulled up vertically, so that the holes in the base plate will drop over the bolts in the foundation. The mechanically-minded might also devise a hinge at the base that would simplify the operation. However, unless you have had previous experience with such things, it is better to have the job done by a professional, such as an automobile towing service with a substantial crane, or electric-sign installer. A lot of weight is involved, and considerable damage can be done if things get out of control.

Raising System

A cable system that permits raising both sections with a single winch gets to be pretty complicated. If desired, a separate winch and cable can be provided for each of the upper two sections. However, once the antenna has been mounted and the tower raised, the need for lowering the tower all the way down will be infrequent. Therefore, after raising the center section containing the top section, I block the center section with a crossbar under each corner of its bottom end. Then the cable is transferred to the pulley at the top of the center section, and the top section is raised. I do not use a blocking bar on this section, depending on the cable to support it. This makes it possible to lower the top section on short notice when high winds develop.

Climbing to the top of the center section to transfer the cable could be avoided by raising the top section first, and then the center section, but this would mean that the tower could not be guyed until it was fully extended, and I prefer to play safe and guy the center section before raising the top section.

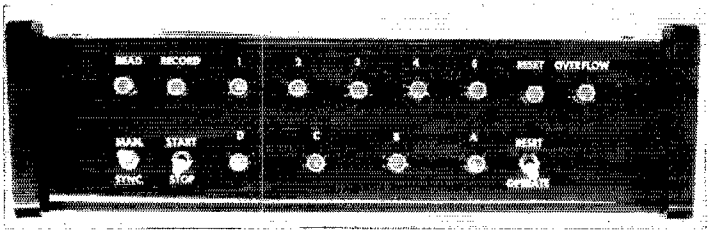
Since the pulleys are on the outside of the tower, it is necessary to feed the end of the cable down on the inside of the outer section at some point above the level where the base of the inner section will be when it is raised. It is advisable to leave an overlap of at least three crossbrace spacings, so the cable should be fed in at the second opening below the top of the outer section. The cable should be passed around a crossbrace, using a cable thimble between the crossbrace and cable, and then securely clamped with two or three cable clamps for the size of cable used (⅜-inch galvanized high-strength, 10,000-pound breaking-strength cable).

Guying

No thought should be given to using this tower without at least two sets of guys, three guys in each set. I used guys of ⅛-inch galvanized aircraft-type cable, broken every 20 feet with strain insulators. In attaching the cable to the insulators, two cable clamps should be used on each side of each insulator, making four clamps per insulator. These guys should be securely

(*Continued on page 142*)

[2] Sears has a line of cast-iron pulleys in a wide variety of diameters and shaft sizes. — *Editor.*



The only controls on the counter panel are switches; no fine adjustments are required. Pilot lights show the operating state.

Digital Counter with Teletype Print-Out

BY R. G. SIMMONS, W2RBN, ex-W5UGY*

A DIGITAL counter for frequency measurements is not a piece of equipment normally found in a ham shack. But once one has been used, the user often wonders how he ever got along without it. With the advent of inexpensive integrated circuit elements, the construction and cost of a counter is within the ability of nearly all amateurs.

The unit to be described here was built primarily to obtain Doppler shift measurements on satellites[1] and to print out the value of the measured frequency on a teletype machine. Thus it is somewhat more complex than most.

A printing frequency counter at a price a ham can afford? Impossible, you might say. But it's been done — by putting a Teletype machine to a new use!

While we won't pretend that such a device is an indispensable adjunct to every amateur station, a study of the circuitry can increase your knowledge of digital techniques, and may stimulate your own ham ingenuity in solving equipment problems by {to the uninitiated} unorthodox methods.

Operation

The block diagram of the unit is shown in Fig. 1. The unknown frequency is applied to the input where it is changed into a square wave by the Schmitt trigger (S.T.). The output of this goes to the counter decades.

The input to the counter decades is closed for one second by the timing decades, allowing the counter to operate and store the number of input pulses arriving during a one-second interval. This is called the "read" cycle.

*Blueberry Lane, Stormville, New York 12582

[1] Hilton, "Making your own Orbital Predictions from Doppler Measurements," *QST*, March, 1962.

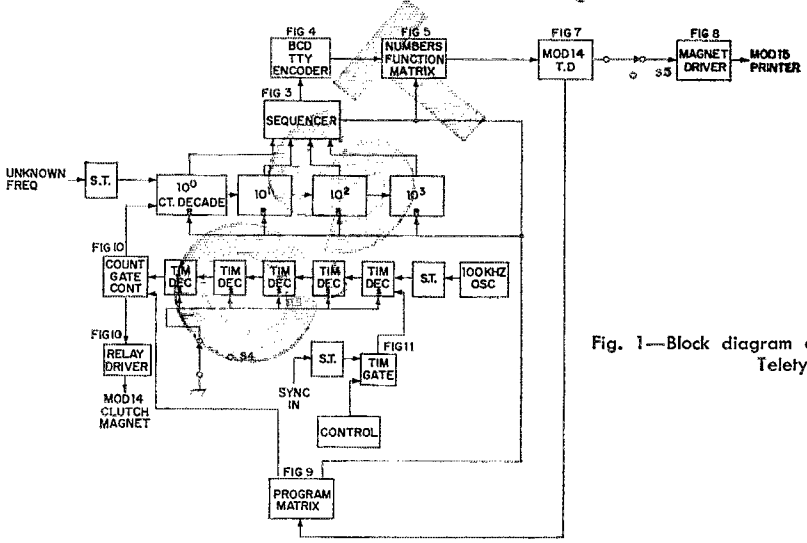


Fig. 1—Block diagram of the frequency counter with Teletype readout.

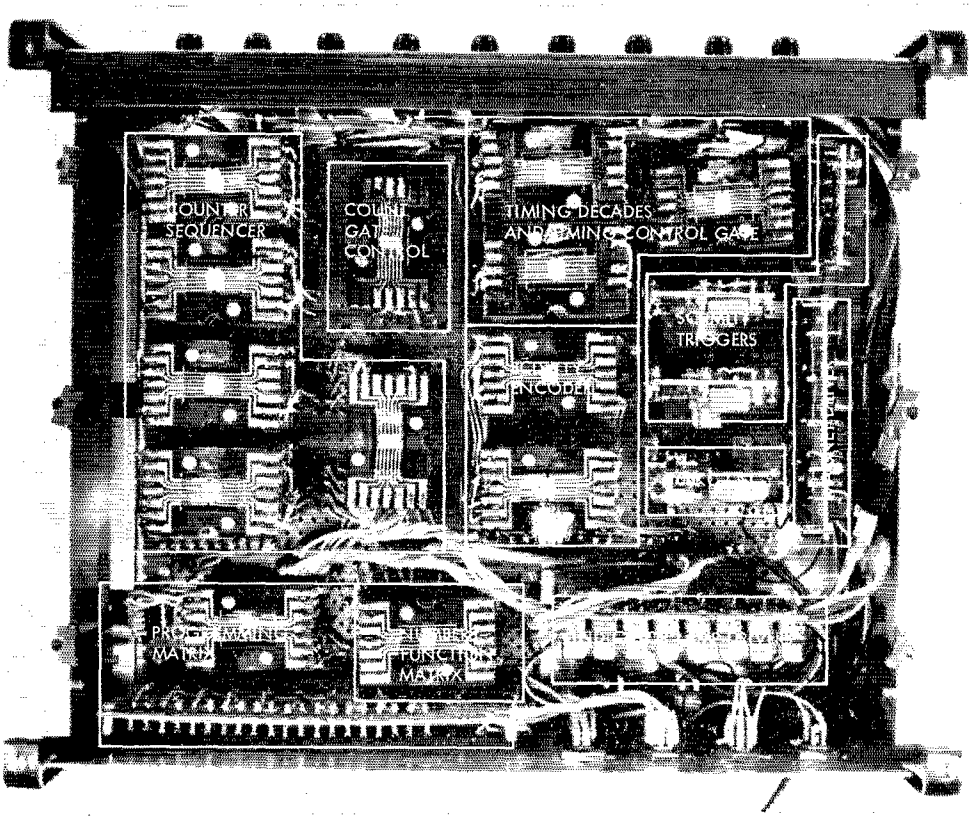
After the read cycle the data stored in the counter is printed out on a Teletype machine. This is called the "write" cycle, and is controlled by a Model 14 tape distributor modified to provide this function. We will call this control function "programming."

The Model 14 tape distributor (TD) tape head provides control through the program matrix. This controls the count gate, provides reset pulses to the count decades, and controls the sequencer. The sequencer allows one number in the decade to be printed out at a time, beginning with the most significant number, until all four digits are printed out on the Teletype machine. The program matrix also controls the numbers-function matrix, which determines whether a number or teletype "stunt" command is delivered to the printer. (These "stunts" are SPACE, LINE FEED, CARRIAGE RETURN, LETTERS SHIFT, etc.)

A program tape punched for the TD causes the numbers to be printed out in proper order along with the TTY "stunt" functions, such as LINE FEED, FIGURE SHIFT, CARRIAGE RETURN, and SPACE.

The format used here is: start with a LINE FEED and CARRIAGE RETURN command, followed by a FIGURE SHIFT, read 10^3, read 10^2, read 10^1, read 10^0, RESET, and TAPE STOP. The last two commands give a spacing command to the Model 15 page printer, providing separation of the number groups. LINE FEED and CARRIAGE RETURN commands are generated where needed at the end of a line to prevent overprinting.

At this point it is necessary to define some terms that will be used in the circuit description. A "logic 1" is a voltage level greater than 0.1 volt d.c. A NOT of a function will be its inverse; that is, NOT 1 = 0, and NOT 0 = 1. These are written as $\bar{1} = 0$, or $\bar{0} = 1$, the bar over the number signifying the NOT. Generalizing, $\bar{A} = 1$ and $\bar{A} = 0$. We shall now discuss the circuit elements used.



Plan view of the top of the assembly with the cover and sides removed from the cabinet. The various sections of the counter, shown in block form in Fig. 1, are outlined and identified in white. The enclosure is a Justin "Gear Box" Model 90, 11½ inches wide by 9½ inches deep and 3¼ inches high. The row of pilot lights on the front panel is visible at the top in this photograph.

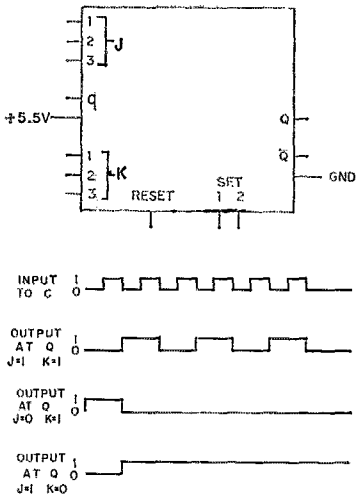


Fig. 2—The J-K flip-flop shown symbolically and its response to a negative-going clock pulse with various conditions at the J and K inputs.

J-K Flip Flop

Fig. 2 shows the block diagram of a J-K flip-flop along with a timing chart. The chart assumes that the J and K inputs are at 1 along with the set and reset terminals. As can be seen, the Q terminal changes from 0 to 1 once for every two input changes of 1 to 0, thus the flip-flop operates on a negative going signal.

The J-K also has features built in that are useful to logic circuit design. A 1 to 0 shift at C with any or all J inputs at 0 and all K inputs at 1 will cause the Q output to go to 0, and subsequent inputs at C have no effect. The reverse is also true; that is, if any or all K inputs are 0 and all J inputs are 1 a shift at C will make Q = 1 and further inputs to C have no effect. With the flip-flops used in this counter, 1 inputs to J and K do not have to be provided but a 0 does have to be supplied from an external source. Also, the Q output may be set to 1 by applying a 0 to either of the set terminals or set to 0 by applying a 0 to the reset terminal.

NAND Gates

The NAND gates operate as follows: If all inputs are at 1 the output is 0; if any one or all inputs are 0 the output is 1. The resultant logic inversion must be taken into account in circuit design with these elements.

Decade Counters

Nine decades are used in this unit, four for counting the input pulses and five for timing the count period. Each decade consists of four J-K flip-flops, and divides the input pulses by 10. That is, for ten input pulses to the decade you get one pulse or change of state at the output.

Since each flip-flop divides by 2 and four are used in each decade, feedback wiring must be provided to reset all flip-flops to 0 after the 9th input pulse. The lower half of Fig. 3A shows a single decade and the wiring necessary to convert from a normal scale of 16 for four flip flops to a scale of 10. The timing diagram, Fig. 3B, shows the relationship of the various flip-flops in one decade during the count, with the binary equivalent of the decimal number tabulated below. This particular form of coding is called "binary coded decimal" or BCD for short.

The circuit requires that the initial conditions be such that all Q outputs on the count decades

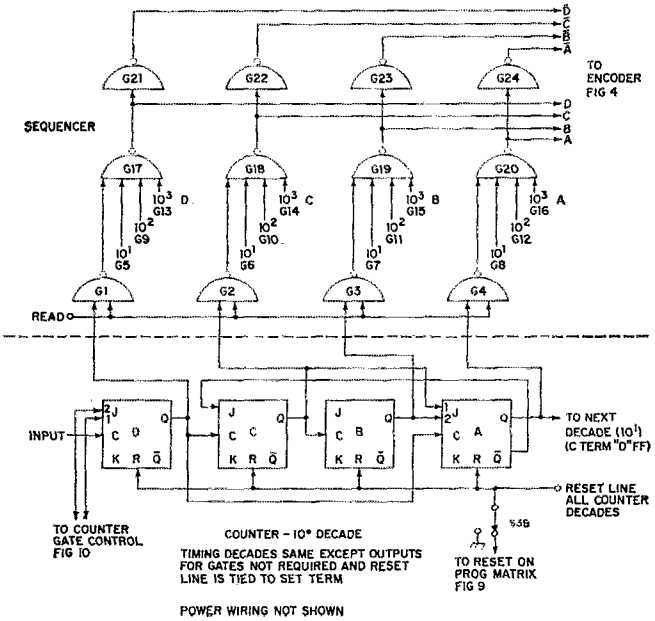


Fig 3A—Sequencer and one counting decade. Remaining counter decades are similar to that shown below the dashed line, and are connected to gates G_{17} through G_{20}, as indicated, through gates similar to G_1-G_4.

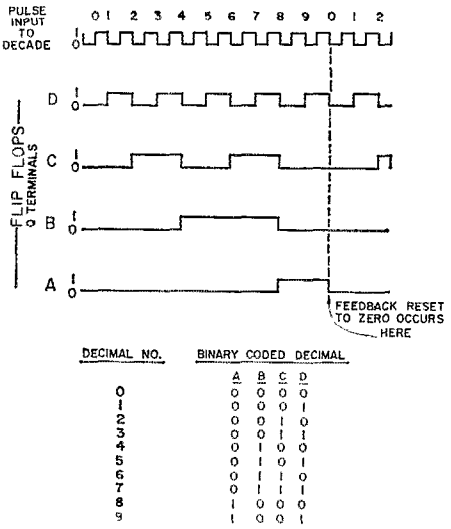


Fig. 3B—Timing sequence for the counting decades.

be set to 0 and all Q terminals on the timing decades be set to 1, so the reset terminal is used on the count units and one of the set terminals is used on the timing units. Also, all Q terminals are used in the counter decades, while the timing units only require using the Q output from the last flip-flop to provide an input to the next decade in the chain.

Sequencer

The top half of Fig. 3A shows the portion of the sequencer for one decade, the 10^0 unit. In the first set of four NAND gates, G_1 through G_4, one input of each gate is connected to a Q terminal of a flip-flop, while a second input on each gate is tied to a READ line, common to the four gates associated with each decade. Each decade has an individual READ line, making four READ lines in all.

These READ lines are held at 0 by the program matrix during the read cycle, which results in a 1 being present at all inputs of gates G_{17} through G_{20}, giving a 0 output at these gates.

In effect, you have four 4-pole single-throw switches controlled by the program matrix and closed in proper order by the matrix. This is done by arranging the matrix to apply a 1 to the proper set of gates, and if the flip-flop tied to the gate also is at 1 the output of the first set of gates will go to 0. Then, since the inputs of G_{17} through G_{20} not associated with the par-

TABLE I Encoder Logic

Code Comparison

Decimal Number	*BCD Number* A B C D	*Teletype Code* 1 2 3 4 5
0	0 0 0 0	0 1 1 0 1
1	0 0 0 1	1 1 1 0 1
2	0 0 1 0	1 1 0 0 1
3	0 0 1 1	1 0 0 0 0
4	0 1 0 0	0 1 0 1 0
5	0 1 0 1	0 0 0 0 1
6	0 1 1 0	1 0 1 0 1
7	0 1 1 1	1 1 1 0 0
8	1 0 0 0	0 1 1 0 0
9	1 0 0 1	0 0 0 1 1

Logic Equations

$$\text{TTY Line 1} = \overline{A}\,B\,C\,D + A\,B\,C\,\overline{D} + \overline{A}\,\overline{B}\,C\,D + A\,B\,\overline{C}\,D + A\,B\,C\,D$$

$$\text{TTY Line 2} = \overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}\,\overline{C}\,D + \overline{A}\,B\,C\,\overline{D} + \overline{A}\,B\,\overline{C}\,\overline{D} + \overline{A}\,B\,C\,D + A\,\overline{B}\,\overline{C}\,\overline{D}$$

$$\text{TTY Line 3} = \overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}\,\overline{C}\,D + \overline{A}\,B\,\overline{C}\,\overline{D} + \overline{A}\,B\,C\,D + A\,\overline{B}\,\overline{C}\,\overline{D}$$

$$\text{TTY Line 4} = \overline{A}\,B\,\overline{C}\,\overline{D} + A\,\overline{B}\,\overline{C}\,D$$

$$\text{TTY Line 5} = \overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}\,\overline{C}\,D + \overline{A}\,\overline{B}\,C\,\overline{D} + \overline{A}\,B\,\overline{C}\,D + \overline{A}\,B\,C\,\overline{D} + A\,\overline{B}\,\overline{C}\,D$$

Reduced by Karnaugh Mappings *

$$\text{Line 1} = \overline{A}\,\overline{B}\,D + \overline{C}$$

$$\text{Line 2} = \overline{A}\,\overline{B}\,\overline{C} + \overline{B}\,\overline{D} + \overline{C}\,\overline{D} + B\,C\,D$$

$$\text{Line 3} = \overline{A}\,\overline{B}\,\overline{C} + A\,\overline{D} + B\,C$$

$$\text{Line 4} = A\,D + B\,\overline{C}\,\overline{D}$$

$$\text{Line 5} = \overline{A}\,\overline{B}\,\overline{C} + \overline{C}\,D + C\,\overline{D}$$

*GE Transistor Manual, 7th Ed. Page 126.

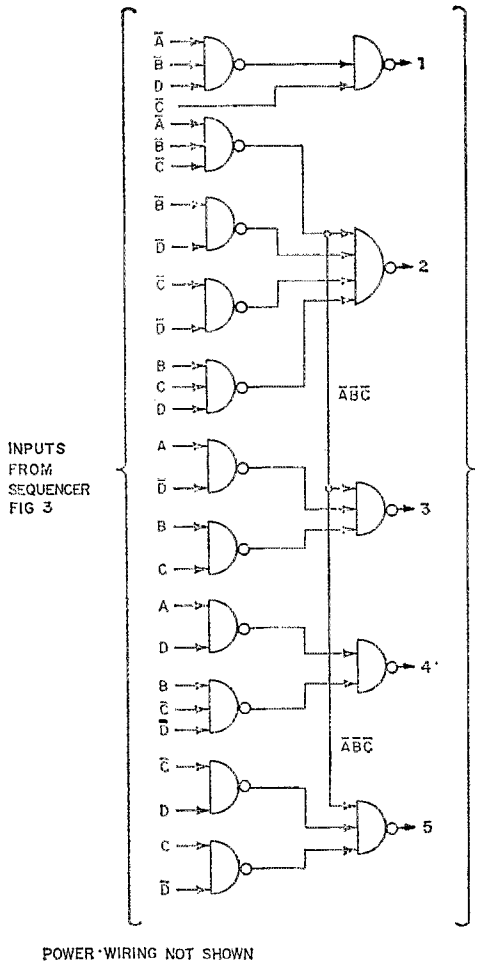


Fig. 4—BCD to Teletype encoder.

ticular decade being read are held at 1, this 0 will cause a 1 to appear at the output of the sequencer, and all four binary numbers are thus read out of each decade in turn. Gates G_{21} through G_{24} are used as inverters to provide the NOT functions needed for the next stage.

BCD to TTY Encoder

Fig. 4 shows the logic wiring of the encoder. This is really the heart of the system. The design equations are shown in Table I. These are formed by taking one TTY code bit at a time, one character at a time, and writing the state of the counter in binary at that time. (For example, when the numeral 1 is in the counter, the flip-flop states are A = 0, B = 0, C = 0, D = 1. The teletype code for the number 1 is mark, mark, mark, space, mark, or 11101.) Only the 1s need be considered, since the 0s are automatic.

For the first TTY bit (TTY column 1) which is a 1, the first binary equation is $\overline{A}\,\overline{B}\,\overline{C}\,\overline{D}$. The next decimal number that requires a 1 in the first TTY bit is 2, and the state of the binary counter is A = 0, B = 0, C = 1, D = 0. Thus the next equation is $\overline{A}\,\overline{B}\,C\,\overline{D}$. The process is continued until all equations are complete for the first TTY bit or column 1. Then the remainder of the equations are written for the 1s in the other TTY bits or columns. Reduction of the resultant five equations can be accomplished by algebra, or as noted.

Further discussion of logic design equations is beyond the scope of this article, but inspection of Fig. 4 will show how the connections correspond to the logic equations. Note that $\overline{A}\,\overline{B}\,\overline{C}$ is tied to each of three gates, thus saving two gates (because you only have to generate it once). Further information can be found in the reference cited in Table I.

Numbers-Function Matrix

The five input gates in the numbers-function matrix, Fig. 5, serve as switches to disconnect the encoder from the TTY function gates in the same manner as the gates on the counter flip-flops. When a number is being read, the No. 1 line on the program matrix is at 1, connecting the encoder to the indicator-lamp drivers, which in turn drive the Model 14 TD. Logic inversion is again accomplished by the second set of NAND gates.

The second set of gates also serves to generate any commands to the Model 15 page printer. By suitable wiring, functions such as LINE FEED, CARRIAGE RETURN, FIGURE SHIFT, and SPACE may be generated. These commands are provided by the program matrix. Also note that the wiring is such that spacing commands are given when "RESET" and "TAPE STOP" commands are given.

Indicator Lamp Driver

The indicator lamps and their drivers, Fig. 6, serve two purposes. One is to provide visual indication of the operation, and the other is to increase the signal level to the Model 14 TD. Any transistor that can handle the lamp current and voltage demands (with 0.5 ma, or less base current) will work. A Motorola HEP-54 and an unknown 5-for-$1.00 type of transistor from a surplus supplier have been used to drive a lamp requiring 80 ma. at 12 volts. Since the maximum number of lamps on at one time is seven, the current drain is approximately 0.5 amp., which is easily supplied from a small filament-transformer and silicon-diode power supply. Indicators are also connected to the ABCD outputs on the sequencer. (The logic is inverted by the lamp driver but is inverted again in the magnet driver.) While not actually necessary, the indicators provide direct monitoring of the circuit operation, and if they are not used on the numbers-function

matrix an inverter must be placed between the Model 14 and the magnet driver. Type 2N3440 transistors might be used with NE-2 neon lamps, although this has not been tried in this experiment, and the magnet driver input circuit might require some change.

Model 14 TD

The wiring changes required in the TD are shown in Fig. 7. This rewiring separates the tape reader from the distributor. (The TD is returned to normal by the switch shown so that it may be used the way originally intended) As a counter control, the tape head is used to program the counter while the distributor continues to function as a parallel-to-serial converter.

Due to the inverted logic from the lamp drivers, the mark segment on the distributor is wired to give a 0, whereas the space segment is wired for a 1. The normal 60-ma. keying loop is also shorted out to maintain continuity in the external loop supply used here.

No problems have been encountered to date because of the low-level switching through the distributor, even though the segments and wiper do not give the best electrical contact in the world. The only other thing to check is that the upper spacing contacts on the READ head are adjusted properly. (These contacts are not used in a neutral keying setup and may need attention). The relay is controlled from the counter control gate circuit to initiate a printing cycle.

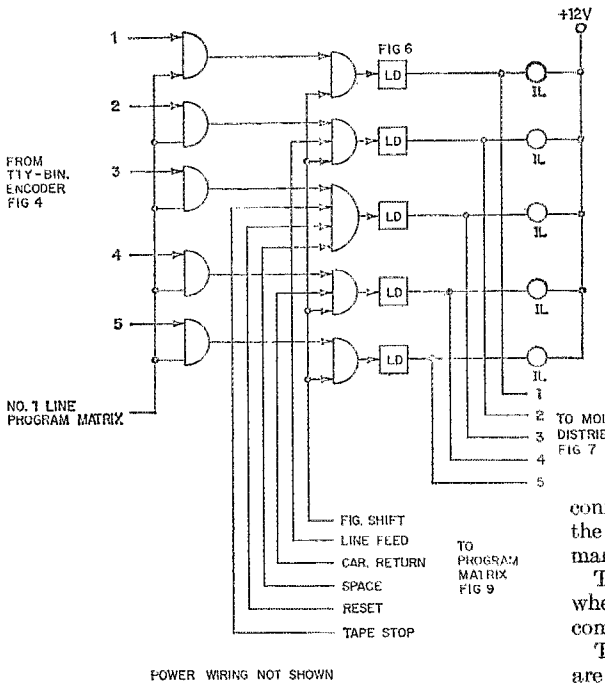


Fig. 5—Numbers-function matrix. *LD* and *IL* designate the lamp drivers and indicator lamps, respectively.

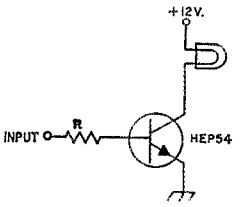


Fig. 6—Lamp driver circuit. See text for transistor requirements.

R—Adjust for required base current; 10K to 12K typical. (No problems have been encountered with the HEP54 because of omission of base-bias divider.)

Magnet Driver

The magnet-driver circuit, Fig. 8, was lifted from a TTY terminal unit designed by R. Weitbrecht, W6NRM (*RTTY Magazine*, Sept. and Oct., 1965.) The circuit requires a + signal or a 1 to give a space output, and zero volts (or a 0) to go to mark. It is extremely reliable, and is highly recommended for use in any solid-state TU. A complete description can be found in the article mentioned above.

Program Matrix

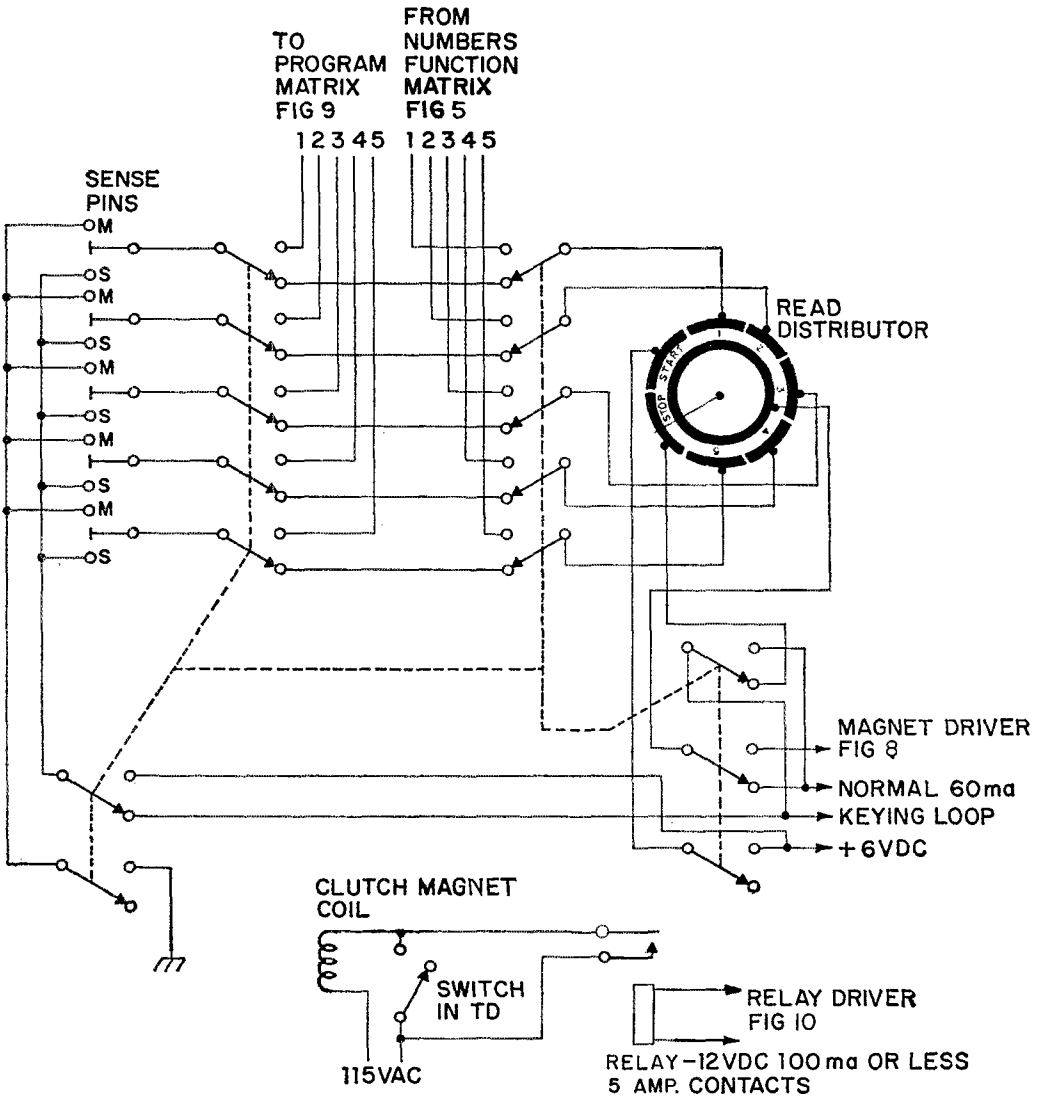
Ten dual-input AND gates are used in the program matrix, Fig. 9. Discrete components are used here because larger currents are required in order to obtain more positive operation with the Model 14 READ head. Nothing is critical in the parts used; any diode that will pass 5 ma. minimum can be used, and the series resistors can be adjusted to limit the current to what the diode will handle.

The operation is as follows: As long as the five input lines from the Model 14 READ head are at ground the outputs of all the diodes and circuits are at 0. Now assume that the code for the TTY character *Z* is punched in the tape in the READ head. This applies +5.5 volts d.c. to lines 1 and 5, allowing the anodes of the diodes tied to this line to rise to this voltage, which represents a 1, and in this case brings the read 10° line up to 1 which in turn ties the 10° decade to the BCD-TTY encoder through the sequencer.

Since line 1 is "up" for all decade READ commands, it is used to inform the numbers-function matrix that a number is being read, and serves to connect the entire counter to the printer, keeping the number from interfering with "stunt" commands to the printer.

The TTY character on the left side of Fig. 9, when punched in the tape, will cause the adjacent command function to be generated.

The capacitors on each line from the Model 14 are there to remove any spikes caused by contact bounce. Any smaller value than shown will not do a complete job here. A 1- to 2-microfarad capacitor may be needed on the RESET and



SWITCH IS 15 POLE D.T. SHOWN IN NORMAL TAPE OPERATING POSITION.
MOTOR WIRING NOT CHANGED. LEAVE ANY FILTERS IN NORMAL 60ma KEYING LOOP

Fig. 7—Wiring changes in the Model 14 TD.

TAPE STOP lines to take care of any voltage spikes that might cause unwanted triggering of the gate-control circuits. Also, all voltage lines should be by-passed with 0.01 disk capacitors.

Count-Gate Control

This unit, Fig. 10, controls inputs to the J terminals on the first flip-flop of the 10^0 decade (FF_1 is controlled by the timing decades and in turn FF_1 is turned on by FF_2; both are reset to 0 by the TAPE STOP pulse from the programmer). Briefly, the operation is as follows: When reset, FF_1 and FF_2 are off (Q = 0). When a 1-to-0 shift from the timing decades turns FF_1 on, the J inputs on the counting decade (from Q of FF_1 and Q of FF_2) go to 1 and counting begins. At the end of one second, FF_1 turns off and FF_2 is turned on, and the J inputs are 0 (Q of FF_1 = 0,

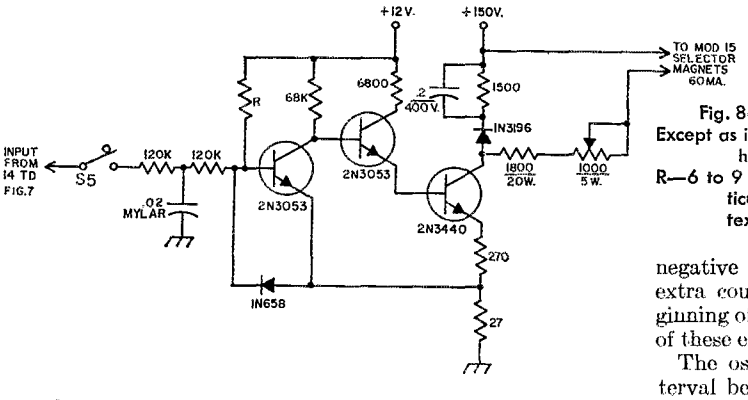


Fig. 8—Driver for selector magnets. Except as indicated, resistors are ½ watt. Use heat sink on the 2N3440.
R—6 to 9 megohms (not needed in this particular unit; see article referred to in text).

Q of $FF_2 = 0$): counting stops and the count decades hold the number. When FF_2 turns on (Q of $FF_2 = 1$), the relay on the tape clutch magnet energizes and starts the program tape.

More than one second is required to print out the numbers, and during this time FF_1 will not trigger because J is at 0, due to the connection to $\overline{Q}$ on FF_2. The two NAND gates give a reset indication when FF_1 and FF_2 are both off (Q = 0 on both). With this sequence a one-second count is printed out every three seconds, giving 20 readings a minute.

Timing Control Gate

The gate, Fig. 11, controls the timing decades in either one of two ways: If S_1 is in the manual position the counter will operate when S_2 is placed in START, and will run until stopped by S_2. Sync operation is used to sample at known time intervals. S_1 is placed in the sync position, with S_2 in "stop", and the sync signals are applied to the C input through a Schmitt trigger. Just prior to a desired pulse from the receiver or tape recorder, S_2 is switched to "start". When the pulse arrives, the counter will start

The sync operation is basically used for Doppler data reduction, where the Doppler shift is recorded on one channel of a tape recorder and CHU is recorded simultaneously on a second channel. This second channel will provide at least one clean pulse useful for triggering this gate every minute of known time. Since the data are on tape as much time can be taken as needed to obtain the necessary information.

Accuracy of Measurements

Any 100-kHz. crystal oscillator of secondary frequency standard quality should hold within ± 10 Hz. for short periods. This is an accuracy of 1 part in 10^4. Also, the counter has a built-in error of ± 1 count, because the last pulse from the unknown frequency source may not have a chance to go negative before the gate closes (or an extra count may sneak in at the beginning of the sample period). The sum of these errors, at worst, is ± 2 counts.

The oscillator also controls the interval between sampling periods, and any error here is cumulative. On a ten-minute run with a + 10-Hz. error, this amounts to an uncertainty of + 60 milliseconds at the end (which can be neglected when using the unit for Doppler data reduction). Probably, drift in the receiving setup will be the greatest source of error, but good practice demands this be minimized in any case If this cumulative error bothers anyone remember that if the data is on tape you can break the sampling period into one-minute intervals and reduce the error to six milliseconds.

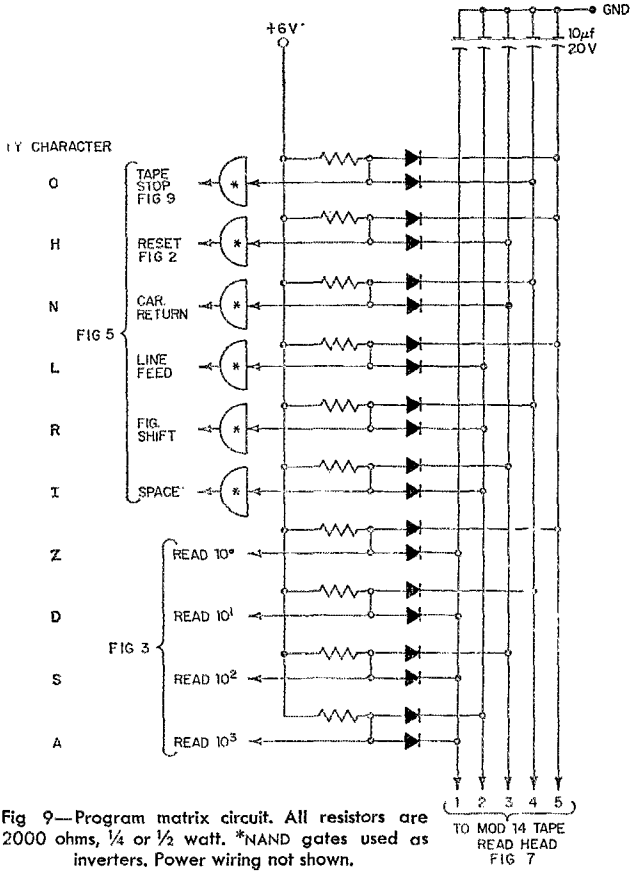
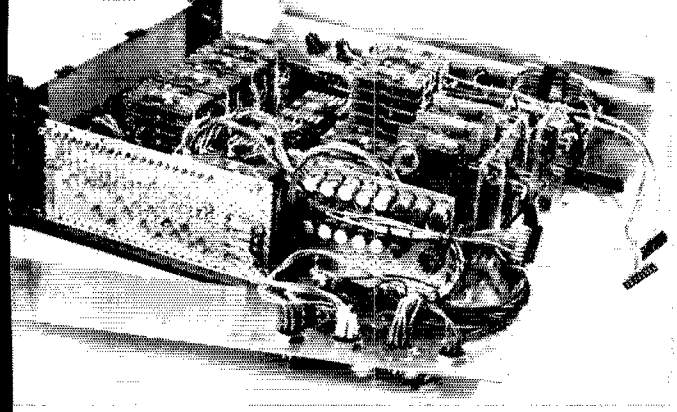


Fig 9—Program matrix circuit. All resistors are 2000 ohms, ¼ or ½ watt. *NAND gates used as inverters. Power wiring not shown.



A view from the rear with the top and all but the left side panels removed. The diode matrix board is at the left.

General Comments

No attempt has been made to make this a construction article. The component values given will depend on the transistors available and upon the requirements of the indicator lamps and relay used. Most of the transistors used in this unit were either Motorola HEP types or the 5-for-$1 variety.

The Schmitt trigger and the 100-kHz. oscillator circuits can be found in any good transistor manual. The integrated circuits were purchased from Solid State Sales, P. O. Box 74, Somerville, Mass. 02143: The FF's are type J-K and the gates are type G-1. Any additional circuits needed to drive the Schmitt triggers from the signal source are not described, as these vary with the trigger circuit design and the signal levels available. Power requirements are +5.5 volts at 1 amp. and +12 volts at 1 amp. for the circuits used. The 5.5-volt supply should be well regulated.

The total cost of the counter should not exceed $100, less the teletype equipment, of course. There are more than 700 transistors and 100 diodes in the counter, most all contained in the 39 FF's and 29 dual gates.

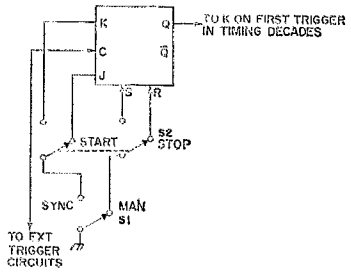


Fig. 11—Timing-control gate.

Additional switches are used to control the counter. A double-pole normally-closed switch (S_3, not shown in the figures) is inserted in the counter-decade reset and gate-control tape stop lines. Opening this switch resets these units and will stop the counter (to set to zero initially). A s.p.s.t. normally-open switch, S_4, is wired to the common set line on the timing decades; using this switch to ground this common line will set these decades to 1 so the first 1-to-0 transition of the 100-kHz. crystal oscillator will start the count. It is opened before starting to sample. A s.p.s.t. switch, S_5, in series with the line to the wiper arm on the Model 14TD and the magnet driver, will stop the printer if desired. Additional controls and variations are left to the individual builder. Additional information on counter operation may be found in other articles[2, 3, 4, 5, 6]. QST

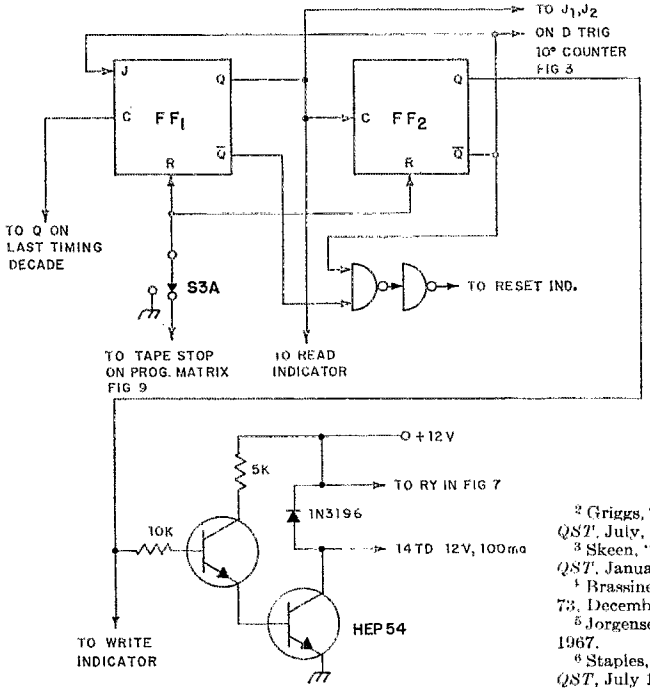


Fig. 10—Count gate control circuit.

[2] Griggs, "A Transistor Secondary Frequency Standard," *QST*, July, 1962.
[3] Skeen, "Low-Cost Precision Frequency Measurement," *QST*, January, 1962.
[4] Brassine, "An Electronic Counter for Amateur Use," 73, December, 1962.
[5] Jorgensen, "An IC Crystal Calibrator," 73, January 1967.
[6] Staples, "Integrated Circuit Frequency Dividers," *QST*, July 1968.

CONVERTING WIDE-BAND F.M. EQUIPMENT FOR 420-Mc. SERVICE

BY GEORGE J. POLAND,* W8FWF

In the last few years 460-Mc. f.m. gear has become available to the amateur, because of changes in FCC regulations covering this type of equipment. With this surplus gear available we decided to set up a few f.m. stations on 432.9 Mc. After checking the equipment and studying schematic diagrams, we selected Link 450-Mc. units, but similar conversions can be done on Motorola high-band gear.

It is advisable to get the gear working on its original commercial frequency first before attempting any conversion; then you only have a few small changes to make and you're all set on the amateur frequency. After conversion and alignment of the receiver and transmitter are completed, you may want to make a power-supply conversion to 110-volt operation. All models of each manufacturer are not covered, but this information should be helpful with most available gear. Most manufacturers will supply complete manuals for any gear you may acquire, for a small charge, usually about $2.50 per manual. It is important when ordering manuals to give as much information as possible: model numbers, chassis numbers (usually stamped in ink on top or bottom of chassis), and numbers for the receiver, transmitter, and power supply. It is always better to include more information than not enough.

Link Model 2975-15 VR D2B Modifications

Most receivers require no modifications other than installation of amateur-frequency first-oscillator crystals and a realignment. Crystal warmers or ovens can be utilized but if base-station operation is anticipated ovens are not necessary for good frequency stability. All receiver circuits in the Link gear will usually tune down to 432.9 Mc.

In the transmitter, all circuits peak in the amateur band, up to the tripler-driver plate (5894 driver tube). In this circuit, C_{37} will need 5 to 10 pf. more capacitance. A simple way to accomplish this is to bend four copper plates into L shape and solder one to each stator of the driver and amplifier butterfly-type plate capacitors. Space the plates close together but not touching, then try tuning the stage to resonance. Remove tubes to make access to the stators of the capacitors easier. If you prefer, replace the capacitors entirely with 25-pf. butterfly capacitors (E. F. Johnson Co.).

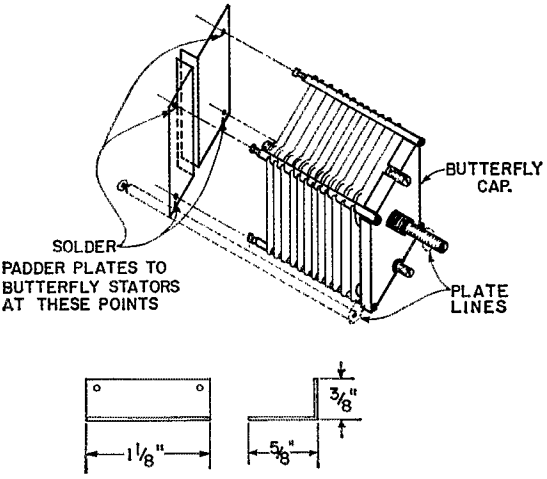


Fig. 1—Method of increasing capacitance of butterfly tuning capacitors in the Link transmitters, to get driver and amplifier plate circuits to tune down to 432 Mc.

*32219 Rosslyn St., Garden City, Michigan 48135.

Link Test Socket Pin Identification

Receiver (Socket B)	*Pin No.*	*Transmitter (Socket A)*
Discriminator	1	First Doubler Grid
First Limiter	2	First Tripler Grid
Second Limiter	3	Second Doubler Grid
Low Frequency Oscillator	4	Tripler Driver Grid
Receiver Oscillator Tripler Grid	5	P.A. Grid
—	6	P.A. Cathode
—	7	—
Receiver Second Doubler Grid	8	R.F. Output
—	9	—
—	10	—
Ground	11	Ground

Crystal frequencies are determined as follows:

Crystal Formulas

$$F_o = \frac{F_{sig} - 39.01\ Mc.}{48}$$

$$F_t = \frac{F}{36}$$

where F_o = First oscillator frequency
F_t = Transmitting oscillator frequency
F_{sig} = Receiving frequency
F = Transmitting Frequency
All frequencies in Mc.

Numbered terminals on the distribution terminal strip, E-1, as indicated on the lug side of the board, are as follows: 1 — Channel No. 1, 2 — Ground, 3 — Speech B-plus, 4 — Ground, 5 — Microphone, 6 — No connection, 7 — Amplifier high voltage, 8 — Driver B-plus, 9 — Channel No. 2, 10 — Keying, 11 — Receiver B-plus, 12 — Filaments, 13 — Receiver audio, 15 — Squelch, 14 — Not used.

Receiver Alignment Procedure

Assuming that your unit was checked out on its original commercial frequency, follow this procedure after you have made all modifications and changed crystals. Apply filament and plate voltage to the receiver. Locate receiver test socket B (of two 11-pin sockets located together, it is one to the rear of the chassis. Some Link models have 9-pin test sockets.) Connect a 100-μ meter between Pin 11 (count pins backwards when viewing socket from top of chassis) and Pin 1 hole, which is the discriminator. The meter should read zero or close to it. Inject a 5-Mc. signal at the grid of the first low i.f. amplifier (V_{105}, a 6BJ6). This is the first tube from the rear of the chassis on the right side, when viewing the chassis from the front or power-supply end. This signal should cause the meter to go to zero, indicating that your discriminator is aligned properly. Now inject a 39.01-Mc. signal at the grid of V_{102}, a 6BH6, first high i.f., located at the back edge of the chassis near L_{113}. Frequency of the injected signal should be adjusted for zero reading on the discriminator, indicating that the second oscillator is working properly. Most receivers have no frequency adjustment on the second oscillator.

On some models, Pin 8 of the receiver test socket is the second doubler grid of the receiver oscillator-multiplier string. Put the meter there or across the metering resistor coming from the second doubler grid, V_{116}. If the crystal is oscillating, a meter reading will be observed. Move the

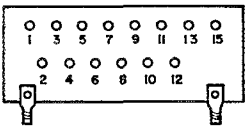


Fig. 2—Arrangement of terminals on strip E_1 in Link transmitters. Numbers may not appear on the strip itself. They are shown for the lug side.

negative lead of the meter to Pin 5 of the socket; this is the grid of V_{118}, a 6AK5 tripler. Adjust slugs top and bottom of T_{115} (located near center of chassis in front of V_{117}, a 12AU7) for peak on the meter. Only a slight peak may be noted at this time. Now adjust T_{116} and L_{111} for maximum reading. By now a fair meter reading should be evident, though the amount is not important at this time. Now you should have a multiplier signal up to the 6AK5 grid, V_{118}.

Inject an on-frequency signal into the antenna jack, at a level high enough to brute-force a signal through several untuned stages. Adjust C_{185} (first-oscillator warping capacitor) to set the signal to a zero reading on the discriminator position of the meter. Then move the negative meter lead to Pin 2 (first limiter) of the metering socket B: begin receiver front-end adjustments, starting with the first round coaxial circuit, L_{101}, toward the front of the chassis. Release locking devices. The Allen set screw is loosened first, and next the large slotted disk in the center of L_{101} is backed off two or three turns. Insert a small metal screwdriver into hole in the center of L_{101} and make a peaking adjustment while watching the meter reading. Tighten both the large slotted screw and Allen set screws. Repeat this peaking operation for all circuits, L_{104}, L_{105}, and L_{113}. When the meter reading reaches satura-

tion, back off the input signal a bit and repeak, or a true peaking operation may not result. After all circuits have been peaked and the receiver sensitivity is approaching one microvolt for 20-db. quieting,[1] go over the front end and high i.f. adjustments and repeak them for best quieting effect with a very weak signal. Best sensitivity is not always obtained at the same point as the maximum meter reading, but it usually is very close. You may be able to adjust for best quieting by ear.

Transmitter Alignment

If your transmitter is wired for multiple-frequency operation, be sure you have the crystal in the proper socket and the channel selector in the proper position. Terminal 1 of distribution strip E-1 is Channel 1, and Terminal 9 of E-1 is Channel 2. Ground one of these points, thereby activating that particular oscillator. Connect a 50-μa. meter between Pin 1 of test socket A and ground, and peak L_3. Move the meter lead to Pin 2, and peak T_1 top and bottom. Move the meter lead to Pin 3 and peak L_4. Move the lead to Pin 4 and tune C_{29} and C_{31}. Move the lead to Pin 5 and tune C_{37} and C_{36}. Connect a 250-μa. meter between Pin 6 and ground. Preset C_{45} at maximum, and tune C_{44} for minimum reading. Connect a power-output meter to the antenna terminal, and load the amplifier tank by decreasing capacitance of C_{45} in small degrees until the rated output is obtained. The coupling of L_{20} to the amplifier tank is adjusted by moving the loop nearer or farther from the resonant parallel lines. Tuning of C_{44} and C_{45}, and L_{20} must be worked in conjunction, to obtain the rated output of 15 watts. This is obtained with approximately 190 ma. cathode current.

An alternate method of tuning the final stage is to insert a 50-μa. meter between Pin 8 and ground to observe output of the transmitter. Tune the amplifier tank for maximum reading in this position. Set the deviation control to the desired deviation.

Motorola T44A6A Conversion

Standard cables and accessories were utilized. Transmitter and receiver crystals have to be changed. I recommend very strongly that only commercial-grade crystals be used for the receiver and transmitter. If your unit has a set of crystals for some commercial frequency, do not discard these as they may be sent to the crystal manufacturer along with your crystal order, to aid the manufacturer in correlating your new crystals. Using the same terms as before, the receiver crystal formula is

$$F_o = \frac{F_{sig} - Mid.\ i.f.}{42}$$

$$= \frac{432.9\ Mc. - 8.845\ Mc.}{42}$$

Several second-oscillator crystal frequencies were used in the T44 equipment. If you have a second-oscillator crystal in your receiver and want to know your Mid. i.f., subtract 455 kc. from the second-oscillator crystal frequency. It is possible to use any Mid. i.f. from 8045 to 8945 kc. (second-oscillator crystal range from 8500 to 9400 kc.). We recommend using the existing Mid. i.f. in your unit, because it will save time in alignment of your receiver. If you have no second-oscillator crystal and do not know what your Mid. i.f. is, simply select a new Mid. i.f. in the previously-mentioned range, possibly 8845 kc. You may have to realign the Mid. i.f. to conform to the new second-oscillator frequency, unless you were lucky and chose the original Mid. i.f. The formulas show 432.9 Mc. as the operating frequency. For others, insert your desired frequency in its place and work out the crystal frequencies.

Insert the first-oscillator crystal in the socket provided, apply power to the receiver and connect a 50-μa. meter between Pin 3 of the receiver test socket and ground. Locate L_7 from the receiver layout and adjust its slug for maximum reading, which indicates crystal activity. Move the meter lead to Pin 6 and peak T_5, top and bottom slug. Insert meter in Pin 7 and peak T_4 and T_3 (top, middle and bottom slugs in triple-tuned cans). Insert meter in Pin 8 and peak L_5 and L_6. (Only one slug in each of these cans.) This completes the oscillator-multiplier tuneup, with the exception of Z_{302}, which is a rectangular circuit near the front end v.f. assembly. Z_{302} will be adjusted later.

Hold the a.f.c. switch in the OFF position. Inject a 69.4-Mc. signal near the bottom of L_1, and adjust the frequency of the signal to produce a zero reading on the discriminator metering position, Pin 4 of the metering socket. Then move the meter to Pin 2, adjust L_2, L_3, and L_4 for maximum. Also adjust L_1 for maximum. Carefully reduce the level of injected signal to keep below saturation. Adjust T_4 (top slug) for maximum reading and again adjust L_4 for maximum. Release a.f.c. switch. Disconnect high i.f. signal from receiver.

To align the receiver front end, hold the a.f.c. switch in OFF position. Apply an on-frequency signal to the receiver antenna terminal and make sure the discriminator reading is on zero with this signal applied to the receiver. As mentioned previously, you may have to insert a very high level of signal at first to get any reading on Pin 2 of the metering socket, because of the several mistuned stages. Adjust the applied signal level to obtain a reading of about 10 μa. Adjust $Z_{301A, B, C, D}$ for maximum reading. Reduce

[1] Receiver sensitivity on f m. is usually quoted in terms of 20-db. quieting, the amount of signal measured in microvolts required to quiet the receiver hiss noise by 20 db. To make this measurement, simply open the squelch control and raise the receiver volume control until the noise level at the speaker terminals is plus 10 db., and then inject enough signal to get a quieted-noise reading of -10 db. It is important for all impedances to be matched when making this check. A 3-ohm to 500-ohm transformer should be connected between the 3-ohm receiver output and the a.c. meter, to correct impedance mismatch between these two points, for accurate quieting measurement.

Motorola Test Socket Pin Identification

Receiver	*Pin No.*	*Transmitter*
Third i.f. — Grid	1	Antenna r.f. Output
First Limiter	2	Oscillator V_1 Grid
First Oscillator Grid	3	Second Doubler Grid
Discriminator Output	4	Third Doubler Grid
Discriminator Input	5	Tripler Driver Grid
Multiplier — 1 Grid	6	P.A. Grid
Multiplier — 2 Grid	7	P.A. Plate
Multiplier — 3 Grid	8	P.A. Plate
Audio	9	Push-to-talk Relay Circuit
Audio	10	Microphone Audio
Ground	11	Ground

the signal level as needed, to keep from reaching saturation. Adjust Z_{302} (first-mixer injection) for maximum reading. Now go back over all r.f. and i.f. adjustments and make sure each is still peaked properly, while injecting a weak signal (about one microvolt) into the receiver. A receiver sensitivity of less than one microvolt for 20-db. quieting is possible with this receiver. A good transistor or Nuvistor preamp will bring this sensitivity down to 0.3 microvolt or better.

Transmitter Alignment and Modification

To select transmitter crystal frequencies, divide the desired transmitting frequency by 24. Any amateur frequency you select will be lower than the original commercial frequency, so all tuned circuits will be tuned lower, and all slugs will be turned farther in. Insert a 50-μa. meter between Pin 2 of the transmitter metering socket, J_4, and ground. Put the transmitter-tune switch in the TUNE position (reduced voltage on tripler, river, and final) until tuneup is complete.

A minimum reading of 20 μa. should be observed with the transmitter on. This is an indication of oscillator crystal activity and there is no adjustment for this reading. Move the meter to Pin 3, adjust L_5 (first doubler plate) for maximum meter reading. Move the meter to Pin 4, and adjust L_6 and L_7 for maximum reading. Move the meter to Pin 5 and peak C_{26}, L_8, and L_9. C_{26} and L_8 are in the plate circuit of the 6146, and L_9 is the coupling to the 2C39A tripler-driver. Move the meter lead to Pin 6 (final grid), adjust Z_1, Z_2, and L_{11} for maximum. L_{11} is coupling loop to the final, Z_1 peaks the driver circuit, and Z_2 alters its length. Adjust Z_2 to a setting that allows Z_1 to be set at about 45 degrees, or about midrange. Some juggling will be necessary between Z_1 and Z_2.

Put the transmit-tune switch in *transmit* position. Move the meter between Pins 7 and 8, to read the plate current of the final amplifier; about 16 μa. is equal to 80 ma. Full output usually is obtained with a p.a. reading of 12 to 15 on the meter. Peak Z_3, Z_4 and L_{13}, reading relative power output on Pin 1 of the test socket. Output can be peaked up by going back through adjustments of the driver and final. Adjust Z_4 to a position that allows Z_3 to be at 45 degrees, or in its midrange. Access to Z_2 and Z_4 is through small holes covered by snap caps on top of the final and driver circuits. L_{11} and L_{13} likewise are accessible from the tops of the circuits. Set the deviation control for the desired swing. A good deviation setting on amateur frequencies is that where the first-limiter current on a nearby receiver does not dip when you modulate the transmitter.

Remove the bottom cover of the transmitter. Locate Z_5 circuit under the final and tripler assemblies. Disconnect leads to Z_5 on input and output and connect a length of RG-58A/U coax in place of the Z_5 circuit. This is done to eliminate the possibility of Z_5 causing any restricted output. Repeak the final and set the transmitter on frequency by adjusting L_1, near the transmitter crystal. Depending on your tubes, power output from 8 to 15 watts may be obtained from this transmitter. Replacing the selenium rectifiers in the power supply with silicon diodes will raise plate voltage and power output. Only a few watts output is necessary on this band to do a very creditable job. For mobile antenna considerations refer to *QST*, October 1967, "A 'Mini-Wheel' Antenna for 432-Mc. Mobile." QST

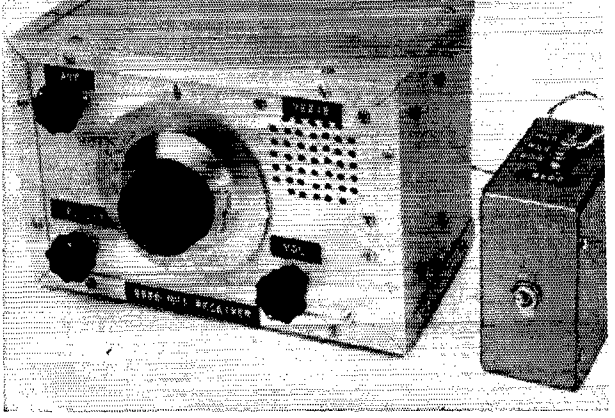
Strays

"Who the devil . . ." VE7 style

VE7FB reports that the Stateside call-changing fever has spread to British Columbia, with the following swaps having been made recently:

Now	*Was*
VE7CAR	VE7BXF
VE7DV	VE7AHK
VE7JH	VE7AEK
VE7LD	VE7BKE
VE7RJ	VE7DV
VE7UC	VE7AFJ
VE7VB	VE7AFW
VE7WR	VE7BXJ
VE7XF	VE7AXM

The SSSB Mark 1



Front view of the two-band receiver and 9-volt power supply. The receiver cabinet is homemade from angle and sheet aluminum. A commercial steel utility box is used to house the power supply.

A Simple Transistor Receiver for 20- and 75-Meter Sideband

BY C. A. LAMONTAGNE,* VE2IB

THE unit shown in the photographs and diagrams is the outcome of my attempt to build a transistor 20-meter s.s.b. receiver that would meet the following requirements:

1) Low cost.
2) Simple to construct.
3) Easy to adjust without elaborate test equipment.
4) Materials locally available and easy to get.

All of these objectives have been achieved, and 75-meter coverage has been included as a bonus. The circuit, a simple single-conversion superheterodyne, consists of an emitter-follower mixer, a half-lattice crystal filter, a single i.f. stage at 9 Mc., a product detector, a low-level audio stage, a commercial audio-amplifier module and a loudspeaker. Also included are a two-transistor tunable oscillator and a crystal-controlled b.f.o.

Because the receiver doesn't have an r.f. stage, switching complications have been avoided, and cross modulation is no problem. No r.f. shielding is necessary in the receiver, since toroids, which have practically no external fields, are used for all the r.f. coils.

The receiver can be powered from either flashlight cells or a separate 9-volt supply that operates off the a.c. line.

Circuit Details

Fig. 1 is a schematic diagram of the receiver. Single-tuned antenna circuits are used because they are adequate at my location. A 9-Mc. i.f. trap is included in the antenna lead, but it may not be sufficient to eliminate 9-Mc. feedthrough in some locations. If such is the case, double-tuned antenna circuits should be employed. Separate padding capacitors, C_1 and C_2, are used to avoid mistuning the antenna trimmer, C_3, to 9 Mc; however, the padders 140-pf. are not strictly necessary, and a single variable should work well at C_3 if ultimate simplicity is required.

Q_1, the emitter-follower mixer, developed from my attempt to use an emitter follower to isolate the antenna from a diode mixer. The diode was inadvertently shorted out, and mixing continued to take place. Investigation resulted in the circuit shown. Q_1 has plenty of gain, is quiet and not prone to cross modulation. Note, however, that this stage may oscillate if too low a value of emitter resistor is used or if Q_1's base lead is not tapped down far enough on the input coil in use.

The v.f.o. is a two-transistor affair that operates from 5.0 to 5.4 Mc. An emitter follower, Q_2, feeds a grounded-base amplifier, Q_3, through a shared emitter resistor. Because the input impedance of the emitter follower and the output impedance of the grounded-base amplifier are both moderately high, no capacitive divider or coil taps are necessary for impedance matching. Since each stage has its input in phase with its output, feedback to sustain oscillations is easy to obtain. One 4.7-pf. ceramic capacitor couples the input of Q_2 to the 5.0- to 5.4-Mc. tuned circuit, and another 4.7-pf. capacitor couples the output of Q_3 to the same circuit.

The complexity and cost of a receiver can be kept at a minimum by designing the set for only one or two bands. VE2IB takes this approach in his Simple S.S.B. receiver, the SSSB Mark I. In addition, by having most of the receiver's gain in the audio channel, he has developed an easy-to-align set that is relatively free from overload.

* 3412 Cozet Street, Ste-Foy, Quebec 10, Quebec, Canada.

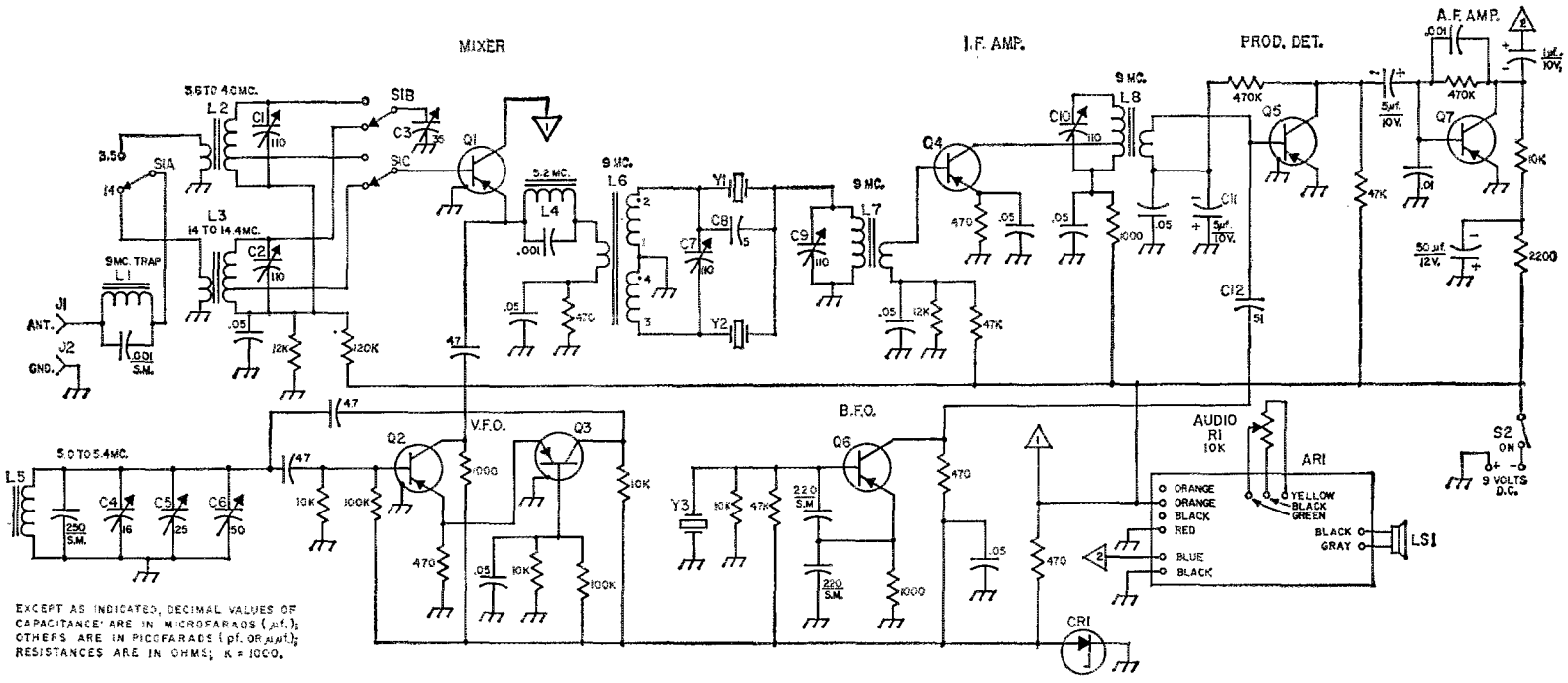
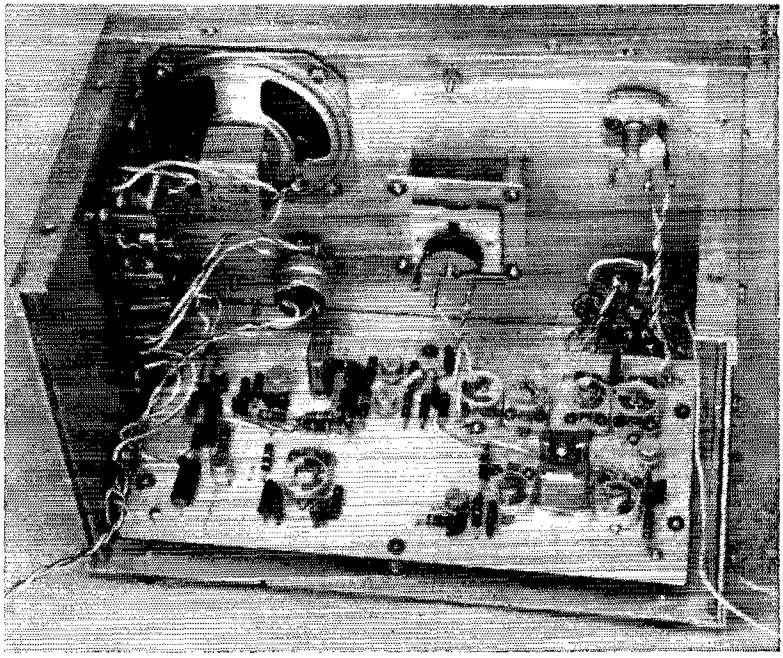


Fig. 1—Circuit of the two-band s.s.b. receiver. Fixed capacitors marked SM are silver mica; those marked with polarity are electrolytic; 0.05- and 0.01-µf. units are Mylar; all others are ceramic. Coils are wound with No. 28 enameled wire on toroid forms made from powdered iron slugs removed from National XR-50 coil forms; details are given in the text. Fixed resistors are ½-watt composition.

AR_1—Audio amplifier module (Lafayette Radio 99 H 9037).
C_1, C_2, C_7, C_9, C_{10}—11-110-pf. ceramic trimmer (Erie 503-000 P3P0 62R or equivalent).
C_3—35-pf. variable (Hammarlund MAPC-35-B).
C_4—N300 ceramic trimmer, 3-16 pf. (Erie 503-000 B2P0 19R or equivalent).
C_5—NP0 ceramic trimmer, 4.5-25 pf. (Erie 503-000 C0P0 25R or equivalent).
C_6—50-pf. variable (Hammarlund HF-50).
C_8—5-pf. disk ceramic.
C_{11}—5-µf., 10-volt electrolytic.
C_{12}—See text.
CR_1—7-volt Zener, ¼ watt or greater (Sarkes Tarzian VR7A or equivalent).
J_1, J_2—Alligator clip.
L_1—6 turns.
L_2—Secondary, 50 turns, tapped 10 turns from cold end; primary, 4 turns around cold end of secondary.
L_3—Secondary, 13 turns, tapped 2 turns above cold end; primary, 2 turns around cold end of secondary.
L_4—12 turns.
L_5—30 turns.
L_6—Secondary, two 15-turn coils, bifilar wound, end 2 parallel with end 4, and end 1 parallel with end 3; primary, 2 turns midway between beginning and end of bifilar winding (at the center tap).
L_7—Primary, 30 turns; secondary, 2 turns around cold end of primary.
L_8—Primary, 30 turns, tapped 10 turns from cold end; secondary, 3 turns around cold end of primary.
LS_1—10 ohms, 0.5 watt, 2½-inch cone.
Q_1, Q_4, Q_6—2N1225 used, RCA SK3006 suitable.
Q_2, Q_3, Q_5—2N1396 used, RCA SK3006 suitable.
Q_7—2N2613 used, RCA SK3004 suitable.
R_1—10,000-ohm volume control, audio taper, with s.p.s.t. switch.
S_1—Phenolic rotary, 1 section, 4 poles, 2 positions.
S_2—Part of R_1.
Y_1, Y_3—27.005-Mc. third-overtone crystal (CB Channel 4).
Y_2—27.015-Mc. third-overtone crystal (CB Channel 5).



Top view of the SSSB Mark I. The audio module is at the left; to its right on the circuit board, from left to right, are the audio amplifier, b.f.o., v.f.o. and mixer. In the foreground, from left to right, are the product detector and the i.f. amplifier.

The oscillator signal is fed to the mixer by capacitively coupling the collector of Q_2 to the emitter of Q_1. Normally Q_2's collector would be grounded for r.f.; however, by leaving the collector hot and using it as a coupling point, you have a receiver in which antenna trimmer adjustments do not pull the oscillator frequency.

A low-impedance link in the emitter lead of Q_1 is used to couple the 9-Mc. output of the mixer to the half-lattice crystal filter. The filter is conventional with one exception; it uses two 27-Mc. third-overtone CB crystals, Y_1 and Y_2, on their fundamental frequencies near 9 Mc. Y_1 was for CB Channel 4 (27.005 Mc.) and Y_2 was for CB Channel 5 (27.015 Mc.)

The 9-Mc. i.f. stage, Q_4, is conventional in every way. If the input link is kept small, neutralization is not necessary.

Because there is little amplification ahead of it, the product detector, Q_5, is a critical stage in this receiver. The circuit is essentially that of a mixer which has had particular attention paid to audio bypassing. Without C_{11}, a 5-μf. electrolytic at the cold end of the base circuit, Q_5 is insensitive and produces a great deal of audio hiss.

Q_6, the crystal-controlled b.f.o., is based on a circuit described by Stoner.[1] Y_3, a 27.005-Mc. third-overtone CB crystal is used on its 9-Mc. fundamental in a series-resonant mode. If a few CB crystals can be tried, the one that results in the best sounding audio should be retained. Because no provision has been made for adjusting the crystal frequency or switching crystals, only u.s.b. signals can be received on 20 meters and only l.s.b. signals on 75. If you want to vary the crystal frequency, a trimmer can be inserted in series with Y_3.

The b.f.o. signal can be coupled to the product detector in one of two ways: either a gimmick capacitor can be used between the collector of Q_6 and the hot end of L_8's primary, or a 51-pf. capacitor, C_{12}, can be connected between Q_6's collector and the base of Q_5. If the first method is used, two insulated hookup wires that are twisted together for about ¼ inch will make a suitable capacitor.

A 7-volt Zener, CR_1, is used to regulate the collector supply voltage of both the b.f.o. and the tunable oscillator.

To make up for the gain usually found in an r.f. stage and additional i.f. stages, an audio amplifier, Q_7, is used between the product detector and the audio-amplifier module, AR_1. RC coupling and filtering are used for simplicity and to reduce the chances of hum pickup.

Power Supply Details

The power supply circuit is shown in Fig. 2. It consists of a voltage doubler followed by a transistor series regulator. A Zener diode, CR_4, provides a more-or-less constant voltage reference for the regulator transistor, Q_8.

Since so much of the receiver's gain is at audio frequencies where hum pickup can be a problem, the power supply is housed in a separate 4 × 4 × 2-inch steel utility cabinet. It seemed easier to shield the a.c. power supply by putting it in a separate steel box than to shield the receiver. Although aluminum provides no a.c. shielding, it is used in the receiver itself because it is easier to work with.

For portable operation, six 1.5-volt flashlight cells in series can be used to power the set. The

[1] Stoner, *Transistor Transmitters for the Amateur*, 1st Edition, page 47.

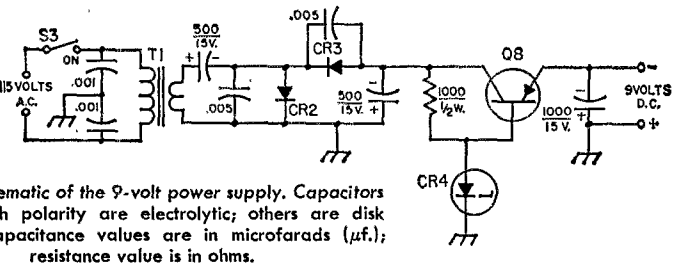


Fig. 2—Schematic of the 9-volt power supply. Capacitors marked with polarity are electrolytic; others are disk ceramic. Capacitance values are in microfarads (μf.); resistance value is in ohms.

CR_2, CR_3—400-p.i.v., 1000-ma. silicon diode (International Rectifier 5A4 or equivalent).

CR_4—9.1-volt, 1-watt Zener (General Electric Z4XL9.1B or equivalent).

Q_8—2N1038

S_3—S.p.s.t. toggle.

T_1—6.3 v. at 0.6 ampere.

usual 9-volt transistor battery isn't recommended, as it doesn't have enough power to supply the rather large current demands of the audio module's Class B stage at high signal levels.

Construction

The SSSB Mark I required no fancy construction work of any kind. A 4 × 8-inch piece of kitchen-counter laminate, obtained from the local hardware store, is used as a circuit board for Q_1 through Q_7. Except for the toroids, which are glued with Glyptal cement to the underside of the laminate, components are mounted on top of the board, and their leads are fed through small holes drilled at convenient places. The leads are clipped underneath the board to a length of about ¼ inch. Connections are made by running hookup wire to the component leads and looping the wire around them. With this type of construction, it's easy to make changes and substitutions. Crossovers are kept at a minimum with a little forethought.

Except for the i.f. input and output coils, which should be at least two inches apart, the placement of the components is noncritical. For the most part, the various stages are arranged in sequence, input to output, around the outside of the board. It was found convenient to locate most of the toroids on the underside of the board in the open spaces below the ceramic trimmers.

No chassis is used in the SSSB Mark I. Instead, the circuit board is supported above the cabinet bottom plate by six ½-inch spacers. The 5⅛ × 6 × 9-inch cabinet is made from pieces of sheet and angle aluminum that are bolted together with self-tapping screws; however, a commercial utility cabinet will probably work just as well. C_6, the main tuning capacitor, is mounted on a 2-inch square aluminum plate that is spaced from the front panel with four ¾-inch long tapped metal pillars. The pillars are secured by the same screws that bolt a National type N Velvet-Vernier dial mechanism to the front of the cabinet.

All the toroids in the receiver are made from ½-inch diameter powdered iron slugs removed from old National XR-50 coil forms. With a hacksaw, the slugs were scored around the circumference about ¼ inch from the end that has a slot for a screwdriver blade. A wafer was split off each slug by rolling the slug under a knife blade held in the hacksaw cut. Fortunately, most wafers break off evenly. Next a small piece of softwood was drilled with a bit whose diameter was the same as the slug's, and a wafer was inserted in the hole with the slotted end of the wafer facing up. A small vise was used to compress the wood and hold the wafer tight. With a ⅛-inch diameter high speed bit, a hand-held electric drill was used to cut a hole through the center of the wafer. The hole was enlarged to about 3/16 inch either with sandpaper rolled around a drill bit or with a very small grindstone of the kind mounted on a shank for use with an electric drill or a polishing machine. Side pressure must be kept to a minimum or the toroid will crack. Sandpaper was used to smooth the edges and to reduce the form to the desired 3/16-inch width. Unfortunately, the hacksaw blades, drill bits and round files, used to form homemade toroids are soon blunted.

Other powdered-iron slugs may be used if they are designed for high frequency operation. A rough indication of a slug's high frequency performance as a core material can be had by inserting the slug into a high-frequency grid-dip-meter coil. If the meter reading drops, the material is lossy at the indicated frequency and should not be used.[2]

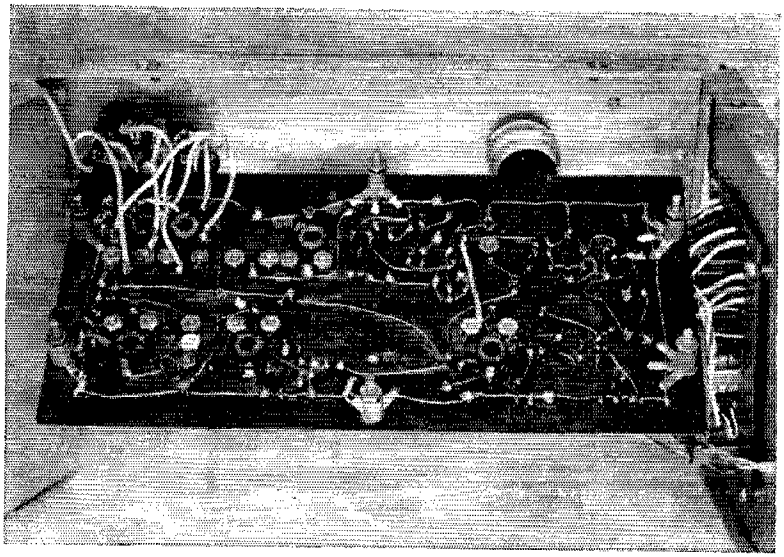
If one doesn't wish to operate on coil slugs, commercial toroid forms may be used. Indiana General CF-101 cores of Q2 material or CF-102 cores of Q3 material can be substituted for homemade forms.[3] With these types, the number of turns per coil will be approximately the same as given in the parts list.

Alignment

Three things are required to align the receiver: a grid-dip meter, a general-coverage receiver and a lot of patience. All toroids should be grid dipped after they are wired in place, but prior

[2] Actually the g.d.o. will be tuned to a frequency that is lower and possibly a great deal lower than that indicated by the instrument dial.

[3] Indiana General Corp., Electronics Div., Keasbey, N. J. 08832. Address all correspondence to Termag Corp., 88-06 Van Wyck Expressway, Jamaica, N. Y. 11418, authorized distributors for IGC. Ask for price bulletin No. 101, bulletin No. 101A, and data sheets for Q1, Q2 and Q3 Ferramic materials.



Bottom view of the circuit board. Clockwise around the board from the lower right corner of the photograph are L_8, L_7, L_6, L_4, L_3, L_2 and L_5. L_1, the only toroid not shown in this view, is mounted on the band switch.

to being glued to the circuit board. Turns should be removed or added until a dip at the required frequency is obtained. L_1 and L_4 should be checked with their respective fixed capacitors in place; L_2, L_3, L_6, L_7 and L_8 should be dipped with their respective trimmers set at half capacitance or greater; and L_4 should be adjusted as described below. Link coupling is used between the g.d.o. and the toroid being checked. Sufficient coupling can be provided by connecting a two-turn link around the toroid to a one-turn link around the g.d.o. coil.

The v.f.o. can be aligned by tuning the general-coverage receiver to 5.4 Mc., setting C_4 and C_6 at minimum capacitance, and tuning C_5 until resonance is achieved. Then C_6 can be varied and the frequency range of the v.f.o. checked. If the range is too small, C_5 should be decreased in capacitance and more turns added to L_5 to bring the circuit back to resonance. If the tuning range is too large, increase C_5 and remove turns from L_5. Temperature compensation is a matter of increasing the value of the N300 ceramic trimmer, C_4, while decreasing the value of C_5 to retain calibration until drift is minimized.[4] I didn't bother much with this, as the receiver drift is very slight without compensation.

For alignment purposes, the g.d.o. is used as a signal source first at 9 Mc. and later at 14 and 4 Mc. Provided the b.f.o. is working, it should be possible to hear a strong note at all these frequencies. Except for the filter and b.f.o. alignment, it's not important that the crystal frequencies be exact. In regard to choosing the crystals, it is best to obtain a few 27.005- and 27.015-Mc. units from a CB enthusiast or a friendly service shop. A number of 27.005-Mc. crystals should be tried and interchanged between the filter and the b.f.o. until good-sounding ungarbled sideband signals can be tuned in on the 20-meter band. Several crystals should be tried in the filter, and various values of capacitance (1 to 15 pf.) should be used at C_8 until a good passband for sideband signals is achieved. I know that these cut-and-try methods will make most engineers shudder, but these ways seem to work for me.

Before putting the receiver into regular station use, some means should be found for protecting the mixer transistor from strong r.f. fields. Some possible methods were discussed in *QST* recently.[5]

Performance

Considering its simplicity and low cost, the SSSB Mark I does a good job of receiving DX here in Quebec. Its sensitivity and image rejection aren't quite as good as a set that has an r.f. stage, but the receiver pulls in all but the weakest s.s.b. signals.[6] What more could be asked for the time and money involved? QST

[4] For C_4 to be effective, the other capacitors in the circuit should be low-temperature-coefficient types.

[5] Emerson, "Save Those Transistors!," *QST*, October, 1967.

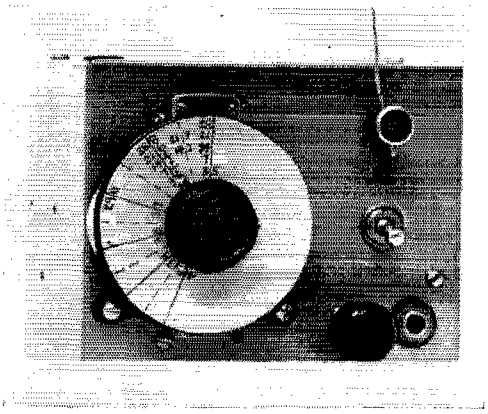
[6] One simple way to improve the image rejection of the receiver is to use higher C input circuits at L_2 and L_3.

IMPORTANT NOTICE

Change of Address

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying please give old as well as new address *and your zip code*. Your promptness will help you, the postal service and us. Thanks.

A Transceiver Monitor Using Transistors



Front view of the monitor. The output jack in the lower right corner is insulated from the panel with fiber washers.

BY WILLIAM L. NORTH,* W4BX

With prospects of retirement and a lengthy trip in a trailer, the idea of transceiver operation from the trailer became very attractive. However, the author did not like the idea of being unable to listen to the quality of his c.w. note or of his radiotelephone signal.

The answer to the problem was found in a simple, inexpensive and practical monitor that is within the reach of anyone who can reasonably handle a soldering iron, a pair of pliers and a screwdriver.

The gadget was constructed from junkbox parts, using circuitry that dates back to the good old days of the 1920s and 1930s when regenerative-receiver overloading did not permit adequate monitoring of one's signal and when separate shielded monitors were employed. The main difference between this monitor and the older ones is that it uses transistors rather than tubes.

The Circuit

Referring to Fig. 1, Q_1 is an untuned product detector with its emitter coupled to a short antenna for local pickup. Its base is coupled to a variable oscillator, Q_3, that tunes the 3.5-4.0-MHz. band. The incoming signal from the local transmitter beats with the signal from the variable oscillator, is detected in Q_1 and amplified by a single audio stage, Q_2. Besides Q_3, a simple 200-kHz. crystal calibrator, Q_4, is coupled to the base of Q_1; S_2 turns Q_4 on or off as desired.

The output of Q_2 is coupled directly to a pair of 2000-ohm headphones through a phone jack, J_2, which is insulated from the metal panel.

For 80-meter monitoring, the fundamental frequency of Q_3 provides the heterodyning signal. For all other bands, harmonics of Q_3 provide the necessary beats. Harmonics generated in Q_1 from Q_3 and Q_4 provide odd-order 100-kHz. check points that are weaker than the 200-kHz. markers generated by Q_4 alone.

Construction

There is nothing critical about parts values or placement. In the unit described, a surplus circuit board was used and the parts were arranged where they happened to fit into the existing printed circuitry. The entire unit was placed in a $5 \times 4 \times 3$-inch Minibox since it had to be shielded in order to work properly. The 3.5–4.0-MHz. oscillator dial is a cheap import which has a 6:1 tuning ratio. Its original metal dial plate was removed and replaced with another that had a paper covering and could be calibrated for each band.

Operation

For c.w. monitoring, the v.f.o. is set about 500 Hz. above or below the frequency of the local signal. For a.m. or s.s.b. monitoring, the v.f.o. is adjusted to zero beat.

In a noisy location, a little more audio output than Q_2 provides might be desirable. However, even with only a six-inch antenna, about 1.5

*6701 Hallwood Ave., Falls Church, Virginia 22046.

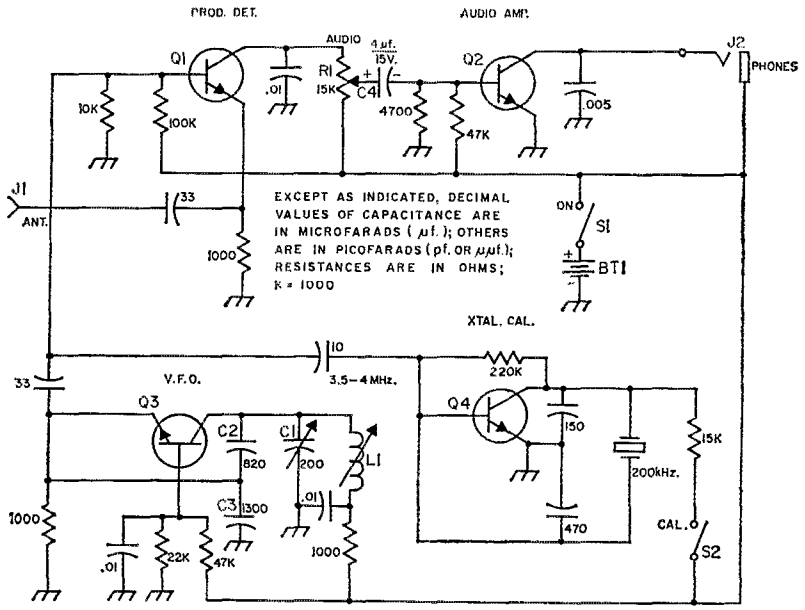
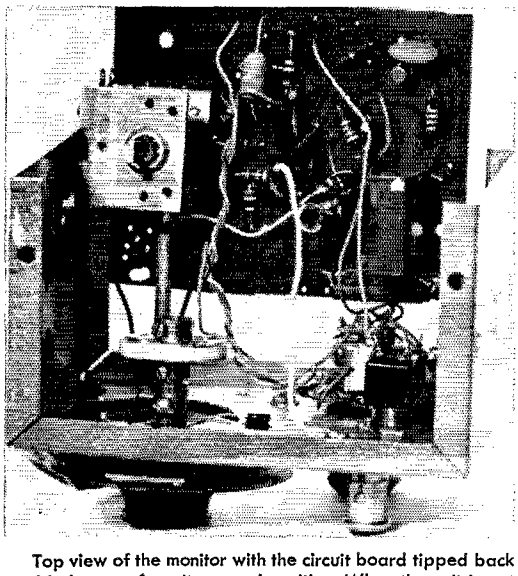


Fig. 1—Circuit diagram of the transceiver monitor. All capacitors are ceramic disks except C_1, C_2, C_3 and C_4. Fixed resistors are ½-watt composition.

BT_1—9-volt battery.
C_1—200-pf., 2-section miniature BC variable, 78 pf. one section, 130 pf. other section, stators connected in parallel (Miller 2110 suitable).
C_2, C_3—Silver mica.
C_4—Electrolytic.
J_1—Insulated binding post.
J_2—Open circuit phone jack.
L_1—App. 2.6 μh. (Miller 4404 suitable).
Q_1, Q_2, Q_3, Q_4—2N706 or similar.
R_1—15,000-ohm control, audio taper, with S_1 attached.
S_1—S.p.s.t.
S_2—S.p.s.t. toggle.



Top view of the monitor with the circuit board tipped back 90 degrees from its normal position. When the unit is put together, the sloppy leads shown are dressed against the front panel so that they don't interfere with the rotor plates of the variable capacitor. The component that looks like a shaft between the variable capacitor and the flexible coupling is one of two metal sleeves that space the circuit board from the panel.

volts of audio were available across the headphones on all bands when a transmitter having 100-watts output was used. Some experimentation with antenna size might be desirable for transmitters having different outputs, as too large a monitor antenna can cause overloading and oscillator instability.

Since the v.f.o. fundamental and harmonics can be heard in the station receiver, the unit is also useful for rough calibration checks. QST

Strays

Stolen Equipment

A Drake R4A receiver was stolen from the Purdue ARC (W9YB) on June 4. Serial Number 68956. If located please notify Purdue Police at Lafayette, Ind.

—•••—

With an antenna, it's not how long you make it, it's how you make it long. (*WA5FOS*)

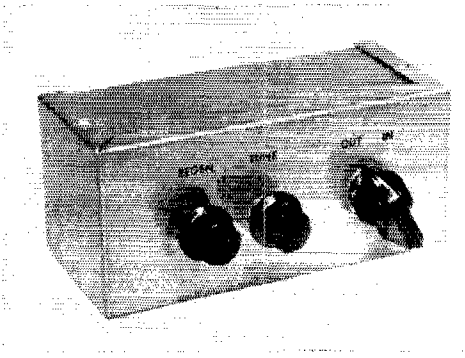
Feedback

Our printer insisted on putting a slash mark through the letter Q in the by-line of the article "Ham'n'Gravy" in the June 1968 issue of *QST*. Of course, it should read (XYL of W9TQC).

An FET Preselector For 20, 15, and 10

A Simple Method To Soup Up An Old Receiver.

BY LEWIS G. McCOY,* W1ICP



The knob at the left is the regeneration control. At the center is the tuning knob and the switch, S_1, is at the right.

There are many good buys to be had in older or surplus receivers. Here is one simple way to put new life into these older jobs.

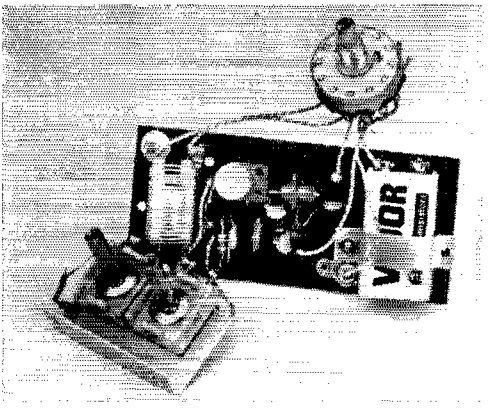
ONE of the more expensive items for the beginner in amateur radio is the communications receiver. One way to keep this cost down is to start off in the hobby with a used receiver. A look through your dealer's shelves or through ham ads in *QST* will show that there are many good buys to be had. Many of these older receivers have excellent tuning mechanisms and good bandspread. The only real problem with older receivers is that with aging of tubes and components, the performance of the receiver may not be up to par, particularly on the higher bands, 20, 15, and 10 meters. One way to step up the performance on these bands, without digging into the receiver itself, is with a preselector.

A preselector or preamplifier is basically an r.f. amplifier which will "boost" the incoming signals. Older receivers may be short on r.f. gain, or sensitivity, and the preamplifier will help alleviate this shortcoming. The preselector will actually do three things for the receiver. It will improve the sensitivity, selectivity, and image rejection.

What Are Images?

In a superhetrodyne receiver, the incoming signal is usually amplified in an r.f. stage and then fed into a mixer stage. Also being fed into the mixer is a signal from the high-frequency oscillator. The two signals beat against each other in the mixer stage producing another signal. This resultant signal is then fed to the intermediate amplifier, amplified, and then converted to audio which we hear in our speaker or headphones. However, the clinker in the act is that if there is insufficient selectivity in the r.f. stage or stages preceding the mixer, other signals besides the desired one can get into the mixer to mix with the oscillator signal to produce undesired signals which are also amplified.

Let's assume that we want to tune in a signal at 7000 kilocycles and we are using a receiver with an i.f. of 455 kc., a common type. Our 7000-kc. signal is fed into the mixer stage along with an oscillator signal of 7455 kc. The difference, or beat, between the two signals is 455 kc., the frequency of our i.f. amplifier. However, let's also assume that the front end of our receiver has poor selectivity and a strong signal also arrives on the antenna at 7910 kc. and is fed to the mixer. The difference between our oscillator signal and this strong unwanted signal is also 455 kc. This signal along with the 7000-kc. one



At the left, on the circuit board, is the input coil combination L_1 and L_2. At the lower left is the mounting bracket for the two modified compression trimmers, C_1 and C_2. Just to the right of the coil assembly is C_3.

* Novice Editor

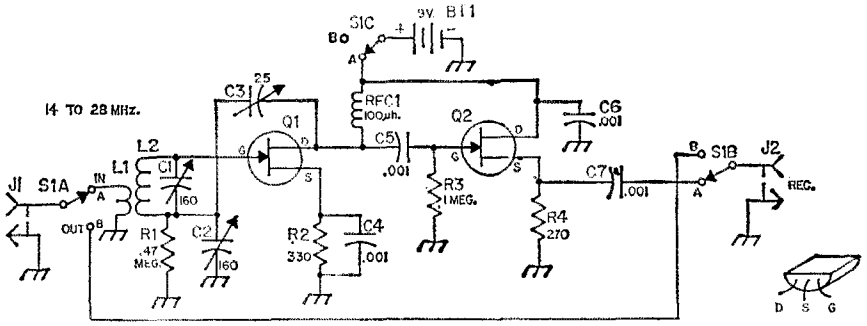


Fig. 1—Circuit diagram of the FET preselector. Resistances are in ohms; resistors are ½ watt. Fixed capacitors are disk ceramic. Circuit component designations not listed below are for etched circuit-board placement reference in Fig. 2.

C_1, C_2—160-pf. modified trimmer; see text (Miller 160-D, or similiar).
C_3—5-25-pf. trimmer (Erie NPO 5-25 or similiar).
L_1, L_2—See Fig. 3.
Q_1, Q_2—Motorola MPF-104.
S_1—3-pole, 4-position wafer switch, 2 positions used (Mallory 3234J or similiar).

are *both* fed to the i.f. to be amplified. The result at the speaker or headphones is interference from the undesired signal to our desired one. This undesired signal is called the *image* signal.

If a receiver has adequate front-end selectivity images shouldn't be a problem. Because the preamplifier described in this article uses tuned circuits it provides additional selectivity, reducing the image problem.

Circuit Details

The preselector shown in the photographs is completely self-contained, and, as mentioned earlier, no modifications are required in the receiver used. The circuit of the unit is shown in Fig. 1. The input circuit consists of L_1, L_2 and C_1. C_1 covers three bands, 20, 15 and 10, without band-switching. An MPF104 field-effect transistor (FET) is used as a regenerative r.f. amplifier. By operating the transistor on the edge of self-oscillation maximum gain is obtained. Regeneration is controlled by C_2 and C_3. Output from the r.f. stage is fed to a source-follower, another MPF104. The source-follower serves to isolate the r.f. stage from the receiver front end. Without it, the r.f. stage might break into oscillation when the front-end tuning of the receiver is adjusted. Output from the follower is coupled to the receiver via C_7. S_1 serves to switch the unit into use, or to bypass it completely. Power is obtained from a 9-volt battery and total current drain is about 4 ma.

Constructional Information

The preamplifier was designed in such a way that it could be fitted into a 2¼ × 2¼ × 5-inch Minibox. An etched circuit board was used to mount all the components except C_1, C_2 and S_1. If you've never made etched circuits, a recent *QST* article described the process and a source of materials[1]. The circuit isn't critical at all; a bread board version with the components mounted on terminals on an insulated board worked just as well as the unit shown in the photos. If you decide on insulated-board type construction the only precaution you need observe is to mount the completed preamplifier in a metal box or enclosure to avoid stray signal feedthrough.

However, we like the etched circuit method because once you obtain the etching materials, construction and making the etched circuits is a very simple and quick process—and it's fun.

The only special items in construction are the two capacitors, C_1 and C_2. In order to keep the cost down two modified trimmer capacitors were used. As purchased, the trimmers have a screw adjustment. All that is required in the modification is to solder a length of ¼-inch diameter brass rod, 1 inch long, to the compression screw head. This provides a shaft that a knob can be mounted on. If your junk box happens to yield up a couple of small variables with a maximum capacitance of 100 to 160 pf. these can be used for C_1 and C_2.

In soldering, whether or not you use an etched circuit board or mount the components on tie points, always use a heat sink when soldering the transistor leads. Too much heat reaching the body of the transistor can ruin it.

The two phono jacks, J_1 and J_2, are installed on the circuit board and the circuit board is mounted on the inside back of the Minibox. Two holes, large enough to clear the outside diameter of the phono jacks, were drilled in the back of the Minibox. In order to prevent the connections on the back of the etched board from being short-circuited, the board was mounted at each end with a ⅛-inch spacer between the back of the board and the box. The two variables, C_1 and C_2, are mounted on an L-shaped bracket that measures 1¼ inches high and 2 inches long, with a ½-inch wide foot. The bracket is mounted on the bottom of the

[1] McCoy, "A Field-Effect Transistor Dipper," *QST*, Feb. 1968.

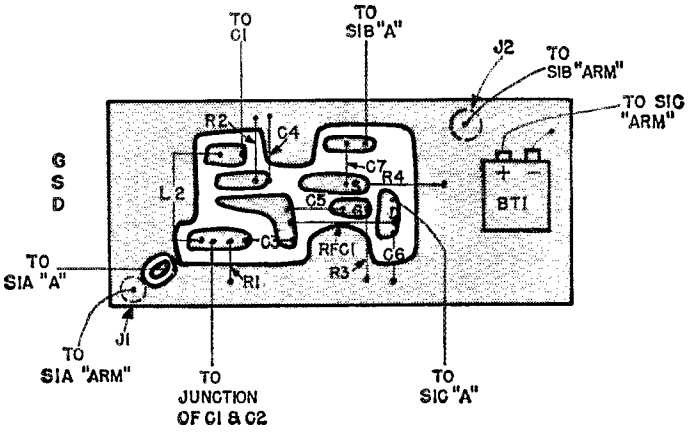


Fig. 2—Etched-circuit template. The darker lines show the component connections.

Minibox and arranged so that the two capacitor shafts project out the front of the box by ⅝ of an inch.

The battery, a 9-volt transistor radio type, is mounted on one end of the circuit board. Phono jacks, and L_1 and C_7 are connected to the appropriate switch terminals. S_1 is mounted on the front of the box.

Adjustment Procedures

When the unit is completed make up a length of coax, no longer than necessary to reach between the preamplifier and the receiver antenna terminal. (We don't mean the coax should be just a couple of inches long, but no more than a couple of feet should be required). Use either 50- or 70-ohm coax for this lead. Connect an antenna to J_1 and the unit is ready to test.

Turn the preselector on and tune the receiver to the 20-meter band, with the b.f.o. on. Tune C_1 through its range and listen for a loud rough note, indicating that the preselector is oscillating. If the unit doesn't oscillate, slowly decrease the capacitance of C_2 and go through the range of C_1 again. If you don't find a condition where the preamplifier oscillates, set C_2 at minimum capacitance and try another setting of C_2, retuning C_1 through it range. Once you find the setting of C_2, with C_2 at minimum capacitance, that makes the unit go into oscillation, slowly increase the capacitance of C_2 to the point where the oscillation stops. Under these conditions you should get a very pronounced increase in background noise or in signal strength from a signal tuned in, when C_1 is properly peaked. When you go to 15 meters, you'll have to increase the capacitance of C_2 to prevent the unit from oscillating—likewise on 10 meters. However, no further adjustment of C_2 is required. While it isn't necessary to change the setting of C_2 when going across a band, C_1 should be repeaked when going from one end of a band to the other.

No doubt some readers may want to use this device with one of the transceivers that are on the market. If so, keep in mind that the preselector will *have* to be switched out of the antenna line when transmitting. Otherwise the transistors would be destroyed. If your transceiver has a separate receiving-antenna input, as some do, the preselector could be used without the necessity of being bypassed on transmitting.

For a simple construction project, we think you'll like the performance of the FET preselector. QST

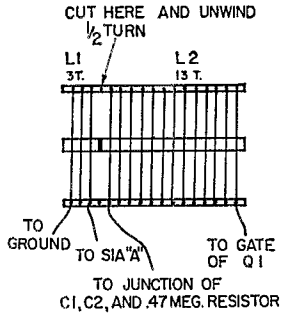


Fig. 3—This is the L_1L_2 coil assembly, made from a single length of B & W coil stock type 3007, ⅝-inch diameter, 16 turns per inch, No. 20.

Strays

Amateurs wishing to send QSL cards to the Amateur Radio Expo station K2US which operated May 2–4, 1968, should address their cards to the Bergen Amateur Radio Association, P.O. Box 15, River Edge, New Jersey 07661.

Feedback

In the article "Cavity Amplifier for 1296 Mc." by WB6IOM in *QST* for January 1968, the plate tuning screw should not carry plate voltage as shown. The 6-32 nut should be soldered to part B in Fig. 4. It will work either way but there is a chance of arcing with the tuning screw carrying both d.c. and r.f.

Recent Equipment

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

Drake W-4 Wattmeter

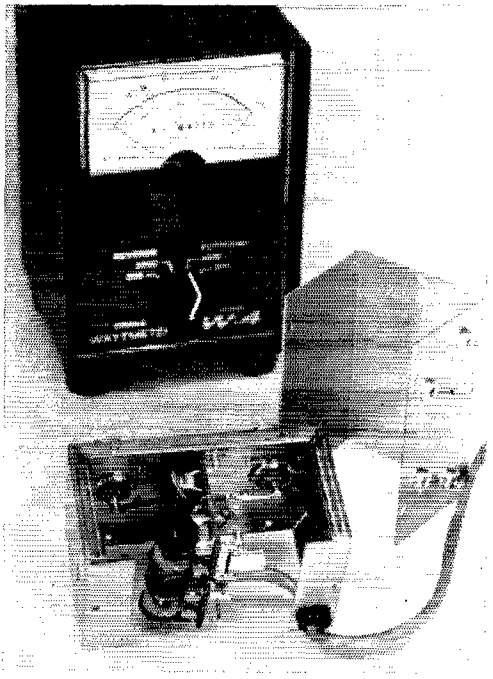
METERS for reading forward and reflected r.f. power are among the more useful pieces of measuring equipment; in fact, it is possible to visualize getting along quite satisfactorily without any other metering facilities, in the routine operation of a station.

The Drake line of amateur equipment now includes such a wattmeter. The principle on which it operates is the well-known one described for the first time (so far as we know) by Warren Bruene in April 1959 *QST*. It has the advantage of retaining calibration over a wide frequency range; in the W-4, the frequency response is rated to be down no more than 2 percent at 2 and 30 Mc., as compared with the response at midrange. The wattmeter is designed for use in coaxial line having a nominal characteristic impedance of 50 ohms.

One useful feature of the W-4 is that the power-sensing circuit can be removed from the wattmeter case and installed at some point where the coaxial leads can be brought to it conveniently. A three-foot cable connects the sensing unit to the indicator, allowing it to be placed at a spot in the operating position where it can be read easily, and where the forward/reflected/range switch is within arm's reach.

Power is read in two ranges, 0-200 and 0-2000 watts, in both the forward and reverse directions. The 200-watt range is calibrated down to 5 watts and the 2000-watt range down to 100 watts. The calibrations are approximately square law, since the indicator is an essentially linear r.f. voltmeter using semiconductor rectifiers (separate rectifiers are used for the forward and reflected readings). The wattmeter is rated to handle 2 kilowatts continuously.

The sensing unit with its cover removed is shown in the photograph. The toroid coil which is the heart of the device is close to the side of the shield box on which the coax fittings are mounted and is not visible in this view. The circular gadgets in the foreground are variable resistors for adjusting the calibrations individually for the four power ranges. The small cylinder to their right is a tubular trimmer capacitor; it is part of the bridge circuit and sets the null in reflected power when the meter is hooked up to a purely resistive dummy load.



The heart of the Drake W-4 Wattmeter is the r.f. bridge in the 2 × 2 × 3½-inch copper-plate shield enclosure shown removed from the case. The instrument is calibrated in watts from 5 to 2000, in two scales.

Although the instruction manual describes in detail how to calibrate the instrument, the user is warned (rightly) that this is something that should be attempted only when accurate equipment is available. As calibrated at the factory, the accuracy is plus or minus 5 percent plus 2 watts on the 200-watt scale and the same percentage plus 20 watts on the 2000-watt scale, over the 2-30 Mc. frequency range.

A plastic nomogram for converting forward/reflected watts to v.s.w.r. is a useful accessory furnished with the wattmeter.

Drake W-4 Wattmeter

Height: 6 inches.
Width: 3¾ inches.
Depth: 5 inches overall.
Weight: 2 lb. 6 oz.
Price Class: $50
Manufacturer: R. L. Drake Co., Miamisburg, Ohio.

Technical Correspondence

CATVI

Technical Editor, *QST*:

Much of the advice to mountain-toppers from K4EJQ (*QST*, June, 1968) could well be followed by any v.h.f. operator with interference problems. However, I must take issue with my good friend Bunky on the subject of operation near a community TV installation (CATV). Such locations should be avoided if you have a choice. However, some of us do not have such a choice because CATV is our neighbor, like it or not. Fortunately, it is a better neighbor than might be believed from the statements in the K4EJQ article. If CATV moves in next door, don't sell your house in a hurry or switch all of your operating to 160 meters. Try living with it; it's not so bad.

My permanent QTH is on a hilltop about 200 yards from a CATV antenna farm which receives and distributes nine or ten v.h.f. channels as well as f.m. radio. Channel 2 is among those used in the area. Despite this near-optimum opportunity for universal TVI, I run full legal power on both 50 and 144 Mc. without any reported CATVI. I have had my share of TVI involving individual home receivers.

It is more difficult to cause interference via CATV than to interfere directly with a neighboring TV set. TVI is usually the result of the generation of TV-frequency spurious radiation in the amateur transmitter, front-end overload in the TV receiver, poor adjacent channel rejection in the receiver, cross-modulation in the receiver front end, or pickup of some signal through the unshielded i.f. of the receiver. Only the first of these will constitute a serious problem with a properly designed, installed and maintained CATV system. There is, fortunately, a vast difference between your neighbor's all-channel preamp and the usual CATV equipment. These systems use sharp bandpass amplifiers with very high adjacent-channel rejection. The equipment is well shielded so that signal input occurs only through the antenna. Because of the good out-of-channel signal rejection in the receiver front end, cross-modulation and overload are not usually serious problems. Furthermore, unlike most domestic TV receivers, CATV equipment is usually well maintained and in proper alignment. If the amateur transmitter is free from spurious emissions, as it should always be, CATVI is unlikely. The old adage that if your own TV receiver is TVI-free you are safe is doubly true with regard to CATV.

An unexpected benefit of having CATV as a neighbor is that they receive most of the TVI complaints, not you. These are dealt with by technically knowledgeable people who usually track down the nonham source with no grief for you.

The avoidance of CATVI involves the well-known methods for preventing any TVI. I would like to pass on some of my own observations on this problem. They are by no means original but may be somewhat less well-known to newcomers in the v.h.f. game than are the old standby solutions such as shielding, bypassing leads, use of parasitic chokes, and the like.

1) One of the main causes of spurious radiation is the use of a 6- or 8-Mc. signal source multiplied to 50 or 144 Mc. Using this popular system it is nearly impossible to avoid spurious radiation somewhere in the TV region. Generation of a v.h.f. signal by use of a transverter from 14 Mc. or, preferably, 28 Mc. avoids this problem and is usually easier and cheaper as well.

2) For high-power operation use a linear amplifier, even for c.w. or a.m. The loss in output on c.w. is negligible as compared to Class C operation. The decrease in harmonic radiation is usually considerable. The output available on a.m. is down a few decibels, but a.m. is becoming obsolete for serious DX work, anyway.

3) Use a cavity or strip-line filter between the exciter and the linear amplifier. This avoids the need for a filter which can handle high power and, if your amplifier is really linear, usually works as well as putting the filter between the antenna and the amplifier. If even more harmonic rejection is needed, use either a low-pass filter or an antenna coupler between amplifier and antenna. (In my experience the use of strip-line filters in both the input and output of an otherwise stable amplifier is a good way to get a 1-kw. wide-band oscillator.)

These measures, when used in addition to the usual precautions, will eliminate even stubborn TVI. To illustrate their effectiveness, I experience less TVI running a full kw. on 50 Mc., using a 14-Mc. signal source and transverter feeding a linear amplifier through a strip-line filter, than I do running 10 watts Class C starting with an 8-Mc. crystal. These measures, along with a high-pass filter and a 50-Mc. trap at the TV set, allow me to catch the 50-Mc. band openings without interfering with the XYL's enjoyment of the French Chef on Channel 2. You can't do much better than that. — *G. R. Lappin, W4WQZ, 4047 Skyland Drive, Kingsport, Tenn. 37664.*

P.S.: I have no interest, financial or otherwise, in any CATV installation or equipment.

MULTIBAND ANTENNA

Technical Editor, *QST*:

The antenna setup shown in Fig. 1 is the result of an attempt to find a system that would be matched well enough on all bands so that the load presented to the transmitter would be within the limits that normal equipment can handle. I started from the Collins broad-band antenna, which used fanned dipoles spread 12 inches at the ends, and tried to treat them as parallel dipoles by cutting one shorter than the other — net result failure. While the Collins configuration was broader it was not broad enough. I finally found that when parallel dipoles near the same frequency were fanned over 12 feet they started to act independently. The present system consists of a balun suspended by glassline between two masts 40 feet apart and fed with RG-8A/U. From this point I run a dipole cut for 3975 and one cut for 3600, spread 40 feet at the ends. Between these points I also run one cut for 7050 and one cut for 7250. In the center I have one cut for 14,250.

My s.w.r. remains well below 1.5:1 over the complete 75/80-, 40-, and 20-meter bands. It is less than 2:1 over 15, with less than 1.5:1 over all the phone section and about half the c.w. portion. The system will also work on 10, with less than 2:1 over most of the band but no actual indication of resonance.

More wires could be used on any band, as all elements here are in inverted-V form and some can be suspended under others. I have even used a

75-meter wire in the center of others cut for the center of the band and achieved a flat line over the entire band, as close as I could determine with the Collins wattmeter.

All antennas were first cut long and then pruned with an Allied Radio bridge and a Millen dipper beat to the station receiver and checked with the wattmeter. Various lengths of coax — 12, 25, 50, and 100 feet — have been spliced into the feed line and cause no significent change when inserted. — *Howard L. Schonher, W4RZL, P.O. Box 1903, Columbus, Georgia 31902.*

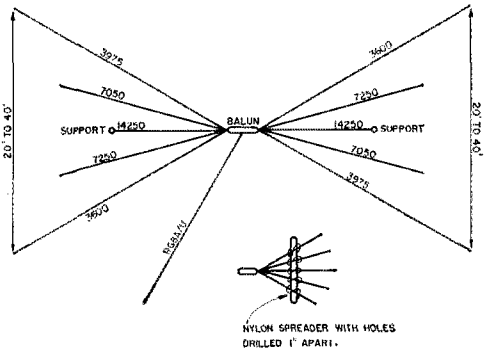


Fig. 1—Multiband antenna system at W4RZL. The balun is supported by ropes from the supports; the 14-Mc. antenna is fastened to it in line with the rope but is not part of the supporting structure. The 7-Mc. antenna can droop directly under those for 3.5–4 Mc. Small drawing shows method of fastening antenna wires at the balun to prevent twisting.

SELECTABLE-BANDWIDTH FILTER

Technical Editor, *QST*:

Fig. 2 is the circuit diagram of a passive five-section Butterworth bandpass filter which is switchable to other bandwidths with the addition of a single pair of identical tuned circuits for each bandwidth. The rolloff outside the bandpass is symmetrical when plotted on semilogarithmic paper; that is, the rising slope is equal to the falling slope. The attenuation slope is approximately 100 decibels per octave with all spurious response attenuated by at least 60 db.

No attempt was made to obtain extremely accurate inductors. The filter has been designed, in terms of frequency cutoff, impedance level, and center frequency, to use standard values of inductance. It is a simple matter to resonate an individual element pair at the center frequency by adding several junk-box capacitors in parallel to arrive at resonance. My filter is set at 900 c.p.s. center frequency, and has bandwidths of approximately 15, 150, 400, 800, and 1200 cycles per second.

For proper operation and minimum ripple in the bandpass, the values of both the input and the output impedances should be changed when changing bandwidth, but I have found relatively satisfactory operation with the fixed termination shown in the diagram. As a point of interest, if a 3-henry inductor is used (with a 0.01-μf. capacitor) the bandwidth is approximately 2500 c.p.s. Similarly, 5 mh. is 15 c.p.s.; 50 mh., 150 c.p.s.; 100 mh., 250 c.p.s.; 200 mh., 500 c.p.s.; 500 mh., 800 c.p.s.; any identical pair between these values, when resonated at the center frequency, will provide a bandwidth between the mentioned bandwidths.

Listening tests with this compared to the usual two or more sections of high-*Q* resonance types of filter have shown that the filter is well worth the construction time. The basic application of this type of filter is for use in the reception of c.w. in the extremely crowded portions of the bands. — *Donald J. Sommer, WA7FBO, 4861 Columbia Drive South, Seattle, Washington 98108.*

INCREASED MEASUREMENT ACCURACY WITH A CALIBRATED HAM-BAND RECEIVER

Technical Editor, *QST*:

A receiver with a crystal-controlled front end is nearly as accurate in cycles per second at 28 MHz. as at 3.5 MHz., provided that most of the error results from dial nonlinearity and calibration. In parts per million, however, performance at 28 MHz. is nearly eight times better.

To improve frequency estimation using the receiver as the measuring instrument, zero-beat the station v.f.o. against the incoming signal (say, in the 3.5-MHz. band), read its 28-MHz. harmonic (in this case, the 8th), and divide the frequency read by the order of the harmonic. The p.p.m. error is reduced to nearly $1/n$ (where n is the order of the harmonic) of the error obtained in reading the frequency directly.

The goal of 0.4 p.p.m. is still well out of reach, but the improvement from 30 p.p.m. to 5 p.p.m. error in the ARRL frequency-measurement tests was very satisfying with my 75A-4. — *Stanley Pope, WA5MBC, 4536 Park Court, Ballaire, Texas 77401.*

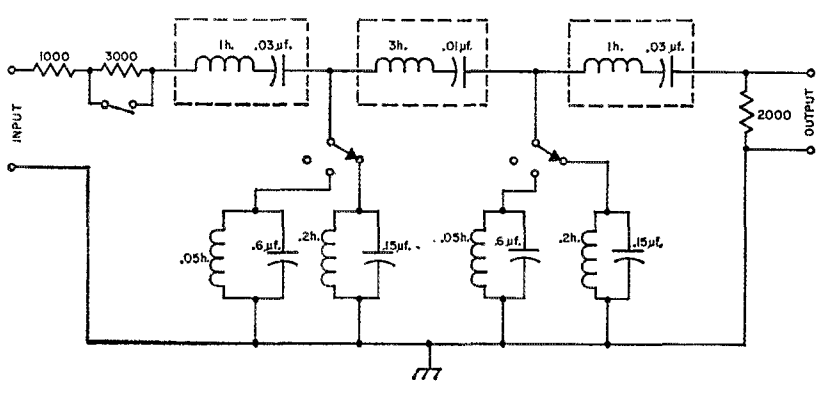


Fig. 2—Adjustable bandwidth filter circuit. Source resistance = 1000 ohms (switched on other bandwidths). Bandwidth position A is approximately 150 c.p.s.; bandwidth position B is approximately 500 c.p.s.

Hints and Kinks For the Experimenter

INEXPENSIVE AUDIO SOURCE

An audio signal generator is essential to the well-equipped shack. However, a continuously-variable audio oscillator is quite a glamorous piece of gear, especially when it is not likely to be used very often, and even the construction of a three-frequency source is a bit of a chore. As a result, most of us try to get by with makeshifts or borrowing.

However, anyone who has a station receiver has a continuously variable audio source in the form of a c.w. beat note. This note can be generated by heterodyning the b.f.o. signal against a 100-kHz. calibrator, the station transmitter oscillator, or what have you. By combining this audio source with any passable a.c. voltmeter — such as a multimeter — and a few junk-box parts, one can have quite a versatile piece of gear.

In approaching this problem, I felt I needed the following:

1) Continuously variable a.f. from 0 to 3 kHz.

2) A choice of output levels from 10 millivolts to whatever I could get — at least a few volts.

3) Reasonably accurate knowledge of the frequency and the voltage.

The circuit shown in Fig. 1 fills the bill nicely. It was built in about an hour with junk-box parts. Although specific values are listed, any resistors that give a 10:1 ratio without adding up to more than a few hundred ohms can be used in the unit, and the potentiometer can obviously be some other value than specified.

Upon completion of the device, plug the unit into the receiver headphone jack if the output impedance is low; otherwise connect it across the speaker output. Several volts of audio should be available in either case. Set the multimeter on a low a.c. voltage range, and plug the test prods into the octal socket. If you want to hear the note in the headset, plug the phones into the monitor jack, J_2, and leave them in place for the duration of the test.

Frequency calibrate the device by checking the audio beat note against a piano or other musical instrument. Middle C, which is 262 Hz., is handy to start with. Each C below this cuts the frequency in half, and each C above middle C doubles the frequency. By adjusting the b.f.o. control until the beat note matches the piano note, you can calibrate the b.f.o. in terms of audio frequency from any selected reference point. Since the HQ-110 I used went from 0 to 1700 Hz. one way and from 0 to 2300 Hz. the other, I had to set zero off to one side to get a 3000-Hz. note.

The device should only be used with amplifiers having an input impedance of ten or more times the series resistance of R_1, R_2, R_3 and R_4; otherwise the input circuit of the amplifier will load the unit and alter the nominal 10:1 voltage ratio. To use the instrument, plug it into the receiver, adjust the b.f.o. control to the desired audio note, set the receiver gain controls to give the desired output on the a.c. voltmeter, select the desired output range, adjust the output control, R_5, to the desired level, and proceed with the tests. For example, to provide 0.01-volt input to an amplifier, select the 10-percent switch setting, set R_5 at 10 on a 0-100 scale, and adjust the receiver output until the a.c. voltmeter reads 1 volt. — *Frank Guc, VE3DPC*

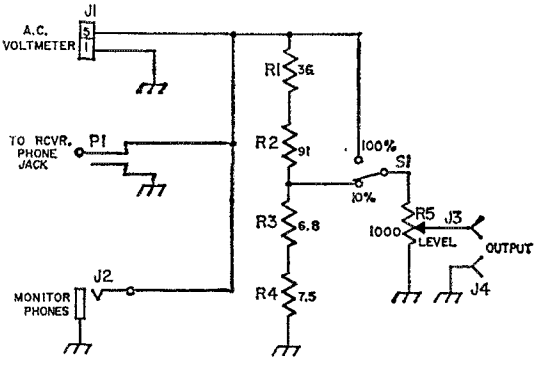


Fig. 1—Circuit diagram of the audio adapter. Resistances are in ohms.

J_1—Octal socket.
J_2—Phone jack.
J_3, J_4—Alligator clips.
P_1—Phone plug.
R_1, R_2, R_3, R_4—½-watt composition.
R_5—1000 ohm wire-wound control, linear taper.
S_1—S.p.d.t. switch.

BATTERY HOLDER

Experimenters who are having difficulty tailoring battery holders for home-brew transistor gear may not have noticed that 1¼-inch plastic water pipe is a perfect fit for size D cells. Octal tube bases, with prongs and index tab removed, make excellent end pieces, and Fahnstock clips make good spring contacts. — *G. V. Lawrence, VE4DB*

V.H.F. QSO Party Announcement *September 7–9*

THE June QSO Party was blessed with exceptionally fine 6-meter openings — can we expect more of the same in September? Or will this be the time when good old 2 comes through for you? Turn on, tune in, drop everything else and get in on the September V.H.F. QSO Party (September 7–9; see box elsewhere on page). You may operate any continuous 28-hour period between 1900 GMT Saturday and 0600 GMT Monday. A glance at the sample log will show you what's required for logging and scoring purposes. Remember that you may claim section-multiplier credits for each band. Count one point for each two-way section exchange on 50 or 144 MHz., two points for each on 220 or 420 MHz., and three points for each on 1215 MHz. or higher. Your final score equals sum of QSO points times sum of section multipliers. Be sure your log indicates your call and section, band(s) used, times (in GMT), and call and section of each station worked. Entries must be postmarked no later than October 1, 1968.

STARTING TIME	ENDING TIME
1900 GMT, Sept. 7	0600 GMT, Sept. 9

Operates any consecutive 28-hour period

These revised QSO-Party log forms shown below, complete with summary and section-multiplier checklist, are free for the asking; drop a card to ARRL Communications Dep't.

ARRL V.H.F. QSO Party

STATION ..KLZND/1..... ARRL SECTION ..CONN..........

Mhz.	(GMT) Date/Time	Station Worked	Section	Nr. mults. per band 50	144	220	432	1215	Pts.
	Sept. 7								
144	1903	K1ABR	RI		1				1
	1918	K2HLA	NLI		2				1
50	1933	K1MUJ/1	CONN	1					1
	1937	WB4HIP/4	EFLA	2					1
220	1958	K1YON	CONN			1			2
420	2232	W1QWJ	WMASS				1		2
1215	2347	WA1IOX	CONN					1	3
	Sept. 8								
144	0031	WA1IOX	CONN		3				1
	0042	K1HTV	CONN		–				1
	0217	W8SH	MICH		4				1

ENTER BELOW ON LAST SHEET USED.

Band	Contacts		Points	Mult.
50 Mhz.	2	X 1=	2	2
144 Mhz.	5	X 1=	5	4
220 Mhz.	1	X 2=	2	1
432 Mhz.	1	X 2=	2	1
1215 Mhz.	1	X 3=	3	1
TOTALS	10	QSOs	14	9

CLAIMED SCORE: ..14.. x ..9.... = ..126........
(points) (mult.) (final score)

(X) Single Operator ( ) Multiple Operator

Calls of all operators/loggers........—........

D.C. power input..75/5/1.....W.
Transmitter..TX-62/mod. HW-30/triplet/APX-6
Receiver..2-B/CN-50/CN-144/CN-220/432-L/APX-6
Antenna..5el/11el/16el/16el/5' dish....

Mail promptly with comments and photos to ARRL, 225 Main St., Newington, Connecticut 06111.

I hereby state that I have abided by the rules specified for this contest and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true.

Dave Sumner ..... KLZND ..... 2 Grove Rd., Cromwell, Conn. 06416
Signature Call Mailing address

Rules

1) The September 1968 V.H.F. QSO Party begins at 1900 GMT, Saturday, Sept. 7, and ends at 0600 GMT, Monday, Sept. 9. Entrants may operate any continuous 28-hour period beginning no earlier than 1900 GMT Saturday (starting on the hour) and ending no later than 0600 Monday. All claimed contacts must be within the chosen 28-hour period and must be made on amateur frequencies above 50 MHz., using authorized modes of operation.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2-, or 3-point units.

3) Fixed-, portable- or mobile-station operation *under one call*, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC/DOT).

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e., able to communicate over at least a mile).

Contacts made by retransmitting either or both stations do not count for contest purposes.

3) Scoring: *1 point* for completed two-way exchanges on 50 or 144 MHz. *2 points* for such exchanges on 220 or 420 MHZ. *3 points* for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of *different* ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Aircraft mobile stations cannot be counted for section multipliers.

4) Foreign entries: all contacts with foreign countries (such as Mexico and the Bahamas) count for score. All foreign countries are grouped together and a multiplier of *no more than one* (per band) may be claimed for contacts with all foreign stations worked. Foreign stations may only work stations in ARRL sections for contest credit and will give their country name.

5) A contact *per band* may be counted for each station worked. Ex.: W2EIF (S.N.J.) works K1YON (Conn.) on 50, 144 and 220 MHz. for complete exchanges. This gives W2EIF 4 points (1 — 1 — 2) and also 3 section-multiplier credits. (If W2EIF contacts other Conn. stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

6) Each section multiplier requires a complete exchange with *at least* one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

7) Awards: A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multi-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to the top Novice in each section where three or more such licenses submit logs and to Novices in sections of less than 3 entries, who in the opinion of the Awards Committee, displayed exceptional effort. Awards committee decisions will be final. QST

The 1968 Simulated Emergency Test

Our First January SET, and We Kept Our Cool

REPORTED BY BOB HILL,* W1ARR†

In his ARPSC column for June 1967, W1NJM heralded a new date, and a new season, for the annual Simulated Emergency Test, the test of amateur emergency preparedness traditionally held in October. Announcing the switch to January 27–28, 1968 (omitting 1967 entirely), for the 21st SET, George added: "Whether or not it will be better, we shall see; we are certain that it will be different!" This SET *was* different, mainly because of greater emphasis on winter-type simulated disasters; but we can proudly add that according to about 90% of the ARPSC officials reporting to Hqs., it was definitely better, too. You just *know* things went pretty well when "Best SET we've ever had" was almost a commonplace remark on EC/RO and net reports. Your reporter was particularly impressed by the number of painstakingly-documented reports, showing untold hours of thoughtful planning and effort far beyond what might be expected, submitted by SECs, ECs, ROs, NTS net managers, and other officials so instrumental in assuring the success of such an undertaking.

"Amateur radio exists because it qualifies as a service." How many times have you heard that? Enough so you term it a cliché? Well, most clichés are well-worn because they're *true*, and this one is no exception. Public service is the pivot about which amateur radio revolves, like it or not; and we can barely pause long enough to congratulate ourselves on one good SET performance before starting to worry about how we can improve the next one. Sure, it's gratifying to be able to boast that some 4000 amateurs participated in the Test — but some of the luster dims when we consider that total reported AREC/RACES registration exceeded 8000. Fifty percent participation? We can do a lot better than that! The 1969 SET is scheduled for January 25–26: why not start planning *now*.

Especially to those of you who actually lived the SET, statistics may seem cold and unfeeling; they do tell the story best, however, and so we have a mess of 'em. They certainly agree with most of the enthusiastic comments from ARPSC officials!

* Assistant Communications Manager, ARRL.

† Strictly pinch-hitting on this report. If you find a goof or two, "Please don't shoot the piano-player; he's doing the best he can"!

What would a real emergency be like without ready-to-go mobile rigs? **WA9KRL** was in the driver's seat when a simulated tornado, high winds and a blackout combined to give Sangamon Co. (Ill.) something to think about. EC K9IDQ noted that mobile activity in particular helped to make for an exceptionally interesting SET.

AREC and RACES

As in 1966, we had 59 sections reporting in, but the cast was slightly different: Quebec, Western Florida, Alaska, San Joaquin Valley, Northern Texas, Western Massachusetts and North Dakota were new faces this time; Santa Barbara, Arizona, Vermont, New Mexico, South Dakota, Manitoba and East Bay were among the missing from '66.

In case you're unfamiliar with how we rate the sections, we rank each one from 1 to 59 in each of four categories: (1) total number of EC/RO reports received, (2) number of mail reports, (3) number of radio reports, and (4) total points scored in the Test. A section ranking first in (1), first in (2), second in (3) and second in (4) would have a total of six ranking-points (1-1-2-2), so the *fewer* such points a section earned, the higher it ranked overall. (The SET isn't a contest, of course; yet it's convenient to have a yardstick by which to measure past and future performances.) Since there is no competition within a section, individual EC/RO reports are listed alphabetically by jurisdiction.

Ohio continues to keep a firm grip on first place in the ratings; Eastern Florida slipped into second spot from its previous third; Northern New Jersey zoomed up from tenth to the No. 3 ranking. Other sections showing notable improvement were Washington (all the way from 57th to fifth!), Western New York (21st last time, sixth this time), Michigan (11 to 7), Iowa (20 to 8), Southern Texas (15 to 10), Indiana (28 to 12), Montana (16 to 12), Nebraska (45 to

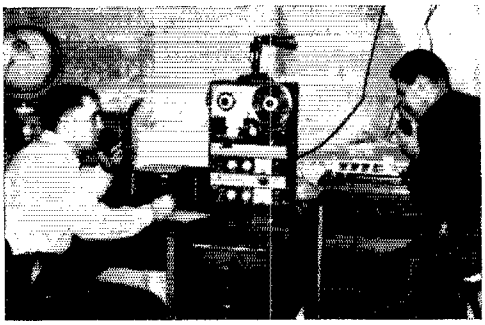
17), Colorado (31 to 24), Southern New Jersey (47 to 24), Arkansas (41 to 26), and Oregon (51 to 33).

In the listing to follow, you'll find the sections arranged in order of ranking, with 1966 rank in parentheses after 1968 rank. (M) after the name of an area of jurisdiction means that only a mail report was received here; (R) indicates only a radio report; otherwise, we got both. Most of the areas had their local SET during the weekend of January 27–28; for those that picked another date, we have indicated that date in parens after the area name.

Total Reports Received: 263 (vs. 283 in 1965)
By Mail: 236 (218)
By Radio: 129 (137)
Total Reported AREC/RACES Membership: 8282 (7251)
Total Reported Participation: 4122 (3454)
AREC/RACES Messages Sent to SEC/RO: 2240 (1958)
EC/RO Messages sent to ARRL Hqs.: 162 (136)
Mobile and Portable Stations: 1513 (1272)
Fixed Stations on Emergency Power: 350 (241)
Total SET points Accumulated: 33,970 (30,685)

Area of Jurisdiction	*Reported by*	*Points*
1 (1). OHIO (6 ranking-points, 13 reports)		**2212**
Belmont Co. (M)	W8DJD	47
Clark Co.	W8VZE	123
Darke Co.	W8ARW	80
Franklin Co.	W8ETU	287
Highland Co.	K8CKY	39
Jefferson Co. (M)	W8ERR	147
Lucas Co. (M)	K8LFI	327
Mahoning Co.	W8OE	89
Montgomery/Greene/ Preble Cos.	W8ILC	454
Richland Co. (M)	WA8MHO	94
Ross Co.	K8SUB	205
Stark Co.	K8DHJ	161
Van Wert Co. (M)	WA8TGA	159
2 (3). EASTERN FLORIDA (9 ranking-points, 13 reports)		**2057**
Alachua Co. (M)	WA4UFO	203
Clay Co. (M)	W4WHK	3
Dade Co.	W4FHZ	287
Duval Co.	W4GUJ	339
Hillsborough Co.	W4KRC	223
Indian River Co.	WA4SCK	104
Lake Co. (M)	K4UYN	99
Lee Co. (M)	W4SMK	99
Orange Co.	W4BKC	323
Polk Co.	W4FP	332
St. Johns Co. (R)	WA4EYY	...
St. Lucie Co. (M)	W4NTE	45
Seminole Co. (R)	W4NMC	...
3 (10). NORTHERN NEW JERSEY (13 ranking-points, 12 reports)		**1643**
Belleville (R)	WB2NSV	...
Englewood	WA2CCF	115
Madison	WB2WFO	57
Monmouth Co.	WB2BCS	447
Morris Co.	K2ZFI	164
Newark	WB2PXO	64
Passaic	K2KDG	235
Plainfield	WA2ASM	399
South Amboy	WA2NJB	32
Stanhope	WA2KZF	130
Sussex Co. (R)	WB2SJH	...
Woodbridge (R)	W2DMJ	...
4 (2). NEW YORK CITY-LONG ISLAND (20 ranking-points, 10 reports)		**2128**
Bronx Co.	WA2PSL	106
Brooklyn	WA2UCP	512
Kings Co. (6 meters) (R)	WA2TKS	...
Kings Co. (10 meters) (M)	WB2AWX	34
Kings Co. (75 meters) (R)	WA2UCP	...
Nassau Co.	W2FI	931
Nassau Co. (Area 7) (M)	W2UAL	...*
Nassau Co. (West-Central) (M)	W2ZAI	...*
Queens Co.	WB2RXB	130
Suffolk Co./Brookhaven (M)	W2OQI	415
* included in W2FI's report		
5 (57). WASHINGTON (30 ranking-points, 11 reports)		**999**
Adams Co. (M)	W7CTS	40
BEARS (King Co.) (M)	W7RJW	172
Clark Co. (M)	W7SAP	53
King Co. (M)	K7WTG	89
King Co. (East) (M)	W7APB	...
Kitsap Co. (1/25)	W7AXT	104
Pierce Co.	W7IKG	450
Snohomish Co. (R)	W7ETR	...
Whatcom Co. (M)	WA7EDG	23
Yakima Co. (M)	K7YDZ	43
(Area unspecified) (M)	W7RXH	25
6 (21). WESTERN NEW YORK (35 ranking-points, 8 reports)		**1032**
Chautauqua Co. (M)	W2SB	151
Chemung Co.	K2DNN	158
Delaware Co. (M)	W2TFL	74
Glens Falls	K2AYQ	237
Oneida Co. (M)	W2IXR	102
Onondaga Co. (R)	WA2AWK	...
Oswego Co. (M)	K2DUR	170
Tompkins Co.	W2CFP	140
7 (11). MICHIGAN (36 ranking-points, 8 reports)		**1204**
Cass Co. (1/25-2/8)	K8HPO	108
Emmet/Charlevoix/ Otsego Cos. (M)	WA8AXF	82
Genesee Co. (R)	W8JAC	...
Ingham Co. (R)	W8CKK	...
Lapeer Co.	WA8IUT	124
Monroe Co. (1/21) (M)	W8NDM	154
Oakland Co.	W8CQB	423
Wayne Co.	W8MPD	313
8 (20). IOWA (37 ranking-points, 9 reports)		**965**
Blackhawk Co. (M)	WAØINC	140
Buena Vista Co.	KØEVC	57
Clinton Co.	WAØEFN	246
Hardin Co. (2/24) (M)	WAØFEX	103
Jefferson/Van Buren Cos. (M)	KØIQV	29
Jones Co. (M)	WØCQC	47
Linn Co.	WØHDX	190
Muscatine Co. (M)	WØFDL	15
Story Co.	WØJIG	138
9 (11). VIRGINIA (40 ranking-points, 9 reports)		**988**
Alexandria (M)	W4JXD	130
Area 4 (M)	WA4PBG	286
Arlington Co.	W4QDF	124
Bristol/Washington Cos. (M)	K4ITV	69
Louisa Co. (M)	WA4NJG	78
Orange Co. (M)	W4EFX	70
Pittsylvania Co. (M)	K4WQS	26
Virginia Beach (M)	WA4EUL	65
Winchester/Frederick/ Clarke Cos.	W4ACC	140

The 6-meter position at Saratoga Co. (W.N.Y.) Red Cross Hqs. was kept QRL and QRV by (left to right) K2TDD, WB2ACJ, and WB2RPL.



VE5VT (left) and **VE5UM** (right) manning the battle-stations at the S.S.B. Control Base Station for Prince Albert/Northern Saskatchewan SET operations. Cooperation between amateur and Citizens' Band radiomen was a highlight, says EC VE5BO.

10 (8). KANSAS (41 ranking-points, 8 reports) **1199**

Zone 3 (M)	KØJMF	77
Zone 5 (M)	WØZGK	140
Zone 7 (M)	WØFII	182
Zone 8 (M)	KØVQC	123
Zone 9(M)	WAØJOG	146
Zone 11 (M)	KØJDD	221
Zone 13	KØLPE	75
Zone 15	KØUVH	235

10 (15). SOUTHERN TEXAS (41 ranking-points, 7 reports) **4137**

Brazoria Co.	K5HMF	...
Calhoun Co. (M)	W5ZPJ	13
Cameron Co. (M)	W5KR	...
Harris Co. (M)	K5HXR	2125
Jefferson Co. (M)	W5TFW	162
Nueces Co.	W5AQK	216
Pasadena (M)	WA5OYS	1321

12 (28). INDIANA (45 ranking-points, 7 reports) **811**

Hendricks Co. (M)	W9HCQ	92
Jay Co.	W9SNQ	75
La Porte Co.	K9HYV	205
Marion Co. (M)	W9BUQ	...
Marshall Co.	K9ZLB	89
Morgan Co. (M)	W9ZSK	87
Randolph Co.	W9QUH	263

12 (16). MONTANA (45 ranking-points, 8 reports) **554**

Billings	K7UPH	88
Bozeman (M)	W7NPV	161
Deer Lodge Co. (R)	W7VNE	...
Harlowton, Wheatland Co.	K7CHA	89
Laurel (M)	W7LBK	88
Missoula	W7COH	105
Phillips Co. (2/3) (M)	K7OZU	12
Valley Co. (M)	WA7IPL	11

14 (9). KENTUCKY (49 ranking-points, 7 reports) **1056**

District 1 (M)	WA4GMA	170
District 2	W4CSN	173
District 4	WA4FMY	234
District 6 (M)	W4BEJ	42
District 11 (M)	WA4BZS	78
Jefferson Co.	W4NOA	327
Oldham Co. (M)	K4HOE	32

15 (7). TENNESSEE (51 ranking-points, 8 reports) **502**

Bristol Co.	WA4NEC	121
Coffee/Franklin Cos.	W4WJH	139
Davidson Co. (R)	W4SQE	...
Gibson Co.	W4IGW	78
Marshall Co. (R)	WB4EST	...
Rutherford Co.	W4SZE	84
Washington Co. (2/28) (M)	WB4EHK	80
Wilson Co. (R)	WA4CRU	...

16 (14). SANTA CLARA VALLEY (56 ranking-points, 6 reports) **749**

Burlingame	W6VZE	35
Half Moon Bay	W6PLS	75
Palo Alto/Mt. View/ Los Altos (M)	W6ASH	113
Redwood City/Menlo Park	W6DEF	386
Santa Cruz Co. (M)	WB6OTB	97
So. Monterey Co.	WB6IZF	43

17 (45). NEBRASKA (58 ranking-points, 7 reports) **575**

Box Butte Co. (M)	KØWPF	92
Clay Co. (M)	WAØQWU	84
Lancaster Co.	WAØEUM	132
Richardson Co. (M)	WAØDFS	68
Scottsbluff Co. (M)	WØVQR	27
Sioux/Dawes/Sheridan Cos.	KØODF	103
(area unspecified) (2/25) (M)	WØZWG	69

18 (22). OKLAHOMA (67 rating-points, 4 reports) **1124**

Comanche Co.	K5BYF	476
Garfield Co.	WA5FVJ	144
Muskogee Co. (R)	K5WPP	...
Oklahoma Co.	W5KOZ	504

19 (18). MARYLAND-DISTRICT OF COLUMBIA (68 rating-points, 5 reports) **482**

Anne Arundel Co. (M)	K3LFD	122
Calvert Co.	W3ZNW	50
Frederick Co.	WA3GDG	70
Prince Georges Co.	WA3EKS	89
Washington Co.	WA3CFK	151

20 (22). ORANGE (69 ranking-points, 5 reports) **942**

Orange Co. (2 meters)	WB6CQR	109
Orange Co. (6 meters) (M)	WB6TFO	148
Riverside Co. (M)	K6CID	342
Riverside Co. (Desert Area) (M)	WA6TAG	135
San Bernadino Co.	K6GGS	208

21 (16). EASTERN MASSACHUSETTS (75 ranking-points, 5 reports) **478**

Acton (1/30)	W1QMN	20
Newton (M)	W1RM	127
Waltham (2/5)	W1JSM	100
Whitman	W1IAU	105
Winthrop (2/5) (M)	W1BB	126

22 (5). ALABAMA (87 ranking-points, 5 reports) **387**

Limestone (2/17) (M)	WA4WLD	63
Macon Co. (M)	K4HJX	108
Madison Co. (R)	W4YFN	...
Montgomery	WA4MTG	75
Morgan Co. (M)	W4YXQ	141

23 (6). GEORGIA (90 ranking-points, 4 reports) **397**

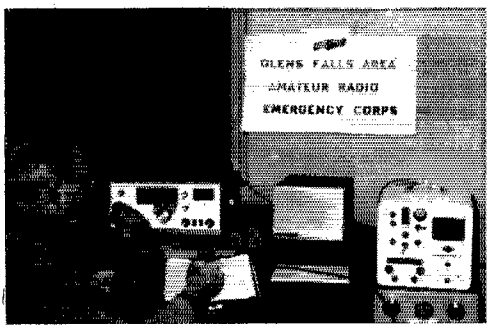
Bibb Co.	WA4HYW	108
Coweta/Fayette Cos. (M)	K4IKV	37
Muscogee/Marion/Chattahoochee Cos. (1/20) (M)	WA4JES	73
Richmond Co.	W4DDY	179

24 (31). COLORADO (91 ranking-points, 4 reports) **683**

Denver Metropolitan (M).	WAØHLQ	325
El Paso/Teller Cos. (M)	WØGCH	196
Pueblo Co.	KØSPR	145
Weld Co. (M)	KØUGF	17

24 (47). SOUTHERN NEW JERSEY (91 ranking-points, 6 reports) **131**

Camden Co.	W2ORS	17
Cape May Co.	WB2APX	13
Cumberland Co.	WA2ANL	13
Gloucester Co. (M)	W2LVW	88
Haddonfield (R)	WB2MNF	...
Mercer Co. (R)	W2YPX	...



One of the contributors to a successful SET effort for Glens Falls (W.N.Y.) was **W2OP**, shown operating portable at the National Guard Armory in Ticonderoga. This activity, led by EC K2AYQ, was given fine coverage in local newspapers.

26 (41). ARKANSAS (102 ranking-points, 3 reports) **426**
Central Arkansas W5DTR 24
Sebastian/Crawford/Logan/Scott Cos. WA5DMT 197
Washington/Benton/Madison Cos. (M) WA5EIT 205

27 (13). ONTARIO (107 ranking-points, 4 reports) **316**
Norfolk Co. VE3GCE 73
Ontario Co. (M) VE3ATI 79
Toronto Metropolitan (M) VE3CO 72
Toronto (2 meters) (M) ... VE3HW 92

28 (26). WEST VIRGINIA (108 ranking-points, 4 reports) **171**
Monongalia Co. W8GUL 135
Nicholas/Webster Cos. (R) ..... WA8WIX ...
Randolph Co. K8MSP 36
Upshur Co. (M) WA8NDY 79

28 (34). WISCONSIN (108 ranking-points, 4 reports) **307**
Marathon Co. W9VHA 146
Racine (M) W9SZL 77
Rock Co. (M) WA9IZK 84
Winnebago Co. (M) ..... W9BCH ...

30 (33). MISSOURI (115 ranking-points, 3 reports) **322**
Greene Co. (R) ..... KØJPJ ...
St. Charles Co. (R) ..... WØRTO ...
St. Louis Co. (M) ..... KØAEM 322

31 (26). WESTERN PENNSYLVANIA (118 ranking-points, 4 reports) **421**
Delaware Co. (M) W3FGQ 128
McKean Co. (M) W3OCR 74
Westmoreland/Allegheny Cos. (M) K3CHD 192
(area unspecified) (M) W3LOD 27

32 (35). SASKATCHEWAN (120 ranking-points, 3 reports) **328**
Moose Jaw (M) VE5IL 61
Prince Albert and Northern Saskatchewan VE5BO 148
Saskatoon (M) VE5RJ 119

33 (51). OREGON (124 ranking-points, 2 reports) **491**
Josephine Co. W7DEM 204
Portland (M) K7PHP 287

34 (19). CONNECTICUT (125 ranking-points, 3 reports) **176**
Danbury (M) W1ADW 46
Hamden W1NFG 130
Southington (R) ..... W1WHR ...

35 (24). ILLINOIS (127 ranking-points, 3 reports) **519**
Cook Co. (M) W9HPG 356
Lee Co. (M) W9LDU 89
Sangamon Co. (M) K9IDQ 74

36 (43). SACRAMENTO VALLEY (129 ranking-points, 2 reports) **406**
Sacramento Co. W6SMU 189
Yolo Co. (M) WA6TQS 217

37 (25). NORTH CAROLINA (137 ranking-points, 3 reports) **358**
Anderson Co. (M) K4VOP 202
Durham (M) W4LEW 94
Rockingham Co. (M) W4NAP 62

37 (nil). QUEBEC (137 ranking-points, 4 reports) **89**
Beaubarnois/Huntington/Chateau Cos. VE2ADE 44
Joliette/L'Assomption/Montcalm/Ferrebonne (M) ..... VE2BRO ...
Ste. Hyacinthe/Drummond (M) VE2BVY 30
Sherbrooke (M) VE2BBY 15

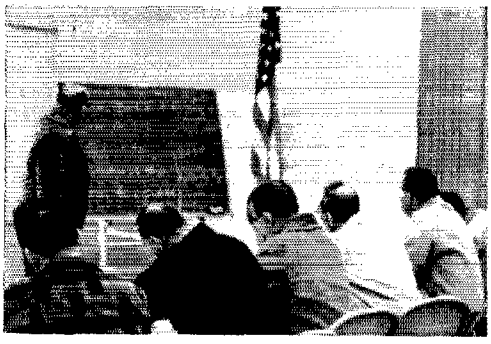
39 (4). EASTERN PENNSYLVANIA (140 ranking-points, 3 reports) **138**
Lancaster Co. (M) W3RLT 110
Montgomery Co. (R) ..... K3HLN ...
York Co. (M) K3FOB 28

40 (48). SAN DIEGO (142 ranking-points, 2 reports) **190**
C.w. activities (M) W6BGF 68
San Diego Co. (2 meters). WA6TAD 122

41 (nil). WESTERN FLORIDA (148 ranking-points, 2 reports) **137**
Bay Co. (M) WA4JIM 108
Escambia Co. W4NOG 29

42 (49). LOUISIANA (154 ranking-points, 2 reports) **82**
Algiers/West Bank (R) ... W5LHS ...
Webster Parish K5WOD 82

43 (36). NEVADA (155 ranking-points, 2 reports) **297**
Ely (M) W7YDX 32
Las Vegas (M) K7RKH 265



Let's sit in on a strategy-type chalk-talk by **WA6YDF** as he and some of the SCV crew decide how to deploy their mobile units.

44 (43). DELAWARE (156 ranking-points, 2 reports) **249**
New Castle Co. (M) WA3DYG 198
Sussex Co. (M) W3PM 51

44 (30). EASTERN NEW YORK (156 ranking-points, 2 reports) **72**
Albany Co. (M) ..... W2AWF ...
Dutchess/Ulster/Orange Cos. W2HZZ/K2GCH 72

46 (nil). ALASKA (157 ranking-points, 2 reports) **238**
Anchorage (M) KL7FLS 84
Fairbanks (M) KL7EWH 154

47 (54). NEW HAMPSHIRE (161 ranking-points, 2 reports) **181**
Merrimack Co. (M) K1DWK 109
Rockingham Co. (M) K1RSC 72

48 (39). ALBERTA (172 ranking-points, 2 reports) **15**
Calgary (R) ..... VE6SA ...
Southern Alberta (M) VE6FK 15

49 (nil). SAN JOAQUIN VALLEY (174 ranking-points, 1 report) **130**
San Joaquin Co. K6RBB 130

50 (nil). NORTHERN TEXAS (178 ranking-points, 1 report) **74**
Deaf Smith Co. W5JSM 74

51 (38). RHODE ISLAND (179 ranking-points, 1 report) **73**
Johnston W1POP 73

52 (40). MAINE (181 ranking-points, 1 report) ... **48**
Aroostook Co. K1CLF 48

53 (57). BRITISH COLUMBIA (182 ranking-points, 1 report) **41**
Powell River (M) VE7BOQ 41

53 (29). LOS ANGELES (182 ranking-points, 1 report) **225**
East San Gabriel Valley (M) WA6JXG 225

55 (31). MINNESOTA (183 ranking-points, 1 report) **191**
Ramsey Co. (M) ..... WAØNHI 191

55 (nil). WESTERN MASSACHUSETTS (183 ranking-points, 1 report) **25**
Southwick W1ALL 25

57 (37). UTAH (188 ranking-points, 1 report) ... **139**
Weber Co. (M) W7GPN 139

58 (52). MARITIME (193 ranking-points, 1 report) **118**
Halifax (M) VE1AI 118

59 (nil). NORTH DAKOTA (202 ranking-points, 1 report) **24**
Grand Forks Co. (M) .... KØRSA 24

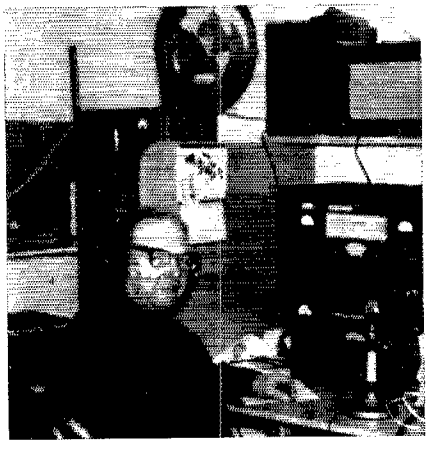
Net Activity

Our traffic nets really outdid themselves this time; the combination of TCC, area, region, and 97 section-level nets turned in an aggregate total of 79,161 points — compared to only 52,092 points garnered in the previous exercise by the same higher-echelon nets plus 52 section-level nets. Traffic skyrocketed from 12,265 to 17,045. In the Hqs. area, local traffic guys and gals saw to it that we rogered 385 SET messages (from ECs, AREC members, local and state officials,

Red Cross officials, NTS officials, *et al.*). W1LVQ handled 132 of these messages, W1BDI 105, WA1GFW 29, W1AW 31, WA1FVH 25, W1EEN 22, K1LFW 8, W1NJM 6, W1EJL 5, W1YBH 5, W1CER 4, WA1FHN 4, K1SXF 3, K1RQO 2, WA1ELA 2, WA1GYP 1, WA1IEG 1.

In the list of net statistics below, Column A shows total traffic handled, B is total minutes in session, C number of different stations participating, D number of different Net Control Stations, and E number of stations performing liaison to higher level of NTS.

Name of Net	*A*	*B*	*C*	*D*	*E*	*Total*
1RN	303	800	39	10	12	1291
2RN	352	726	34	8	12	1246
3RN	178	685	43	12	18	1099
4RN	307	587	52	7	13	1098
RN5	442	915	52	..	..	....
RN6	510	761	54	5	60	1385
RN7	267	803	24	7	10	1203
8RN	287	780	70	55	85	1277
9RN	296	771	41	17	10	1284
TEN	299	523	..	..	..	....
TWN	63	379	19	4	4	520
ECN	162	632	35	8	7	939
EAN	1189	855	110	6	16	2374
CAN	788	814	79	13	19	1920
PAN	759	761	49	3	0	1633
TCC Eastern	498					
TCC Central	271					
TCC Western	874					
KYN (Ky.)	482	1740	23	5	5	2318
WFPN (Fla.)	198	1440	300	4	1	2263
Ga. SSB	351	969	280	14	22	2060
NYCLIPN (N.Y.)	623	1200	25	8	7	1948
Passaic Valley T & E (N.J.)	185	1445	32	9	2	1749
PFN/EPEPTN (Pa.)	360	1040	106	11	11	1722
KSBN (Kans.)	314	923	111	2	6	1499
NNJ AREC & Tfc. (N.J.)	73	1260	18	8	3	1424
KTN (Ky.)	258	967	72	6	5	1424
NCN (Cal.)	338	840	41	9	15	1380
CN (Conn.)	278	900	25	11	16	1363
RPQ (Que.)	260	832	64	15	9	1340
Aurora Emergency (Alaska)	89	1200	4	1	4	1322
TEX (Tex.)	133	1046	29	7	9	1317



ORS/OPB/OBS (also former SCM and Ass't Director) **W6GGC** on duty at one of the operating positions at W6CXO, Red Cross Western Area Hqs. in San Francisco. Trustee W6JWF reported everything went A-OK from the new location.

Flanked by a group of intent young SWLs, **WA9MQI** prepares to send out the first SET message from the Indianapolis Red Cross Amateur Radio Club, transmitting from the Community Communications Coordinating Center. (Can you say that five times, real fast?)

WSN (Wash.)	160	1005	24	9	9	1303
VN (Va.)	256	817	36	13	16	1300
EPA (Pa.)	303	774	38	14	14	1293
MDD (Md.-D.C.-Del.)	124	960	28	4	9	1205
Va. SSB	77	907	63	6	8	1180
NJPN (N.J.)	180	817	57	5	7	1171
AENK (Ala.)	116	960	11	2	1	1113
AENM (Ala.)	288	537	103	4	6	1081
Tenn. Teenage	114	840	40	5	2	1069
B.C. ARPSC	54	745	110	0	4	1039
NYS (N.Y.)	180	674	38	7	8	1005
QIN (Ind.)	114	731	26	7	9	977
Greenville AREC (Ohio)	2	876	15	1	2	923
MON (Mo.)	126	706	17	5	6	921
BN (Ohio)	109	596	42	11	12	904
N.W. N.J. AREC VHF	45	733	20	9	6	893
GSN (Ga.)	166	578	16	13	10	891
Tenn. Phone	103	420	139	2	4	831
Tenn. SSB	116	420	123	2	4	812
QFN (Fla.)	248	380	34	6	14	796
NJN (N.J.)	159	518	26	5	7	789
OLZ/SSZ (Okla.)	75	555	21	7	10	757
Stark Co. Emer. (Ohio)	77	600	25	1	3	747
Alta. Public Service	140	450	43	6	5	721
WARTS (Wash.)	59	480	40	7	6	684
Rockingham Co. Emer. (N.C.)	70	470	12	4	2	594
QKS (Kans.)	61	361	19	10	7	545
ILN (Ill.)	67	394	16	2	5	528
N.H. AREC	31	357	31	4	7	505
Metro. Toronto 75-Meter	21	450	5	1	1	491
OZK (Ark.)	36	349	20	6	4	475
Tri-County AREC 2-Meter FM (Mich.)	47	315	23	2	1	423
Ark. Razorback SSB	65	187	37	7	8	401
Puget Sound Emer. (Wash.)	26	320	10	3	2	391
Oswego Co. (N.Y.)	22	260	22	5	1	356
Madison Emer. (N.J.)	61	250	6	4	2	353
La. 6-Meter	72	190	24	4	2	340
Bristol CD (Va.)	22	260	11	1	3	324
Ore. AREC 2-Meter	42	213	21	2	3	322
NTN (Wash.)	90	120	31	5	4	317
ECTN (N.J.)	140	90	12	5	4	299
Zone 7 AREC (Kans.)	60	158	22	2	5	297
Zone 11 AREC (Kans.)	20	200	28	2	2	296
Augusta Area AREC/RACES (Ga.)	21	180	25	4	4	291
Ramsey Co. Emer. (Minn.)	34	180	18	4	4	290

Tri-County RA (N.J.)	37	180	15	3	4	282
Western Que. AREC VHF	56	150	25	2	1	271
Metro. Toronto 2-Meter FM	33	180	18	3	1	269
Mich. Counties Emer.	25	190	13	3	2	266
Wayne Co. 75-Meter AREC (Mich.)	17	191	13	2	2	254
SDSN (Cal.)	37	180	..	3	4	252
Box Butte Co. 2-Meter AREC (Nebr.)	19	128	18	5	8	248
Buena Vista Co. (Iowa)	14	180	8	3	2	235
PTN (Me.)	25	165	7	3	3	234
Delaware Co. 6-Meter (Pa.)	52	120	18	2	3	233
Bay Co. CD (Fla.)	31	130	14	4	4	229
Morgan Co. Emer. (Ala.)	58	120	18	2	1	229
Wayne Co. 6-Meter AREC (Mich.)	8	180	13	1	1	224
Lancaster Co. 2-Meter Emer. (Pa.)	16	155	13	2	3	222
Clark Co. CD (Ohio)	17	115	19	2	3	195
St. Johns Co. AREC (Fla.)	1	180	1	1	1	193
Navesink Emer. (N.J.)	37	120	5	2	3	192
Washington/Benton/ Madison Cos. (Ark.)	29	80	23	4	3	190
Delaware Emergency	20	127	16	1	0	184
Tropical Phone Net (Fla.)	57	60	21	1	2	174
Zone 13 AREC (Kans.)	51	60	6	1	8	168
Butler Emer. Weather (Kans.)	12	120	10	1	2	167
Laurel AREC (Mont.)	31	90	9	2	1	154
Santa Cruz Co. (Cal.)	2	75	28	3	1	153
MTN (Manitoba)	27	75	8	2	4	148
Missoula Area Emer. (Mont.)	27	65	18	2	1	143
NCK Pi-Net (Kans.)	22	70	11	1	2	129
KEC (Kans.)	17	51	15	2	1	113
Grand Forks Co. AREC (N.D.)	15	60	5	2	3	110
So. Wis. 2-Meter Relay	16	60	7	2	1	105
Tompkins Co. Amateur Emer. (N.Y.)	11	60	7	1	2	100
NCK 2-Meter (Kans.)	8	67	4	1	1	93
Marshall Co. AREC (Ind.)	9	56	8	1	1	91
Belknap Co. 2-Meter Emer. (N.H.)	8	30	9	2	3	81
Belmont Co. RC (Ohio)	4	60	1	1	1	76
Pittsylvania Co. Emer. (Va.)	1	35	2	1	1	50
Newport Co. Emer. (R.I.)	9	..	8	..	2	35
Ely Emer. (Nevada)	0	20	4	0	0	28
Totals (1968)	17,045	52,962	3797	569	720	79,161
(1966)	12,265	31,780	2081	346	431	52,092

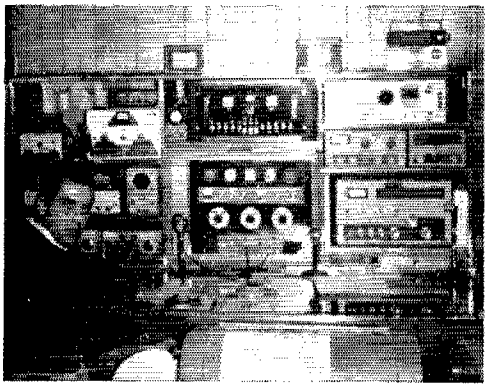
Red Cross Participation

What would a SET be like without the Red Cross? Probably nonexistent. Anyway, AmCross came through again this year, as always — and also submitted the best photographs! Hats off to K4IAG, Chief of Radio Communications, and to the whole nationwide ARC organization for an outstanding job of cooperation with the amateur service.

Soapbox

"Did not like the SET change to January, as it caught me during final examination week at college." — *K1CLF, SEC Maine.* "The N. H. AREC Net, by continually monitoring and passing traffic on 3945 kc., acted in the capacity of an NTS station in the absence of other nets. Thanks to the cooperation of the members of the net, this made a highly successful test of the function of the AREC Net in New Hampshire." — *K1QES, SEC N.H.* "My first SET, but found it rewarding and very successful. Great participation and good procedure made it possible." — *WB2WFO, EC Madison, N.J.* "The selection of late January for SET instead of September is a wise decision, in the opinion of this EC. (1) It comes in the middle of what normally is a 'lull' traffic period. (2) Adverse weather conditions in many areas make the exercise more realistic. (3) January is equally spaced from Field Day, when many AREC and club groups have major operations." — *WA2ASM, EC Plainfield, N.J.* "We found some unknown holes in our 6-meter coverage and intend to re-test these areas." — *K2AYQ, EC Glens Falls, N.Y.* "Ten meters was no good within the county — even asked a couple of W6s to try to a relay." — *K2DUR, EC Oswego Co., N.Y.* "This was my first SET as the new Emergency Coordinator and the first one in Washington County in some time. Only one hitch developed: the EC was struck down with a bad case of the flu the day before the SET." — *WA3CFK, EC Washington Co., Md.* "Test went smooth enough, but WA3FXK gave the NCS a shock when he reported that he was sitting on his roof with his Sixer and his halo in the rather brisk 20-degree weather." — *WA3EKS, EC Prince Georges Co., Md.* "Best SET in the last ten years for this area." — *K3CHD, EC Westmoreland-Allegheny Co. area, Pa.* "Just getting set up here in this county. Will make better score next year." — *K4WQS, EC Pittsylvania Co., Va.* "Although activities in Brazoria County during the SET were somewhat limited this year, it is felt by this EC that we can say our mission was accomplished. Our plan was simple and yet demonstrated that if an emergency should happen we could handle the communications that would be necessary." — *K5HMF, EC Brazoria Co., Texas.* "Results can only be summed up in one word: lousy. After much work, time, and expense, it would be expected that better results would be forthcoming. Apathy and indifference are the two words to describe." — *W6DEF, EC Redwood City-Menlo Park area.* "During the SET, due to the rugged terrain in the county, several frequencies and modes were used. 75-meter a.m., 75 s.s.b., 40 s.s.b., 2-meter a.m. and 2-meter f.m. were used. Excellent results were obtained using the 2-meter f.m. units in mobiles." — *W7DEM, EC Josephine Co., Ore.* "Proved to be a very good time of year. Most interest shown in many a moon. We had many old-timers on the

Happiness, SET-style, is receiving an official message from the Director of Disaster and Emergency Readiness of the American Red Cross, and that's what Dayton (Ohio) Ass't EC W8MCW is doing here at ARC station W8RXM/8.



This elaborate and impressive setup belongs to Westmoreland Co. (W. Pa.) EC K3CHD, who ran the whole works on emergency power during the SET—all h.f. bands, all modes. To top it off, the station is located on one of the highest points in the county!

air for the first time in a long while." — *WA8AXF, EC/RO Emmet/Charlevoix/Otsego Cos., Mich.* "Operation was very successful, with most of the activity locally on 2 meters. The newspapers did not cooperate this year, but two local TV stations did cover the exercise very well." — *W8ILC, EC Montgomery/Greene/Preble Cos., Ohio.* "We included CB mobiles in Test and found that they were unable to get any traffic from disaster scene to CD Hqs., which was a distance of 5 miles. They finally directed one of their mobiles to drive half the distance and act as relay; even this proved unsuccessful through their QRM. The amateurs took over with no problems. We realize we need more than one drill a year." — *K9ZLB, EC Marshall Co., Ind.* "While we may not have set the world on fire as traffic-handlers, the SET served to point out what our shortcomings would be during an actual emergency, and this was the important thing. All in all, I thought our test was most successful even though area participation could have been greater. General reaction of the locals who participated: 'It was fun.' 'Best we've had.'" — *K9IDQ, EC Sangamon Co., Ill.* "We had over 75% participation of the AREC membership. The only weakness which came to light in the drill was the liaison area into NTS. This was covered adequately during the Test, but it was the effort of a single station. We must develop more capability in this area than the four or five stations we now have." — *K9HYV, EC LaPorte Co., Ind.* "We had best tie-ins ever with our section net — traffic flowing both ways." — *W9HPG, EC Cook Co., Ill.* "Our group function as a unit in admirable shape and made us very proud of them. We do not have a large group, but the members we have are devoted and enthusiastic." — *WA9IZK, EC Rock Co., Wis.* "Our approach, tried for the first time this year, was to contact officials personally in several towns around the county. Mobile units stopped in a town and located an official, such as mayor, marshal, fire chief, etc. After we explained the purpose of our activity, the official was asked if he cared to send a message back to the sheriff in Clinton. All of the town officials were interested and glad to send a message. Thus, by personal contact, we demonstrated directly to officials in six small towns in our county that amateurs could supply communications for *them* in time of need." — *WAØEFN, EC Clinton Co., Iowa.* "For such limited membership, I feel our results were quite gratifying. We promise better next time." — *WAØJOG, EC Zone 9, Kans.* "The ECs did a remarkably good job locally and in their participation state-wide. They certainly deserve commendation for their efforts. The participating AREC members too made a showing of what they could do should the need arise. I personally feel a complete sense of accomplishment along with the honor of being a part of this great Nebraska team." — *KØOAL, SEC Nebr.* "Plans for next year are already being formulated. It is hoped that a more extensive test can be planned on the state level." — *WAØEUM, EC Lincoln/Lancaster Cos., Nebr.* "Our first effort but we all learned a lot." — *KL7GEF, SEC.* "The 1968 SET for Halifax area consisted of a simulated ice-storm on the Halifax County peninsula. Communications were conducted entirely on 6 meters, with six mobiles and one base station. Results showed that if an emergency did arise and we had to provide communications, it would be best done with the use of fixed-portable stations rather than mobiles. Signals were generally weak even though distances involved were not that great (on the order of 6 miles, for the most part)" — *VE1AI, EC Halifax.* "Representation from sections was outstanding. If we could just get NLI to do even partly as well during normal times!" — *W2FR, Mgr. 2RN.* "Suggest that in the next SET there be a broader explanation of the functions of each cycle. There seemed to be confusion on the part of the sections as to when to send the 'thru' traffic to Region. Suggest also more emphasis on the necessity of maintaining representation from sections at each cycle." — *WB6BBO, Mgr. RN6.* "We had a two-hour test of emergency power only, with all sections represented for a while. Also had a 'real time' SET, in which ten local groups within the three sections participated at the same time, interchanging messages via NTS section and region net. A few schedules got fouled up, but generally things were light to moderate." — *W8CHT, Mgr. 8RN;* "Not much section activity evident at regional level. Arizona had no exercise, although RACES rescheduled a test the following weekend. It is anticipated that when we get used to holding SET at this time of year, more section activity will occur." — *K7NHL, Mgr. TWN.* "All in all, about the best SET yet for CAN. Still not enough stations to carry the load from all regions. I acted as a roving rep from CAN to 9RN when not QRL, and think this sort of thing good idea for future thought for all area and region nets: having one extra man to help from his region to Area and back again." — *W9DYG, Mgr. CAN.* "You may wonder, why only three NCS? Well, it seemed to me that in an actual emergency there would be no assigned NCS, so why not try it to see how many helpers I could collect. Also, the other NCS were busy with their own nets, TCC skeds, EC jobs, etc. So I took ten NCS slots on PAN. It was an experience, and has given me some ideas for future consideration." — *W6VNQ, Mgr. PAN.* "Gratifying to see all but one of our regularly assigned, and many unassigned, stations handed the functions as scheduled, and this on rather short notice. All functions except Station 'K' ran smoothly, with failures held to a minimum." — *W3EML, Mgr. TCC Eastern.* "The mixup on EAN/CAN schedules emphasized the need for better planning on future planned emergencies. Let's hope we can boost our percentages in 1969." — *WØLCX, Mgr. TCC Central.* "I was quite surprised to find, in checking back to the last SET, that we did not handle a great deal more traffic than in October 1966. I might mention that I originated about 15 messages, five of which were of the ARL-81 type. I was pleased to receive replies to these five messages, indicating delivery in good time. This is a good indication to me that our NTS was and is operating in a highly efficient manner." — *W7DZX, Mgr. TCC Western,* "It is surprising the number who do not care and will avoid handling even one message' I contacted a ham in the same city as the SCM who had never heard of him, apparently did not know the street he lived on, and was not even mildly interested in taking a message for him." — *W1JFF, EC Newport, R. I.* "Since I was bringing TCC traffic into EAN each day of SET and participating in nets at all levels, I received a pretty good over-all picture of how the various nets were functioning. I thought all net managers did a fine job of informing the 'troops,' but it was readily apparent that a whole lot of people either didn't read the available information or didn't apply a great deal of thought to what they were reading." — *W1BJG, RM Maine.* "As usual, we handled as much SET traffic after the SET as during it. Had trouble filling skeds because so many CN people active in higher-level nets. Found SET-Bulletin instructions confusing." — *W1ZFM, RM CN, Conn.* "Better SET than last time. Ran smoothly, but need more stations participating, especially those who don't ordinarily work in nets. I believe January better than October for SET." — *W4BAZ, RM Ky.* "I believe this point system of giving points for minutes in session is wrong, for this goes against the idea of having a high efficiency rate of messages per minute, and encourages keeping the nets open longer than necessary." — *WA4OHO, Mgr. QFN, Fla.* "We struggled through another one, thanks to our many savvy operators. Our big thrill was two QNI from G5AFO (W3QCW), our former RM." — *K8OAE, RM MDD, Md.-D.C.-Del.* "Traffic still seems

(Continued from page 144)

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

Phase Out The BPL?

In the poll survey conducted among ARRL appointees last January, a rather strong sentiment in favor of replacing the traditional "Brass Pounders League" was indicated. Since then, much thought has been given to how to accomplish this.

On the west coast years ago, there was established the "Brotherhood of Radio Amateur Traffic-kers" (BRAT), principally under the ramrodding of W7FIX in his stellar traffic publication *Pacific Area Net News*. Proponents of this system have been after us for some time to put something of this nature into effect, replacing the BPL. That is, the proposals haven't mentioned it as replacing the BPL, but in practice this is the only way it can be done. Until the recent poll survey, traffic people in general have been cool to the idea. They wanted something along lines of BRAT, but they want BPL too.

The poll survey question was based primarily on a proposal made in *QST* in 1965. Let's see if we can compare the *QST* and BRAT proposals, item for item:

Proposal	*BRAT Points*	*QST Points*
For each net attendance	1	½
For each NCS function	3	1
For each representation function	1	1
For each 100 message handlings per month	3	1
For 500 total message handlings or 100 originations-plus-deliveries (present BPL)	–	1
For operation in a real emergency	–	5
For "alert" of not less than 3 hours	–	2

Operators who make 25 or more BRAT points in a single month get a BRAT certificate. Those who make 300 or more points in a year get a "Master Traffic Handler's Certificate (MTHC)." If over 700 points in a year, a "Grand Master Traffic Handler's Certificate (GMTHC)" is awarded; if over 1000 points, a "Great Grand Master Traffic Handling Certificate (GGMTHC)," etc.

The *QST* proposal, the reaction to which was lukewarm in 1965 but much warmer this year (assuming everybody who voted reviewed the details), took emergency considerations as well as traffic handling into account, and therefore is not so much a traffic award as a public service award. This leads to the possibility that instead of replacing the present BPL we could eliminate our present Public Service Award or change its requirements so that a minimum of a certain number of public service points per month would be required.

What think you, OMs? The vote of 162 to 102 on this question makes it quite apparent that the majority are in favor of the idea. Now we need some discussion on the "how" of the idea in definitive terms. Perhaps, then, the detailed proposal can be contained in a fall "poll survey" with implementation by the first of 1969 in mind.

Whither Public Service?

Sorry to repeat a title that has been used before, but the question still remains. The 1967–8 SET, results of which appear in this issue (we hope), show an *increase* in participation both in NTS and AREC. Nevertheless, we continue to get plaintive letters from ECs and SECs to the effect that amateurs are not responding to organizational efforts at section and local levels. Some say CB is stealing our thunder, some say MARS, some observe that independent amateur organizations are getting the bulk of the attention, some simply cry "apathy" — and some even seem to feel that we should think about abandoning our own organizational efforts. Then of course there is the ever-present group who blame "the League."

Most likely, if it be true that amateur radio public service is on the decline, the cause is a combination of all the above — yes, even including "the League"; because the League is not just the headquarters, or the headquarters and the Board of Directors, but the entire

The Lafayette (La.) Amateur Radio Club annually assists in the local cancer drive, this year held in April. Shown standing, l. to r., are Club Board Member W5OCN and President WA5NDW. Seated are Lark Editor W5NQQ and Secretary WA5QQB. A 2-meter rig is set up to relay to another point from which mobiles are dispatched on 80 and 2 meters.

* Communications Manager, ARRL.

membership, including *you*, OM. Those dedicated volunteer officials who are working their tails off to make amateur radio mean something along public service lines have a right to gripe, and we don't blame them. ECs and RMs and PAMs are not getting the support that most of them deserve from the amateur populace.

Less sympathy is due those who complain that there is no one to lead them. If they are qualified to lead, they should be leading instead of complaining; if not, they should be using their energy to *get* qualified to lead.

But what we do about the "unwashed multitudes" of amateurs who not only stay out of nets or any other kind of public service work in droves but sneer at and belittle those who do participate, we just don't know. How do we reach them? How do we get them to listen to reason? Most amateur publications cater strictly to the popular, most amateur conventions stick public service talk into specialized meetings competing with other specialized meetings. What is really needed is a "captive audience," and once we get one the persuasion has to be convincing, gripping — yes, even entertaining. The amateur public is no different from the general public in that it likes to laugh and will love anyone who makes it laugh.

Readers of this column are mostly those amateurs interested in public service. If you agree that public service is important, then do something about it, both in participation in your local preparedness program and in recruiting of other amateurs to take part. Be a leader, in fact even if not in title. — *W1NJM*.

Iowa Tornados

At approximately 1645 CDST on May 15 a tornado "touched down" in Charles City, Iowa, a community of approximately 10,000 in North Central Iowa, causing extensive damage and interruption of all power and communications facilities. We have a number of reports from participating amateurs who were instrumental in restoring temporary emergency communications facilities.

WØPAN says that within an hour after the tornado struck, KØCQH arrived in Charles City with his mobile rig. He was joined by WAØINC who brought a complete emergency station (including generator) with him, and set it up at the County Court House, near Red Cross Disaster Headquarters. Immediately, emergency traffic started flowing, involving such things as medicine, medical supplies, doctors and nurses from surrounding communities. Members of the Waterloo and Cedar Falls AREC groups led by WAØIYT soon arrived on the scene.

At 1700 the Southern Minnesota PICO Net alerted hams in Southern Minn. and a group from Albert Lea (*W1Øs* MQJ DOT, ODB, KØUND) responded with a complete station set up at Red Cross Disaster Headquarters. With two such stations in operation, EC KØYVU assigned the station at Red Cross headquarters to incoming traffic on 3990 kc., and KØYVU's home station to outgoing traffic on 3960. Since the stations were about half a mile apart, this arrangement worked very well. Larry lists 54 amateurs as having participated in the operation.

WØDDW also submitted a complete report on the disasters at Charles City and Oelwein, 60 miles southeast. The latter tornado funnel cut a path more than seven blocks wide directly through the downtown area, ruining more than 90 blocks of valuable property. Within five minutes after the "attack," Waterloo EC WAØINC had alerted RACES and AREC members via their local 2-meter net. WØJPJ and other Waterloo amateurs were soon on the air "standing by" for traffic while *W1Øs* INC IYT UKK GZF KZP, WØDDW and KØCQH raced to Charles City in their radio-equipped cars. These members of the Northeast Iowa Amateur Radio Association were the first stations on the air from Charles City from the County Courthouse, as mentioned above. There was neither telephone nor electrical service in the entire town. During the next several hours these mobiles provided communications which resulted in Charles City receiving a plane-load of blood from Minneapolis (through KØZZR) and another plane-load of drugs from Dubuque. Later, this mobile group provided the only radio services for the National Guard and local authorities until portable generators and outside equipment could be located and set up.

Six amateur mobile units are lined up in front of the Red Cross disaster headquarters in Charles City, Iowa, in the aftermath of the killer tornado which struck there May 15. Although not too distinct, you may be able to recognize (l. to r.) KØHWJ, WAØNAX, KØICG, KØIIP, WØTCK, WØHUU.

Meanwhile, four of the mobiles had been asked to change direction and head for Oelwein to set up communications for the hospital, telephone office and Red Cross Disaster Center there. For several hours mobile equipment was the only communication out of Oelwein; then WAØPRZ, a high school student, got his home station on the air using a small portable generator. Five Waterloo amateurs had a fixed-portable station set up in the basement of a church, stringing a dipole from the flagpole and using WØEFM's generator. Within a short time WØEFM had begun a steady flow of both outgoing and incoming emergency traffic which continued for 74 hours. More than 590 outgoing messages were sent and the station cleared more than 460 incoming "ARL 19" inquiries from all over the U.S. Reporter WØDDW gives special credit to those mentioned above and also KØLVB at Marshalltown, WØYLS in Dubuque, KØYPV in Des Moines, WAØFFN in Mt. Auburn, and also *WØs* PZO CZZ BEC, *KØs* AVM KAQ, *W1Øs* NEH AOU LMU and especially WAØIYH, who spent more hours manning the disaster-center station than any other individual operator.

SCM WØTCK contributes the information that eleven members of the Mankato Area (Minn.) Radio Club Emergency Corps, including seven mobiles, arrived at Charles City at 3 P.M. on May 18, for the purpose of assisting the Viking Amateur Radio Society of Waseca, Minn., who were providing communications for the Floyd County sheriff in directing clean-up operations in Charles City. However, there seemed sufficient operators for this, so the Mankato group, which was VHF-equipped, went into the primary work of providing communications within the city for the Red Cross, mainly in the health and welfare line. Portable units were set up on 6 and 2 meters for contact with the mobiles and a 6-meter station for liaison with the Viking ARC group was set up at Red Cross disaster headquarters, *WAØs* IDB IYM SSN and KØJLV served as NCS at this location, while seven others operated mobile to check out missing persons reports and incoming welfare info requests, and a number of miscellaneous communications requirements which developed from time to time.

In the June 1 issue of the Rochester Amateur Radio Club's *Flyer* we find an excellent summary of participation from the Minnesota hams, who deserve the greatest credit for sending down teams to all affected areas and utilizing them effectively. Contingents went down from Austin, Mankato, Albert Lea and Waseca, many of the amateurs serving days and nights with almost no sleep. The group from Waseca reached Charles City at 12:30 A.M. Thursday (May 16), set up at the Floyd County Hospital and Red Cross headquarters and operated with Red Cross survey teams. On Saturday and Sunday a group went down again and again the following weekend. Many Minnesota hams, such as WØAZR and WAØJJR, manned their home stations for many hours to assist in relaying traffic.

Each official who reported operations had a few words of criticism of the operation, along with the praise and credit for what was done right. Perhaps we can summarize the criticism later in detail. For the moment, it will have to suffice to say that although amateurs were out in force, as usual, to assist in handling emergency traffic, there was the usual lack of required organization to make the communications flow smoothly in all cases. Some traffic, especially on 75 meters, was sloppily and peremptorily handled. Stations kept breaking into nets handling high-precedence traffic to get prompt handling for personal or "for friends" health & welfare inquiries. Many participating operators had no idea of correct message form. Attempts to handle local traffic on 75 meters were generally futile because of the QRM and QRN, but there was a dearth of v.h.f. equipment.

Nevertheless, the operation can generally be termed as another star on the record of amateur radio public service. Perhaps those who so commendably *tried* to do the job but found themselves lacking in some way will now realize the importance of training and preparedness. Hope spring eternal. . . .

Diary of the AREC and RACES

Received since July *QST* copy was written is a detailed account of the Falmouth, Ky., tornado on April 23, written by W4RHZ. In fact, it is so detailed that trying to reproduce it here is out of the question; perhaps we can do so, at least in part, elsewhere. Here are a few of the factual aspects:

Upon hearing of the tornado, Joe immediately checked his emergency generator, extension cords and desk lamps. Then he reported into the Queen City Emergency Net. W8HQK checked with the Red Cross in Cincinnati and it was decided to set up a station at Falmouth as soon as possible. WA4LPC and W4RHZ agreed to undertake this, and while the former was on his way to *chez* W4RHZ, Joe started getting gear together. The two of them arrived at Falmouth at 6:30 P.M. (Apr. 23), where they got an escort to Red Cross headquarters at a school building. By this time it was dark and navigation inside the building, crowded with people, was by kerosene lamps and flashlights. The generator was set up in a second-floor corridor and the 6-meter rig, along with a two-element beam, inside one of the rooms. Nearly all the glass had been blown out of the windows and the roof at one place sported a large hole. K4MEE volunteered to take the antenna up to the roof, and after some difficulty this was accomplished. First station raised was W4VLA in Fort Thomas, and contact with the "outside" was finally established. Later, the trio were joined by K4JHR, WA8OGS, WA4YXC and WA4NXD, and more equipment was made available. At about 1 A.M. a 10-kw. generator was put into operation by a local fire department.

The next day W4JP from the University of Kentucky started operating on 3960 kc. sideband, as reported in July *QST*.

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On April 30, VE2DFE/mobile came upon an auto accident in Montreal, gave a priority call on the VE2MT repeater and was answered by VE2DEA, who collected all information and contacted Montreal police, so that a cruiser could immediately be dispatched. — *VE2ALE, SEC Quebec.*

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On May 4, during operation of the Western Quebec VHF Net, VE2AUD/mobile called with emergency traffic about a car accident in the Ville St. Laurent area of the TransCanada Highway, concerning injuries. NCS VE2APT took all information and relayed to the Quebec Provincial police, who in turn dispatched a cruiser and ambulance to the scene.

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On May 4, VE2DFE in the area on private business, heard a loud crash on a nearby street corner in Mt. Royal. He immediately fired up his mobile unit and called via VE2MT for assistance. VE2CA, who was at the QTH of VE2DEA, collected all information and advised the Montreal Police Department, who in turn dispatched a cruiser to the scene.

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Further public service rendered via repeater occurred on May 21, when VE2BU/mobile, in contact with VE2ALE via repeater VE2RM advised of a car accident on the TransCanada Highway in Montreal. VE2ALE took down all the information and telephoned the Dorion Detachment of Quebec Provincial Police who in turn notified the detachment responsible for that section of highway, and cruiser was dispatched. Meanwhile, VE2AKM called broadcast station CJAD in Montreal to advise motorists of a possible traffic delay caused by the accident. — *VE2ALE, SEC Quebec.*

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On May 29 the Glens Falls (N.Y.) Area AREC was called out by the Southeastern Adirondack Chapter of the Red Cross to provide communication between RC headquarters and its disaster unit at the scene of an apartment house fire in Fort Edward, N.Y. Red Cross coordinator W2OP contacted WB2ZTP who manned the headquarters station

These two U. of Ky. students set up W4JP/4 at the Red Cross shelter after the Falmouth, Ky., tornado, April 23. In foreground is WA4YDO, background K2VJE. Photo by K2VJE.

while W2BOR mobiled to the fire scene. Communications were handled between these stations pertaining to canteen operation at the fire and emergency housing for the five families displaced. W2FEM relieved WB2ZTP at headquarters. After the fire was out and the Red Cross had set up a shelter with telephone available the net was secured, at 1615Z. — *K2AYQ, EC Glens Falls Area AREC.*

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On June 7 WA0FLL received a telephone call from a local radio station requesting assistance in locating a tourist driving in Southwestern Ontario so he could be notified of a death in his family. Contact with W0HXM resulted in the Minnesota State Police being notified, and VE5ZO contacted the RCMP at Regina.

Did they find him? Shucks, *we* don't know. The story seems to end there.

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Forty-one April SEC reports are recorded, representing 15,661 AREC members, 2 reports and about 2000 AREC members down from the year previous. Guess we'll have to get busy and enforce some rules that SECs who don't report don't get travel funds. Sections reporting: W.Fla., E. Mass., Okla., Que., Ark., Mo., Me., Colo., Nev., Mich., Alta., Conn., Utah, Del., Tenn., La., N.C., San D., S.N.J., Wash., Ohio, Nebr., S.C.V., Mont., Orange, Ala., B.C., So. Tex., So. Dak., E.Fla., N.H., Ill., Sask., San F., N.N.J., W.Va., Ky., Mar., N.Y.C.-L.I., Ga., E. Pa.

National Traffic System

The practice of "following the system" is adhered to rather rigidly at area and region levels, still reasonably so at section levels. At local levels, adherence is somewhat less rigid.

Local levels? Yes, there is such a level in NTS, although because these nets are usually AREC nets in origin and effect there is sometimes a tendency to overlook this, and often a tendency to neglect the required section level liaison. The Public Service Manual, which now serves as the NTS bible, describes local nets as "those which cover small areas such as a community, city, county or metropolitan area not a complete ARRL Section." It goes on to point out that they usually operate on v.h.f., by voice, at no specified time, and "are often designated as 'emergency' (AREC) nets that do not specialize in traffic handling."

In order to be considered a part of NTS, such a net must meet at least once per week and *must conduct regular liaison with the rest of the system.* We emphasize the latter because it is most important. No net can be a part of NTS just by saying it is or that it wants to be. NTS is not something you can "subscribe" to. Certain procedures have to be followed, certain requirements have to be *met.* Meeting not less than once a week is one. Conducting liaison with the rest of the system through the section net is another. Here are a few more:

(3) Use of standard ARRL message-handling procedures. These are all outlined in detail in the Operating Booklet and in Operating Aid 9A.

(4) Monthly report on Form CD-125 or equivalent, for inclusion in the (this) NTS monthly summary in *QST.* This report can come directly to headquarters, but your SCM should also have a copy. Your liaison channel *must be shown* on your report, or you *may not* be included as a NTS net.

(5) Plans must exist for full-scale operation in an emergency, including full-scale section net liaison.

"Following the system" is not too rigid at local level. Some adherents feel it should be more so. At section level, things tighten up slightly, but comparatively few section nets run the full gauntlet of two sessions per day, at whatever GMT times correspond to 1900 and 2200 local, and some are mighty loose in their NTS procedures. At region level, things get pretty rigid and are rapidly getting rigider. From there on up, procedures are pretty set and operating about as crisp as one used to hear on commercial circuits.

A system is not a system if it is not followed. If you are truly interested in being a part of NTS, the best thing to do is participate in a net that is already a part of the system. Starting a net of your own and then trying to "join" NTS is the hard way. — *W1NJM.*

May reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN	31	1748	1.166	56.4	97.3
CAN	31	1195	.853	38.5	100.0
PAN	31	1568	1.054	50.58	100.0
1RN	62	505	.358	8.3	85.9
2RN	62	535	.643	8.6	96.1
3RN	62	1079	.798	17.4	98.0
4RN	46	374	.329	8.1	68.4
RN5	62	694	.306	11.2	89.4
RN6	62	1437	.748	23.1	100.0
RN7	58	422	.301	7.3	47.2
8RN	62	661	.374	10.7	94.1
9RN	62	494	.414	8.0	96.0
TEN	54	328	.373	5.3	65.3
ECN					
TWN	55	253	.204	4.6	60.0
Section/-					
Local[1]	2169	12,449		5.7	
TCC Eastern	124[2]	860			
TCC Central	93[2]	738			
TCC Pacific	124[2]	1186			
Summary	2909	26,536	EAN	8.2	——
Record	3237	32,465	1.322	17.8	——

[1] Section/Local nets reporting: EPA, VHF 6 Meter, PTTN, EPAEPTN, Pa. Fone (Pa.); WIN, WSBN, BEN, WSSN, SWRN (Wis.); AENB, AENH, AENM, AENT (Ala.); VN, VSB, VSN (Va.); NCN, SCN (Calif.); MDDS (Md.-Del.-D.C.); OLZ, SSZ (Okla.); LAN (La.); MINN (Mo.); VTNHN (Vt.-N.H.); Md.-D.C. Tfc.; NJN, NJEPTN, Passaic Valley (N.J.); QMN (Mich.); W. Fla. Phone; Alberta PSN; OZK (Ark.); HNN (Colo.); Ohio SSB; E. Tenn. Phone; VEN, FMTN, QFN, GN (Fla.); PTN (Me.); QIN (Ind.); TTN, TEX (Texas); ILN (Ill.); KTN (Ky.); NYS, NYCLIPN, NLS, NYCLIVHF (N.Y.);

BUN (Utah); GSN (Ga.); WSN (Wash.); FCATN (Ky.); RTQ, W. Que. AM-FM (Que.); THEN, NCNE NCNL (N.C.); QKS (Kans.); RISPN (R.I.); BN (Ohio); WMN (Mass.); MJN, MSPN Noon, MSPN Eve (Miss.).

[2] TCC functions, not counted as net sessions.

QRN and bad weather condx kept CAN's rate below 1000 for the first time since last September. PAN moved to 7135 kc. on May 20, with good results; W6VNQ is putting out some significant instructions to tighten procedure. 1RN is trying a session at 0130Z, and hopes for matching section net sessions at 0200Z; 1RN certificates to W1WCG, WA1DRS, WA1GXC, WA1HEW, WA1GGN and WA1HSN. W2FR is leaving no stones unturned to make 2RN the best there is; a recent bulletin sets the theme. The following have received 2RN certificates: *W2s* PU FEB HYM MTA RUF QC THE CVR ODC, *K2s* JBX KIR, *WA2s* KIP UWA, *WB2s* NZU RKK SEZ ZSH ZET OYE SMD UHZ DDQ. K3MVO reports the largest traffic total and rate since December, despite the QRN. New RN6 manager is WA6ROF; W6SE and W6IPC received RN6 certificates in May. RN7 tests on 40 were not encouraging; certificates have been issued to W7AXT and VE7ZK. W9QLW's monthly 9RN poop sheet mentions dearth of traffic, more coming down from CAN than going up from the sections. TEN statistics suffered because eight sessions were not reported; remember, gang, if you don't report your session, the credit is *zilch*, just as though the session was held with no representation and no traffic. K7NHL notes quite a few graduates from last year's novice ranks in TWN.

Transcontinental Corps. W3EML reports that all spots in Eastern Area TCC are filled and 100% reported, with half a dozen applicants looking for jobs. WØLCX reports seven unsuccessful skeds, attributes them to QRN, poor conditions or failure to show up. Usual fine report from W7DXZ, who states that despite rumors to the contrary, he does *not* pick cherries for a living!

May reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern.....	124	92.7	2264	860
Central.....	93	92.4	1580	738
Pacific.....	124	93.5	2395	1186
Summary	341	93.0	6239	2784

The TCC roster: Eastern Area (W3EML, dir.) — *W1s* BJG EFW EOB NJM, *W2s* FR GKZ MTA ZVW, K2RYH, *WA2s* BLV UWA, *WB2s* FIT OYE RKK UHZ, W3EML, K3MVO, *W4s* NLC UQ ZM, K4KNP, *W8s* CHT RYP UM, K8KMQ, *WA8s* OCG POS ZGC. Certificates to W1EOB and K4KNP. Central Area (WØLCX, dir.) — W4OGG, K4DZM, *WA4s* AVM WWT, WB4AIN/4, W5KRX, *W9s* CXY DND DYG VAY, *WØs* INH LCX, *KØs* AEM YBD, *WAØs* DOU MLE. Pacific Area (W7DZX, dir.) — *W6s* BGF EOT HC IPC IPW TYM VNQ VZT, *K6s* DYX LRN, WA6ROF, WB6HVA, *W7s* AAO KZ ZB ZIW, WA7CLF, VE7ZK.

Other Net Reports:

Net	*Sessions*	*Check-ins*	*Traffic*
North American SSB.....	27	666	761
Clearing House.....	27	366	236
Coast Guard Traffic.....	72	488	21
Pacific Coast.....	—	175	235
QTC.....	23	356	323
7290.....	46	1147	1114
Hit & Bounce.....	31	376	455
Mike Farad E & T.....	56	418	375
Interstate SSB.....	—	1122	845
20 Meter ISSB.....	25	481	3786
NETN.....	31	383	102

QST

Strays

This is VK2NS shown holding a Marconi T250 used by Australian Ross Hull, 3JU before he came to the U.S. to join the ARRL staff. This photo comes via W5ACL who has been working Trev since 1928.

NEW BOOKS

Radio Control Manual, by Edward L. Safford, Jr. Cat. No. 135. Published by Tab Books, Blue Ridge Summit, Pa. 17214. 2nd edition. 192 pages, including index, profusely illustrated, 5½ by 8½ inches. Paper cover. Price, $3.95.

This second edition contains about 70 percent new material including information on the digital type systems so popular now with multichannel fans. Complete data are supplied on transmitters and receiver, encoder and decoder circuits, and servomotors. The 12 chapters include "How Radio-Control Systems Work," "Radio-Control Circuits," "Tools and Instruments," "Building a Simple Short-Range System," "A Tube Transmitter," "A Transistor Transmitter," "Radio-Control Receivers," "Servos," "Model Aircraft," "Radio-Controlling Model Cars," "Radio-Controlling Model Boats," and "The Bonner-Digimite System."

R/C. Primer, 3rd edition, by Howard G. McEntee. Published by Kalmbach Publishing Co., 1027 N. Seventh St., Milwaukee, Wisconsin 53233. 8¼ by 11¼ inches, 65 pages, illustrated. Paper cover. Price, $2.00.

The author tells the hows and whys of radio control systems, how to mount them, how to service and maintain them. In fact, there is something here on just about every area of the hobby except how to construct the components. There are no circuit diagrams since the author feels that this area is already well covered in existing books. You will find elementary circuits showing how to use receivers and transmitters to the best advantage. There are also many sketches of mechanical ideas and their application to radio control.

Getting the World in Tune

Banquet Address at the National Convention in San Antonio, June 9, 1968

BY ARMIN H. MEYER,* W3ACE/EP3AM

INTERNATIONAL radio is so commonplace, I doubt youngsters today can be thrilled as was I four decades ago to hear stories of radio amateurs communicating with Admiral Byrd at the Antarctic. A young fellow in a neighboring town in central Illinois made frequent contact with that Antarctic expedition. Of course, the village lights blinked as he pressed the key and he was compelled to observe "quiet hours" until 10:30 P.M. But all this was inspiring at least to one youngster. It resulted in my obtaining my first amateur license as W9ACE in 1928.

My first transmitter was a t.n.t. That was a one-tube breadboard affair with a plate tank of quarter-inch copper tubing. The Byrd-watcher had sold me a second-hand 210 tube which I learned only later had been subjected to far too much plate voltage too long. This delayed W9-ACE's first successful QSO for several weeks until Allied Radio for a small fee came to my rescue with a new 210.

With a broadcast receiver condenser in the t.n.t. plate circuit, the whole 20-meter band was covered in about two or three degrees of the nonvernier dial. One day I suffered the same experience of numerous other amateurs of those days, a long-distance telephone call from New York asking me to get off the trans-Atlantic telephone frequency just outside the 20-meter band. Subsequently, the Federal Radio Commission enshrined that occasion in history with a pink slip.

Pick the Right Channel

The moral was clear, and it has been indelibly impressed on my mind for two-score years: If you are on the wrong wavelength, you are in trouble. If you are on the right wavelength, effective communication is possible. I have found that this moral applies in international affairs, even as it applies to us amateurs.

In pre-depression and pre-World War II 1928, we Americans were a self-satisfied lot. At least in the Midwest, we grew up regularly reminded of President Washington's farewell injunction to "beware of foreign entanglements." In general, Americans were not enthusiastic about communicating with the rest of the world. But even then, amateurs in their own way were demonstrating that isolation is impossible and that we are living in what Wendell Willkie subsequently called "One World."

After World War II, we Americans, somewhat with the Kiplingesque mentality of bearing the white man's burden, plunged into world affairs with almost a religious zeal. The United Nations was organized and it found its home on our shores. Now, 20 and more years later, many Americans tend to be discouraged and disillusioned. The happy world family did not develop as we expected. Over $100 billion in foreign aid plus American blood in Korea and Vietnam have left us somewhat depressed and frustrated.

*U.S. Ambassador to Iran, Tehran

Armin H. Meyer, W3ACE/EP3AM

Undoubtedly our pessimism is excessive. Too often good news is overlooked or unprinted. For example, I can happily report that Lebanon and Iran where I have been privileged to serve as Ambassador are dramatic examples of successful U.S.-aided countries. Both are standing on their own feet and playing constructive roles on the world stage.

International Communications

If all our post-World War II dreams for world peace and prosperity have not been realized, what is the reason? I happen to believe it is as much as anything a problem of communications. And this is a field not too far removed from our hobby of amateur radio. The parallels of fraternity, or the lack thereof, in amateur radio affairs and international relations are quite striking. Several rather basic thoughts occur to me.

The world family we seek is not a question of unilateral transmission, by us or by others. One needs only to listen to shortwave broadcasts these days to sense the sterility of this technique. The frequencies are so often cluttered up. Kilowatts of over-modulated nationalistic propaganda tend to saturate the ether. The QRM is mutually self-defeating. The cause of international amity is not best served.

The problem is clearly one of *two-way communication*. All over the world there are leaders calling CQ for peace. Obviously many of these signals are spurious in character and purpose. But many also are well-intentioned. Their authors wish a harmonious world society. Perhaps too many are transmitting. Perhaps too, too few are listening.

The world into which you and I were born is a fantastic world. Communication is not that of the bludgeon of the cave man. It is not the javelin of the tribal society nor the lance of the medieval knight. It is not the musket of the seventeenth-century colonialist. It is not even the horse-carried despatch of the eighteenth century nor the F. B. Morse telegram of a century ago. We are living in a new world of instantaneous exchanges of news and thought. You and I as radio amateurs know this perhaps better than anyone else.

One of my distinguished American colleagues once wisely observed that in our present miraculous world we can transmit messages half-way around the world in a fraction of a second but for the diplomat the most important problem is securing comprehension of the message across the last two feet.

The challenge facing this and future generations, if we are to survive, is that of the transceiver—instant two-way communication, on the same wavelength and hopefully with unmistakable Q5 S9 comprehension.

"*You Can't Work 'em If You Don't Hear 'em*"

Those transmitting and listening in other lands are also human beings. They are as sensitive as we are, perhaps more so. They are in search of human dignity. Nothing is more important than for us to understand that in successful international relations listening to the other fellow's signals is just as essential as transmitting our own.

Our problem is, therefore, not that of a crystal oscillator emitting its own signal into a void on a fixed wavelength. It is a worldwide problem of sending and receiving signals on a variety of frequencies, and resonating them as best we can in the cause of world peace. This is not easy. Peoples over the globe differ in culture, in creed, in standards of living, in aspirations. This is a v.f.o. world, and propagation patterns vary.

WWV and our country may provide a superb frequency standard but we must recognize that the world spectrum is broad. If a successful world society is to be established, two-way communication, well-modulated, on various frequencies will be necessary.

This leads to another line of thought. I have not yet braved the Extra Class exams (I fought valiantly for the grandfather clause which happily came to pass in the continuation of the Advanced Class), but I recall from my youth that at any frequency resonance is best if inductive and capacitive reactance are equal. A quarter of a century of service in our country's Foreign Service has only validated this scientific fact.

In suggesting this point, I am referring to what one of our country's most venerated Ambassadors taught me years ago, i.e. that in dealing with other nations the most important diplomatic requisite is a proper balance of sympathy and cynicism. This is good advice for day-to-day diplomacy. It is also helpful to us as a nation. Resonant relationships with the rest of the world are not to be found in capacitive isolationism nor in inductive imposition of our views on others. Resonance in world affairs will be optimum when a proper balance exists between self-interest and regard for others.

All of my experience, therefore, adds up to the simple thesis that if a harmonious and peaceful world is to be achieved, amateur radio can offer some lessons:

(a) two-way communication requires listening as well as transmitting.

(b) the world in which we live is a world of diversity and change, requiring v.f.o. techniques rather than a fixed crystal frequency; and

(c) international resonance is in essence a capacitance-inductive relationship whereby each nation seeks to equate its own self-interest with the needs and aspirations of others.

In thus trying to get the world in tune, hamdom has a role to play. One of our mandates is to "enhance international goodwill." In past decades such mandates were entrusted primarily to Ambassadors conveying *demarches* from their own Sovereign to the Sovereign to whom they were accredited. But the wonderful world of radio has changed all this. Now people are talking to people—and none more directly than the members of the world-wide amateur fraternity. Ours is not a dominant role. But each of us via our mikes and our keys can make a contribution.

When I first joined the amateur ranks forty years ago, nothing inspired me more than a Kipling quotation to which I was referred by the ARRL booklet, *How to Become a Radio Amateur*. It said:

"And only the Master shall praise us
And only the Master shall blame
And no one shall work for money
But each for the joy of the working
And each in his separate star
Shall draw the thing as he sees it
For the God of things as they are."

With a creed such as that, I am convinced that amateur radio will continue to thrive. So will international communications. So will our country.

QST

Strays

Here is a good example of amateur-c.b. cooperation. Members of the Clallam County (Washington) Amateur Radio Club sponsored an amateur radio class under the auspices of W7DJE, director of the evening school at Peninsula College. Class enrolment was 26—one half of which were members of the Clallam County Citizens Band Radio Club. With the excellent response to this Novice class, a fall advanced class is being planned. Pictured above are W7DHZ, WA7HKR, WA7-HGM, WA7IOH, Leo White, and K7RJV. (Photo courtesy of The Port Angeles Evening News.)

Happenings of the Month

Election Notice
Anti-Noise Bill Passes
Hams Indicted for Profanity
Jersey Gets Ham License Plates
VE3ZZ Retires from Dot

ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions:

Nominations are now in order for director and vice director in these eight divisions of ARRL. Only ten Full Members need to join together in naming a candidate, by a petition which must reach the Secretary of ARRL by noon EDST September 20.

Democracy within our League starts with these nominations. If more than one candidate is nominated, and each meets the requirements explained below, then all Full Members of the League in the division will have a chance to choose from among the candidates by secret ballot between October 8 and noon of November 20.

The election procedures, outlined briefly here, are specified in the Articles of Association and Bylaws; copies will be sent to members free upon request.

Any eligible Full Member of the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf Divisions can be nominated for either director or vice director. If one person is nominated for both offices, his nomination for director will stand and that for vice director will be void; no person may simultaneously be a candidate for both positions.

Since all the powers of the director are transferred to the vice director in the event of the director's death, resignation or inability to serve, careful selection of candidates for vice director is just as important as for director. The following form for nomination is suggested:

Executive Committee
The American Radio Relay League
Newington, Conn. 06111

We, the undersigned Full Members of the ARRL residing in the.....Division, hereby nominate.....of..... as a candidate for director; and we also nominate..... .....of.....as a candidate for vice-director; from this division for the 1969–1970 term.
(Name Call City Zip Date)

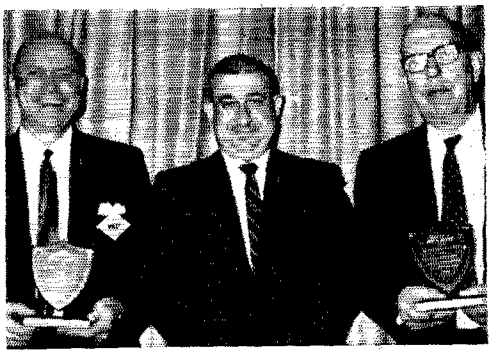
The signers must be Full Members in good standing. The nominee must be the holder of at least a General Class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a Full Member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, is commercially or governmentally engaged in frequency allocation planning or implementation, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in Newington, Conn., by noon EDST of the 20th day of September, 1968. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full

OVERSEAS AND ABSENTEE BALLOTS

All ARRL members who are licensed by FCC or DOT but are temporarily resident outside the U.S. or Canada are now eligible for Full Membership. These members overseas who arrange to be listed as Full Members in an appropriate division prior to September 20 will be able to vote this year where elections are being held.

Even within the U.S., Full Members temporarily resident outside the ARRL division they consider home may now notify the Secretary prior to September 20, giving the current *QST* address and the reason why another division is considered home (e.g., holding an amateur call appropriate to the division). So if your home division is the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf, but your *QST* goes elsewhere because of a different residence, please let the Secretary know, as soon as possible but no later than September 20, so you'll receive a ballot for your home division.



The Pacific Division recently honored its past director Harry Engwicht, W6HC (right) and past vice director Ronnie Martin, W6ZF (left) for their long service. Presenting plaques to each is the current director, J. A. Doc Gmelin, W6ZRJ.

Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 8 and November 20, except that if on September 20 only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are: *Central:* Philip E. Haller, W9HPG and Edmond A. Metzger, W9PRN. *Hudson:* Harry J. Dannals, W2TUK and Stan Zak, K2SJO. *New England:* Robert York Chapman, W1QV, and Bigelow Green, W1EAE. *Northwestern:* Robert B. Thurston, W7PGY and R. Rex Roberts, W7CPY. *Roanoke:* Victor C. Clark, W4KFC and L. Phil Wicker, W4ACY. *Rocky Mountain:* Carl L. Smith WØBWJ, and John H. Sampson, Jr., W7OCX. *Southwestern:* John R. Griggs, W6KW and Thomas J. Cunningham, W6PIF. *West Gulf:* Ray K. Bryan, W5UYQ; the vice-director's office is vacant.

Full Members are urged to take the initiative and to file nominating petitions immediately.

For the Board of Directors:

July 1, 1968

JOHN HUNTOON
Secretary

VE3ZZ RETIRES FROM DOT

W. A. Caton, VE3ZZ, retired on June 26, 1968 as Chief, Radio Regulations, in the Canadian Department of Transport after 44 years of service with DOT and its predecessor agencies.

Bill Caton was licensed as 3FE in the early 20s, a resident of Napanee in eastern Ontario. After service in the Royal Canadian Corps of Signals, and graduation from its Advanced Radiocommunications Course, Bill started on his career by accepting a junior radiotelegraph operator position at Chebucto Head Direction Finding Station near Halifax, Nova Scotia, on May 20, 1924. Within three years he was Radio Inspector at Halifax and in 1928, at Toronto. He went to Ottawa in 1937 as Supervising Radio Inspector, became Assistant Chief and finally Chief Radio Inspector in 1948. A decade later Bill was appointed Controller of Radio Regulations. His duties along the way have included the licensing of broadcast stations; safety communications facilities, both aeronautical and maritime; and participation in international telecommunications conferences, e.g. Regional Broadcasting Conferences, Montreal and Washington, 1949-1950 and the Extraordinary Administrative Radio Conference on Space Communications, Geneva 1963, where Canada was perhaps the strongest supporter of amateur radio.

His first job at Ottawa, and his last job there, were similar: intensive work on the Radio Act of 1938 and again on the Radio Act of 1968! Ham radio and his family (a wife, a son and a daughter) will share retirement hours with music, hunting, fishing — and even his building of a summer place in the central Ontario bush country.

LICENSE REVOKED

The station license for WB6MHC, licensed to Jesse U. Aaron of Los Angeles, has been revoked effective May 14, for failure to reply to official Commission correspondence. The original problem revolved around a TVI complaint.

This emphasizes once more the need for keeping a valid address on file with FCC and for promptly answering all correspondence from the Commission.

PORTLAND, OREGON, OFFICE MOVES

The District FCC Office in Portland, Oregon is now located in room 314 of the Multnomah Building at 319 S.W. Pine Street; zip code 97204. The office continues to conduct examinations Friday mornings, beginning at 8:45 A.M.

W. A. Caton, VE3ZZ

At The New England Division Convention, Swampscott, Massachusetts, Father Dan Linehan W1HWK presents Amateur of the Year honors to Richard Gregorio, K1RAW, who has handled a great deal of Viet Nam morale traffic—from both ends!

MORE RECOGNITION

The Governor of Washington State, the Honorable Daniel J. Evans, has issued an "official statement" setting aside September 1-8, 1968 as Washington State Amateur Radio Week, mentioning amateur contributions to the advancement of science, to preparation for civil defense and in emergency communications.

Mayor Owen L. Duncan of Huntington, West Virginia, proclaimed June as "Amateur Radio Month," the first such designation reported to us. His statement recognized the June 2 hamfest, the June 29-30 ARRL State Convention and Field Day June 22-23, and amateur contributions to friendship and understanding.

CANADIAN CLUB WINS ANTENNA FIGHT

The Burnaby (B.C.) Amateur Radio Club has succeeded in heading off antenna restrictions on amateur structures. The District of Burnaby contemplated a height limit on antenna structures in residential zones, principally to deal with an antenna for cablevision.

The amateurs showed that in a number of British Columbia towns amateur structures were regarded as part of a legitimate home activity, an accessory use in residential districts.

The club had armed itself with the ARRL "Legal Kit" and advice from Canadian Director Noel Eaton, VE3CJ, General Counsel Robert M. Booth, Jr. W3PS and Canadian Counsel Arthur K. Meen, VE3RX.

Similar assistance is available to clubs or individuals in Canada or the U.S. whenever necessary.

CANADIAN NATIONAL EXHIBITION

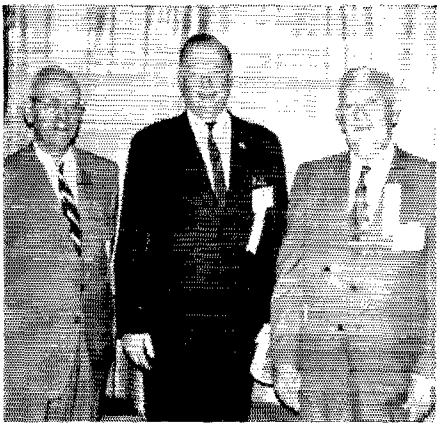
The Scarboro Amateur Radio Club will man a booth of its own design at the 90th Canadian National Exhibition in Toronto August 15 through September 2, 1968. An amateur station under the call VE3CNE will be in operation daily from 10 A.M. to 10 P.M. on 80, 40, 20 and 2 meters. Special QSLs will be sent to all stations worked from the exhibition; yours goes to VE3CNE, Canadian National Exhibition Park, Toronto 2B, Ontario.

ANTI-NOISE BILL PASSES

The Senate on June 24 passed and sent to the President a bill, HR14910, which permits the Federal Communications Commission to regulate the manufacture, import, shipment, sale or use of incidental radiation devices capable of causing interference to radio communications. Passage of the bill is an important first step toward eventual reduction in spectrum pollution caused by auto ignitions, motors, heating devices, electrical signs, electric fences and the like.

The bill was first introduced into the Senate in 1965, and was passed by the Senate in 1966. However, Congress adjourned without House action on the measure and the bill died. Virtually the same bill was introduced into the House in May, 1967 and the present bill in March this year.

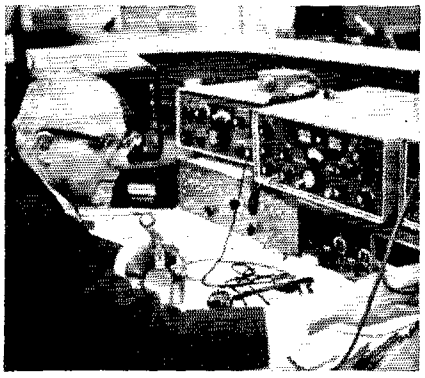
Needless to say, the bill won't solve all our electrical noise problems at once; there are a great many noisy gadgets around now which can only be put out of business on a case-by-case basis. Moreover, public utilities are exempt from the new measure, although presumably Section 15.31 of FCC's rules still will require action by these companies in specific instances.



The Dayton Hamvention's Bill Biddle, K8UZ welcomes ARRL General Counsel Robert M. Booth, Jr, W3PS/K4PS and Great Lakes Director Alban A. Michel, W8WC to the traditional April event. W8WC should be panting—he'd just rushed to Dayton from Lansing, where he had attended the ARRL Michigan State Convention!

Behind the Diamond

Number 7 of a Series



On the ARRL's Board of Directors there are men from a wide variety of occupations. Our "resident expert" on computers and automatic data processing is **Charles G. Compton, WØBUO,** director from the Dakota Division since 1960. He has just finished a hitch as vice president, 1966 to 1968, and has been a member of the ARRL Executive Committee since 1963.

Charlie is a systems engineer in data processing for Minnesota Mining and Manufacturing and a consultant to other firms in the same line of work. He's been involved in recent studies of ARRL's membership records, to see to what extent we can benefit from automation of our *QST* mailing list. (For the time being, no action has resulted, since would-be suppliers of a.d.p. gear haven't yet been able to accommodate all our standard needs on a reasonable cost basis.)

Prior to his election as director, Charlie was vice director from the Dakota Division in 1958–1959. He served two terms as president of the Saint Paul Radio Club and was civil defense radio officer in the city for more than two years. While serving as Dakota Director, he has been on the Membership and Publication, Housing, Planning and Finance Committees and has served two terms as chairman of the Public Relations Committee.

WØBUO holds appointment as an Official Phone Station, is a member of the A-1 Operator Club, and holds the Extra Class license.

NEW JERSEY HAM LICENSE PLATES

Radio amateurs of New Jersey have finally secured the promise of call letter license plates, leaving only Kentucky without the privilege. The victory came over a veto by the governor on the advice of his motor vehicles department. A *QST* representative was unable to secure any information as to when applications could be filed or the address to which they could be sent.

Assembly bill A-265 was adopted finally on June 17 when the State Senate overrode the veto 28–0, following a similar Assembly action, and it becomes effective July 1. A fee of $10 over the normal fee is to be charged for issuance or replacement of the special plates.

THREE AMATEURS INDICTED

Larry D. McCreary, K4KHE; Conrad H. Bridges, W4EBG and Walton B. Berkley, WB4AOE on May 20 were indicted by a Federal Grand Jury in Bowling Green, Kentucky, on charges of transmitting indecent, obscene or profane language. Trials are expected to be held in Federal Court in October and November. So far as we know, this is the first such action by the Justice Department on these charges (though of course there have been administrative actions by FCC against amateurs on a number of occasions).

CANADIAN LICENSE FIGURES

Below are tabulations of amateur station licenses in Canada, by region. The figures in each case are as of March 31, end of the Canadian fiscal year. The 1968 total of 12,502 is about 3.1% above last year's tally.

Region	*1968*	*1967*	*1966*	*1965*
Vancouver	1768	1711	1635	1549
Edmonton	1166	1138	1132	1091
Winnipeg	1255	1231	1252	1283
Toronto	4634	4472	4313	4149
Montreal	2233	2169	2055	1935
Moncton	1446	1399	1306	1273
TOTALS	12,502	12,120	11,693	11,280

The growth came before the Department of Transport announced that the license fee of $2.50 per year was being raised to $10 per year. No official indication of the effect on total VE/VO licenses will be available until next March.

Efforts continue at securing a modification of the fee. The Department of Transport has acknowledged the tremendous adverse reaction to the new fees, and some sort of alteration appears to be in process of discussion within DOT. Important news on the subject will be transmitted by W1AW and printed here in "Happenings." QST

Hamfest Calendar

Alabama — The North Alabama Hamfest Asso., Inc. Hamfest will be held in Huntsville on August 17 and 18 at The Mall. Contact James A. Brasher, WB4EKJ for details.

California — The Sierra Hamfest will be held at the Bowers Mansion Picnic Grounds, half-way between Reno and Carson City on August 24.

Idaho — The WIMU Hamfest will be held August 2, 3, and 4 at Mack's Inn.

Illinois — The 11th annual Picnic and Hamfest of the Six Meter Club of Chicago will be held August 4 at the Frankfort Picnic Grove, 1 mile north of Rt. 30 on U.S. 45, Frankfort, Ill.

Illinois — The Quad City ARC has scheduled its annual Mississippi Valley Hamfest for August 18 at the Rock Island Arsenal, Rock Island, Ill. The site this year is an all weather site with adequate display facilities. Lunch will be served in the cafeteria. Tickets are $1.50. Contact John E. Greve, W9DGV, 2210-30th St., Rock Island, Ill. for advanced tickets. Talk-in on 3.9, 50.4 and 146.94 MHz.

Illinois — On August 4, there will be a meeting of 160-meter enthusiasts near Minooka, Ill. The event is called the "160-meter Reunion." For details and to confirm attendance, write or call W9UCW, Barry Boothe, Rt. 1, Minooka, Ill. 60447. Tel.: 815-462-5893. 1810 kHz. will be monitored.

Illinois — The Mini-Hamfest, sponsored by four amateur radio clubs in Northern Illinois and Southern Wisconsin, will be held Sunday, August 18 at the Boone County Fairgrounds, 1 mile North of Belvidere, Ill., on Rt. 76. Free coffee and donuts from 9:00 to 10:00 A.M. Overnite camping facilities for Saturday night.

Illinois — The Hamfesters Radio Club will help the people of Illinois celebrate their one-hundred and fifty years of statehood by holding the 34th annual Mid-Western Hamfest and Picnic Sunday, August 11 at Santa Fe Park, 91st and Wolf Road, Willow Springs, Ill. The official flag of the Sesquicentennial will be flying and there will be manufacturer and distributor exhibits, swapper's row, awards and a variety of activities for all. Clowns and games for the harmonics plus special awards for the XYLs. Picnic tables, food and refreshments will be available at the park. Gates will open at 9:00 A.M. Free early bird coffee and doughnuts from 9:00 A.M. to 10:00 A.M. For further information and tickets write to the Ticket Chairman, Charles Borkowski, WA9TWA, 1851 West 21st St., Chicago, Ill. 60608.

Kansas — The KNRC announces their Hamfest in Concordia August 3 and 4.

Kansas — The CKRC will hold their Hamfest on June 8 at Salina.

Kentucky — On Sunday August 11, the East-Kentucky Radio Society, Inc. will hold their Hamfest at Jenny Wiley State Park. After an informal evening of socializing, the Hamfest will formally convene on Sunday morning at 11:00 A.M. A day of boating, picnicing, code contests, fishing and just plain fellowship is in order. See you there.

Kentucky — The ARTS will sponsor the 1968 Kenvention to be held August 30 and 31.

Michigan — The S.W. Michigan V.H.F. Picnic will be held August 4.

Michigan — The Annual Upper Penninsula of Michigan Hamfest will be held this year in Sault Ste. Marie, Michigan on August 3 and 4. There will be a banquet on Saturday evening, complete with the "afterglow." On Sunday there will be the usual meetings and complete program for the entire family including contests, tours, etc. For more information write Clare Smith, K8ZSM, Box 279, Rt. 2, Sault Ste. Marie, Mich. 49783.

Minnesota — The St. Cloud picnic is scheduled for August 11.

Missouri — The annual Hamfest of the Southwest Missouri ARC will be held on August 25 at the Fassnight Park Pavilion, Springfield, Mo. Swap table, code tests, covered-dish luncheon.

Montana — The WIMU Hamfest is to be held at Mack's Inn, Idaho on the weekend of August 2, 3, and 4. Transmitter hunts, meetings, program for the women and children.

Nebraska — The Tri-State ARC Picnic is August 18 at Bridgeport.

New Jersey — The South Jersey Radio Asso. will sponsor its annual gala Hamfest on September 8 (Rain date September 22). Advance registration for non-members is $2.00 with August 24 the deadline. General admission at the gate is $3.00. The ticket covers entire family. Activities include 2 and 6-meter hidden transmitter hunt, games, and swimming for the children. Bring your own lunch baskets. Hot dogs, hamburgers, soft drinks, etc. will be available at the picnic. Advance registrations from Eugene M. Bond. WA2MGV, 15 E. Camden Ave., Moorestown, N. J. 08057. Checks should be made out to South Jersey Radio Asso. Talk-in on 3.840, 145.2 MHz. and on 6 meters. Molia Farm is near intersection of Route 40 and Route 47 near Malaga, N. J. If you use Route 295, get off at exit "Route 47 South." Picnic grounds 20 miles from this exit. Look for signs.

New York — The Long Island Hamfest and Picnic sponsored by the Federation of Long Island Radio Clubs will take place Sunday, September 1 at the Hempstead Town Park Point, Lookout, L.I. Auction, swap shop, technical discussions, manufacturer's displays, mobile contests and activities for the family. Rain or shine starting time is 9:00 A.M. and ending at dusk. For further information write to FLIRC, P.O. Box 304, Long Beach, N. Y. 11561.

New York — The NYSPTEN Picnic will be held August 17 at Cooperstown.

New York — The Central New York Chapter of QCWA is holding its annual Chapter picnic on August 10 starting at 1:30 P.M. at Taughannock Falls State Park on beautiful Cayuga Lake, 10 miles north of Ithaca on Route 89. Each member to bring his own basket lunch plus a covered dish. Outdoor grills available. This is a family affair and all members of QCWA and their families are invited. Mobile operations on 3810 kc., eyeball QSOs, swimming, boating and swap and sell for everyone. For further information contact Clark Galbreath, W2AXX, Affairs Chairman, or Wendell Dunning, WB2QCO, Secretary, for further information.

North Carolina — The Shelby Radio Club will hold its annual Hamfest September 1 at beautiful Brackett's Cedar Park, 14 miles north of Shelby near Polkville, N. C. Bingo for the ladies and plenty of playground equipment for the children. Displays of new equipment and plenty of swap-shop items. Tickets are $3.00 for adults, $1.75 for children. Delicious barbecue and chicken. For maps and other information contact Charlie Harry, K4RER, P.O. Box N, Grover, North Carolina 28073.

COMING A.R.R.L. CONVENTIONS

August 3-4 — Central Division, Springfield, Ill.
August 17-18 — Florida State, Melbourne
August 30-31 — Kentucky State — "Louisville Ham Kenvention," Louisville.
August 30-September 1 — Southwestern Division, Phoenix, Arizona.
September 28-29 — Roanoke Division, Greensboro, N.C.
October 12-13 — Hudson Division, Tarrytown, N. Y.
January 17, 1969 — Southeastern Division, Miami, Florida.
June 20-22, 1969 — National, Des Moines, Iowa.

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.

Ohio — The Findlay ARC is holding its annual Hamfest on Sunday, September 8 at the Riverside Park in Findlay. Everybody is invited. Bring your lunch or get it at the park. Swap and shop and auction. Ladies' bazaar.

Ohio — The Warren ARA will hold its 11th annual Hamfest August 25, Newton Falls, rain or shine. Follow the arrows from Rt. 534 or Turnpike Exit 14. Talk-in on 10, 6 and 2 meters. Swapshop, homebrew, code, contests. XYL-YL program, rag chews galore. Food sold or bring picnic lunch. For Hamfest bulletin write WARA, Box 809, Warren Ohio 44481.

Pennsylvania — The WPA/KSSN annual c.w. traffic men's picnic-business session will be held on Sunday, September 8 at the Rustic Lodge located about one mile south of Indiana, Pa. on Route 286. The lodge can be easily reached from U.S. Route 22. Signs are posted. Additional particulars can be obtained from W3IYI or WA3IPU.

Pennsylvania — The Uniontown ARC will hold its 19th annual Gabfest on Saturday after Labor Day, September 7 on the club grounds on the Old Pittsburgh Rd. Signs will be placed at the intersection of Route 51 and Old Pitts. Rd. Refreshment stand will be open, front row for the swap and shoppers. Registration is $2.00. For more information write Joseph M. Sofranko, 438 Braddock Ave., Uniontown, Pa. 15401.

Pennsylvania — The 13th Annual Hamfest by the Four York County Clubs will be held at Adams County Fair Grounds 4 miles north of Abbottstown, Pa. September 1, rain or shine. Registration begins at 9:00 A.M., talk-in on 50.62 and 145.62 MHz. a.m. and 52.52 and 146.94 MHz. f.m. Plenty of eats, drinks, transmitter hunt, auction, bingo and program for the XYLs. For more information write LeRoy Frey, K3POR, 170 S. Albemarle St., York, Pa. 17403.

Pennsylvania — The Mt. Airy V.H.F. Radio Club is holding its 13th Annual Family Day and Picnic on Sunday, August 11 (rain date August 18) at Fort Washington State Park, Flourtown, Pa., in cooperation with the Dealware Valley Chapter of the QCWA. Come and get together with your families and friends for an old time outing of games, cookout and just plain relaxing for a day away from home. There will be games for the kids and activities for the YLs and XYLs. Free soda for all, no reservations required. $2.00 per family.

Pennsylvania — The 31st Annual Hamfest of The South Hills Brass Pounders & Modulators will be held in Pittsburgh, on August 4 in the pavilion at St. Clair Beach.

South Dakota — The Prairie Dog ARC will sponsor their annual picnic again on August 17 and 18.

Tennessee — The 9th Annual Cedars of Lebanon Hamfest will be held August 25 at Cedars of Lebanon State Park, ten miles South of Lebanon on Route 231 S. Talk-in for mobiles on 50.25 and 3.980 MHz. Pot luck lunch at 1:00 P.M. Everybody bring enough food to feed your party. Drinks will be available on the grounds. For further information call W4VJW, Tenn. Phone Net on 3980 kHz. week days at 6:45 A.M. CDST.

Vermont — The Carrier Net will have a picnic at Lake St. Catherine State Park, south of Poultney on August 4.

Vermont — The International Field Day is scheduled for August 18 at the Old Lantern Inn, Charlotte, Vt. For registration write to Bill Fake, W1FS, 30 So. Hill Drive, Essex Jct., Vt. 05452. $2.50 for early bird, $3.00 at the gate.

West Virginia — The 10th Annual Ham-Picnic by the Black Diamond Radio Club at Bluefield West Va. City Park on Sunday, August 25. Saturday night rally and "Thumpin Keger" round-up. Tune 3890 and 3927 kHz. or write B.D.R.C., P.O. Box 292, Bluefield, West Va., 24701 for information.

Wyoming — The WIMU Hamfest is to be held at Mack's Inn, Idaho on the weekend of August 2, 3, and 4. QST

ARRL SOUTHWESTERN DIVISION CONVENTION

Phoenix, Arizona Aug. 30-Sept. 1, 1968

The 1968 ARRL Southwestern Division Convention will be held at the Del Webb Townehouse in Phoenix, Arizona August 30 through September 1, 1968.

Major General John B. Bestic, USAF, K4BMR, will be featured speaker at the banquet on Sunday.

Southwestern Director John Griggs, W6KW and ARRL General Manager John Huntoon, W1LVQ will conduct the ARRL Open Forum. A DX Forum will be led by Robert L. White, W1CW, assistant communications manager of ARRL. A round table on f.m. repeaters will be handled by the Arizona Repeater Assn. while the RTTY meeting will be moderated by W7VKO. Moonbounce expert W6DNG takes charge of the v.h.f. session, while W7PCY will moderate the Novice forum. MARS men will meet with W7GNP and traffic handlers with K7NHL.

Contests include a Novice homebrew transmitter contest (write in advance to Novice Contest, Convention Committee, Box 15297, Phoenix, Arizona, 85018); a transmitter hunt and a u.h.f. beam-gain contest (420–450 MHz.).

NASA will have working models and a slide presentation on space communications equipment. K7AL of the U.S. Army Proving Grounds will present a slide talk on the Electromagnetic

Environmental Test Facility, showing how it helps the Army avoid radio interference.

Gals who are licensed will enjoy the YLRL session: those who are not, the SWOOP (Suffering Wives of Operators Protective) initiation. And for all the ladies, there's a luncheon at Mountain Shadows, Scottsdale.

Reservations for rooms ($12 single, $16 double) can be made directly to the Townehouse, 100 West Clarendon, Phoenix, Arizona 85013 or for other accommodations, through the Valley of the Sun Convention Bureau, 805 North 24th St., Phoenix, Arizona 85004.

Registration and banquet combination is $12 at the door; registration alone is $3.00. Other info on the convention may be secured from ARRL Convention, c/o Townehouse, 100 West Clarendon, Phoenix, Arizona 85013.

ARRL FLORIDA STATE CONVENTION

Melbourne **August, 17-18, 1968**

A double-barrelled good time for Florida hams and their families has been planned by the Platinum Coast ARS. On Saturday, the convention will meet in the Melbourne Civic Auditorium with all the usual attractions — displays, meetings, forums, contests, swap shop and an auction. The WA4-WB4-WN4 QSL Bureau will be manned by W4LR. Saturday evening, there will be a dance from 9 to 1.

On Sunday, the whole show will shift to Wickham Park for a old-fashioned family outing. Two lakes manned by lifeguards will attract swimmers. Barbeque pits and picnic tables encourage do-it-yourself eats. An ARRL information center will be manned at the park; in other respects, however, Sunday's ham activities will be spontaneous and unrehearsed.

This is one convention which won't drive you to the poorhouse — registration is $1.00! Write the Platinum Coast Amateur Radio Society, Post Office Box 1004, Melbourne, Florida 12901.

ARRL KENTUCKY STATE CONVENTION

Louisville **August 30-31, 1968**

The third annual Louisville Ham Kenvention presented by the clubs in Southern Indiana and greater Louisville, will be held August 30-31, 1968 at the Executive Inn.

The convention sparkles into life Friday at 6 p.m. with equipment exhibits, a new amateur radio film, QSOs 'n' Coffee, and a big get-together sponsored by the Indianapolis DX Association.

Alban A. Michel, W8WC director from the ARRL Great Lakes Division keynotes the ARRL Session on Saturday, with Lewis G. McCoy, W1ICP, representing hq. and L. F. Jeffreys, WA4KFO, section communications manager for Kentucky, presiding. The "DXers Delight" moderated by K9GCE/PJ5MM includes KW6EJ, W2GHK, and W4BPD. A joint MARS forum will feature Transcon Net manager AF8-UJB, while a session on nets has been organized by W9HRY.

Governor Louie B. Nunn of Kentucky signs a proclamation for Amateur Radio Week August 24 through August 31, coinciding with the Louisville Ham Kenvention. The citation emphasized amateur emergency communications.

W4LW leads a unique "upgrading" code competition in which Novices and Technicians who copy 13 and Conditionals, Generals and Advanced Class amateurs who conquer 20 will receive a valuable workshop tool as an award. Other skill events: a zero-beat test; junk box ingenuity; original circuitry; homebrew equipment appearance judging and even a kit-building category. Bring your favorite project to K4FJK.

Lots of technical talks, too: W1ICP on monoband *vs.* triband beams and WØHTH on quads *vs.* Yagis; "A View of RTTY Today, for Beginner and Oldtimer" prepared by W6FFC (ex-K8DKC) and put on by WA4TWB; "Now it's Amateur Color TV" by W9HWK and K4ZQR; and "Slow-Scan to Australia," by W9NTP, to mention only a few.

"Voice-modulating a Laser Beam," by Tracy Kinsel, Bell Labs, Murray Hill, N. J., will illustrate how 1200 conversations and 100 TV programs can be channeled simultaneously to and from satellite and moon-based stations of the future. Demonstrations will also take place throughout the day in the convention hall.

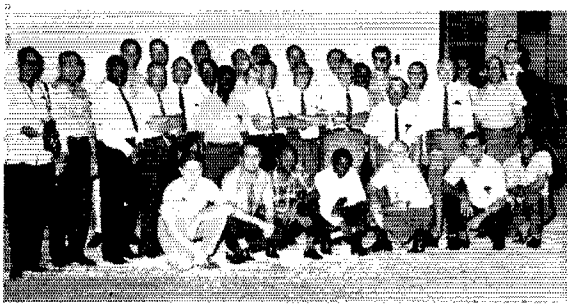
"Solving Amateur Calculations by Time-Sharing Computer," will be presented by Roy Huffman of IBM Indianapolis. Amateurs will have access to a computer which will design a multi-element quad or yagi in seconds after it is told frequency and boom length.

An all-day ladies program has as just one feature Phil Pecora of "World of Beauty" talking about wigs.

Registration is $2.50 in advance, $3.00 at the door; the ladies program is $3.00 (including lunch and registration) and the Saturday banquet is $7. Tickets and info from: Kenvention, 648 South Fourth Street, Louisville, Kentucky 40202. QST

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION



Here are members of the *Jamaica Amateur Radio Association* meeting at their club headquarters station, 6Y5RA in the Kingston Red Cross Building. Guests at the meeting were VE3HC, W4QS, VE3CL, and VE3COK. (Photo courtesy of Gleaner Co.)

REGION III CONGRESS

Sydney, Australia, April 15, 1968 was the setting of the inaugural meeting of the Region III organization of IARU. The general aims of the organization are to foster greater cooperation among Region III amateur societies toward strengthening amateur radio. Each society will appoint a director; a secretariat is provided by the *Wireless Institute of Australia* (*WIA*); and, a bulletin will be published through cooperation of the *New Zealand Association of Radio Transmitters* (*NZART*) and the *Japan Amateur Radio League* (*JARL*).

Delegates present at the first Congress were, representing *JARL*, President JA1FC, and Foreign Liaison Director JA1BK; representing the *Philippines Amateur Radio Association* (*PARA*), DU1EA; representing *NZART*, President ZL2APS, and ZL2AC; representing *WIA*, VK3VX, VK3QV, and VK3IZ; and, representing IARU Hq., President WØDX. Greetings were received from Nepal, India, South Korea, Laos, Thailand, United Kingdom, and Hong Kong.

The Region III organization now joins sister regional IARU organizations existing in Regions I and II. The next Region III Plenary meeting is expected to be held in Tokyo during 1971.

FLASH—3RD-PARTY AUTHORIZATION WITHDRAWN

The previous announcement concerning the exchange of third-party communications with amateur stations in West Berlin has been recinded. It has been determined that the regulations of the Federal Republic of Germany, which in effect prohibit third-party communications, also apply to amateur stations in West Berlin including stations operated by U.S. Forces personnel.

SPACE CONFERENCE COMING

The Administrative Council of the International Telecommunications Union (ITU) has announced the intention of holding a world administrative conference in the latter part of 1970, to deal specifically with space radio communications problems and allocations. The exact dates, location and duration will be decided at next year's Council session, as will the detailed agenda. Frequencies between 200 and 20,000 MHz. are expected to receive the greatest scrutiny. The last such space conference was held in 1963 in Geneva (see *QST* for January, 1964, page 60).

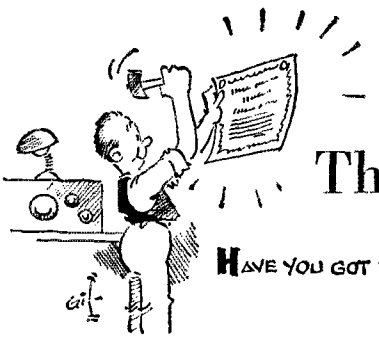
ITALIAN EARTHQUAKE EMERGENCY

Shortly after the disastrous earthquake last January which killed about 500 people in Sicily, a number of radio amateurs located in and around Palermo hurried to the disaster scene and set up emergency communications equipment. During the next few days hundreds of messages were transmitted to amateurs on the Italian mainland for onward dispatch to relatives and friends. (*Region I Bulletin, 11BBE.*)

IARC CONVENTION

The International Amateur Radio Club will hold their annual convention September 7–8, 1968. Amateurs in Geneva at the time are invited to attend. For further information write Ted Robinson, F8RU, 10 Rue de Gex, Ferney-Voltaire, Ain, France.

IARU/ARRL President WØDX administered the oath of office to new officials of the *Liga Mexicana de Radioexperimentadores* during their national convention in Monterrey, Mexico. From left, are WØDX, XE1CCP, XE1MMG, President XE1LLF, Vice-president XE1SH, XE1HD, and XE1SSU.



Those Higher-Class License Examinations

In Six Parts — Part VI

Receiving Principles

IN this concluding section of the examination series the questions are on receivers and the general problems of reception. As before, the FCC sample questions that follow are taken from both the Advanced and Extra Class examinations; those from the former are headed with (A), and those from the latter with (E).

Study material for this section will be found in *The Radio Amateur's Handbook*, Chapter 5. The part you need is pages 92–119, inclusive, in the 1968 edition and pages 90–117 in the 1967 edition. Supplementary information also will be found in Chapter 3 of *Understanding Amateur Radio*; read all of the chapter in this case.

The only questions you're likely to get in an actual examination that will require any numerical work are ones dealing with the relationship between signal, intermediate, and image frequencies in a superhet receiver. These are simple sums and differences; the principles are explained in the study references given above.

The half-dozen exam-like questions at the end will let you see how well you make out with the multiple-choice form.

In conclusion, if you've stuck with us and have done reasonably well in the monthly tests, you shouldn't have to approach the actual exam with trepidation. You're well prepared!

FCC Sample Questions

(E) Of what importance is the signal-to-noise ratio of a receiver? At what radio frequencies is this ratio most important?

The signal-to-noise ratio of a receiver determines the minimum strength of signal that may be detected without being masked in the receiver noise. This ratio becomes most important in the v.h.f. range and above, because at frequencies where propagation is via the ionosphere atmospheric noise is more of a factor in determining the overall signal-to-noise ratio than receiver noise.

(E) What are some different types or sources of noise voltages in reception? How is each type generated?

Noise voltages fall into two general categories, natural and man-made. Naturally generated noise voltages may in turn be separated into two classes, those generated inside the receiver itself, and those arising external to the receiver.

The types generated in the receiver are principally thermal-agitation noise and shot-effect noise. Thermal agitation noise is the result of random movement of electrons in a resistance, a phenomenon which depends on temperature. As a result of the random movement, a varying voltage containing components spread continuously over a wide band of frequencies appears between the resistor terminals. The noise voltage is very small, but with the high amplification provided by the receiver the noise generated in the receiver's input circuit becomes evident as a smooth hiss. Shot effect (and an associated phenomenon called partition noise) is noise voltage generated by minute variations in the electron stream that conducts the current in a vacuum tube. The noise voltage amplitude, as in the case of thermal noise, is very small but with large amplification is readily made audible in the output of a receiver. It is also a hiss-like noise. A comparable noise phenomenon occurs in transistors.

The principal source of natural noise external to the receiver is atmospheric noise or "static." Natural static is a broad-band radio signal generated by electrical discharges in the atmosphere, such as lightning; it occurs in "crashes" which usually are frequent enough to overlap.

Man-made noise is any noise voltage capable of causing radio interference that is generated by man-made devices – – such as electric motors, gas-discharge devices, thermostats, and automobile ignition systems — in which the generation of a radio frequency voltage is an incidental result of the operation of the device. The r.f. voltage usually is generated by a spark that occurs on the opening and closing of a circuit, as in a thermostat, switch, or the commutator of a motor. The spark may also be intentionally produced, as in the ignition systems of internal-combustion engines. In devices such as neon and flourescent lamps, where the current is abruptly started and stopped at the power frequency rate, the steep wavefronts so generated have frequency components extending well into the radio-frequency spectrum. As heard in the receiver, noise generated in electrical equipment operating from the power line has pronounced hum modulation (at some multiple of the power frequency) superimposed on a buzz or "hash"-type irregular noise. Automobile ignition systems cause a

"popping" type of response in the receiver at a more-or-less regular rate which depends on the motor speed; this is because the pulse generated by each spark is of short duration compared to the time between sparks.

(A) How do noise limiters operate?

A noise limiter is designed to reduce "impulse" noise which, because of the short duration of the pulses compared with the time between them, must have high amplitude to contain much average energy. A limiter circuit, therefore, is constructed so as to pass all energy up to the level of the desired signal being received, but to cut off energy above that level. A series circuit is arranged to become non-conductive above the set level; a shunt limiter short-circuits any signal above the desired level. In both cases the action is effective only for the few microseconds occupied by a noise pulse, and since this time is quite short compared to the interval between pulses, the effect of the momentary open- or short-circuit in the signal path is hardly noticeable on the signal itself.

(E) Where in a receiver circuit should a limiter/blanker stage be placed to provide maximum utility?

For maximum utility a limiter-blanker stage should be placed ahead of the high-selectivity circuits of the receiver. Noise suppressing circuits of this type are most effective on pulse-type noise of high amplitude but very short pulse duration, because it is necessary that only a small part of the desired signal be blanked out while the pulse is being suppressed. Circuits having high selectivity cause the energy in the pulse to be spread over a longer period of time, making it necessary to blank out a larger portion of the desired signal along with the noise pulse. The more selectivity ahead of a noise-reducing device, the more difficult it becomes to secure good pulse-type noise suppression.

(A) A superheterodyne receiver having an intermediate frequency of 455 kc. is to be adjusted to receive a signal on 3900 kc. What frequencies can the high frequency oscillator be set to, to give a beat signal at the intermediate frequency?

In the heterodyne process, two signals are mixed and produce two new signals, one the sum of the two original frequencies and the other the difference between the two frequencies. In the question above, the signal frequency, 3900 kc., is larger than the intermediate frequency, 455 kc., and there is obviously no positive number that can be added to 3900 to give 455. Thus only the difference frequency can be used. The high-frequency oscillator could be set either to 4355 kc. (4355–3900 = 455) or 3445 kc. (3900 – 3445 = 455).

(E) What is the image-response of a receiver? How can it be reduced?

Image response is a phenomenon peculiar to superheterodyne-type receivers. In the superhet the incoming frequency is converted into a new one more suitable for amplification. In the conversion process a local-oscillator frequency is modulated by the incoming signal, giving rise to the sum and difference frequencies (sidebands) characteristic of any modulation system. In the great majority of superhet receivers the lower sideband — i.e., the difference frequency — is the one chosen for further amplification, the sum frequency and local-oscillator frequency being filtered from the converter output. The chosen frequency is called the intermediate frequency (i.f.)

For any given local-oscillator frequency there are two signal frequencies, one above and one below the oscillator frequency, that will result in the same difference and thus produce an i.f. signal. For example, if the i.f. is 1500 kc. and the local-oscillator is set to 9000 kc., signals at 7500 and 10,500 kc. both will result in a difference frequency equal to the i.f. Of these two, only one is the desired signal; the other is called the image. Image response in a receiver is the cause of undesired interference. It is minimized by the use of as much selectivity as is practicable at the desired-signal frequency, and by using as high a frequency as practicable for the intermediate frequency. The latter reduces image response, for a given degree of signal-frequency selectivity, by placing the image signal farther down on the selectivity characteristic.

(E) How do trimmer and padding capacitors affect receiver tuning?

The terms "trimmer and "padder" are often used interchangeably, but also have separate specific meanings. A trimmer capacitor is one used to effect a fine adjustment of capacitance; it is usually connected in parallel with a larger capacitor which may be either variable or fixed. When paralleled with a variable capacitor it is generally used for adjustment of the minimum capacitance of the circuit to set the high-frequency limit of the tuning range. For example, in gang-tuned capacitors trimmers will be used to make the tuned circuits "track" at the high-frequency end of the range.

A padder capacitor may be any fixed capacitor connected either in series or parallel with another in order to reach a specific value of capacitance not otherwise available. An example is the padder capacitor connected in series with the variable oscillator tuning capacitor in a gang-tuned superhet receiver when all the sections of the variable tuning capacitor have the same maximum capacitance. In the usual case the oscillator frequency will be higher than the signal frequency, so to tune the same range in kilocycles on both frequencies, and thus maintain a constant difference (i.f.) frequency, the effective oscillator capacitance range must be smaller than the capacitance range in the signal circuit.

The padder capacitor sets the maximum value of effective tuning capacitance in the oscillator circuit.

(E) Define the conversion efficiency of a mixer tube.

The conversion efficiency (usually called conversion gain) of a mixer tube is the ratio of the i.f. output voltage developed in the plate circuit to the r.f. signal voltage applied to the grid.

(A) What function does a variable-mu tube perform in an r.f. amplifier stage of a receiver?

A variable-mu or remote-cutoff tube is one designed in such a way that the amplification factor decreases with increasing negative grid bias. This enables the tube to handle both large and small signals (by proper choice of grid bias), with minimum distortion and cross modulation.

Varying the grid bias also offers a convenient means of varying the gain of the stage without introducing undesirable distortion effects. The gain may be varied either by manual or automatic adjustment of the grid bias. In automatic gain control the bias voltage is obtained from rectification of the signal and is applied (usually) to two or more r.f. or i.f. stages so that the gain can be varied over a wide range. Sufficient control obtained in this way makes the audio output substantially constant over a wide range of signal levels.

(A) How does automatic gain control operate? When can it be used for s.s.b. operation? C.w. operation?

In a circuit providing automatic gain control, the amplified signal is converted to d.c. by rectification and the d.c. is used to reduce the amplification or gain of one or more stages in the receiver. Thus when a strong signal is received, it produces a reduction in receiver gain and prevents overloading; with a weak signal, the gain is reduced only slightly or not at all, thus permitting the maximum gain needed. With vacuum-tube amplifiers, the rectified d.c. voltage is negative and is applied to the amplifier grids to reduce the stage gain; with transistors, the d.c. is generally used to change the base bias or collector voltage in such a way as to reduce the gain.

Since the beat-frequency oscillator is in operation for reception of c.w. and sideband signals, the a.g.c. voltage must be derived from a rectifier isolated from the b.f.o.; otherwise the energy from the b.f.o. would itself produce an a.g.c. voltage and reduce the receiver gain.

A.g.c. circuits can be designed to act rapidly or slowly, depending upon the time constant of the resistor-capacitor combination involved. For c.w. and sideband reception, the a.g.c. circuit should function promptly with the receipt of a signal (fast attack time) and become inoperative rather slowly when the signal disappears (slow decay time). This type of action holds the receiver gain constant during the spaces between c.w. code characters and during short pauses in s.s.b. voice transmission.

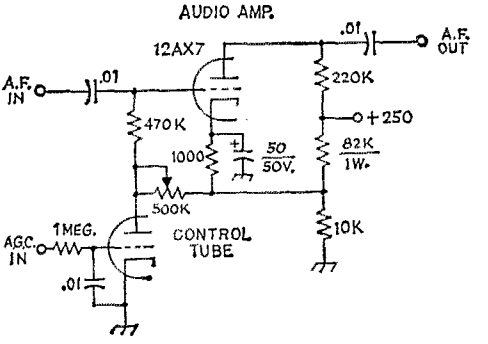
(E) How will a long and a short time constant a.g.c. circuit affect reception?

In amplitude-modulation reception the time constant of the a.g.c. must be long enough so that the modulation on the signal is completely filtered from the d.c. output of the a.g.c. rectifier, but not so long that the a.g.c. will not follow rapid fading.

In reception of suppressed-carrier s.s.b. or c.w. signals, the a.g.c. system should respond as rapidly as possible to the initial received signal, but its decay time should be long enough to hold the receiver gain at essentially the same level between code elements or during the short pauses in voice communication.

(E) How does a squelch circuit operate? Draw a commonly used squelch circuit.

A squelch circuit silences the audio output of a receiver when no signal is being received. One method of accomplishing this is to apply greater-than-cutoff bias to an audio stage so it cannot amplify, and then restore normal bias and normal operation by means of a control tube whose operation in turn is controlled by a.g.c. voltage developed by an incoming signal. An adjustment usually is provided so that signals below a selected level cannot "open" the squelch circuit to permit reception.



(E) How can you distinguish between a product and an envelope detector?

An envelope detector is one whose output is a reproduction of the modulation envelope of the detected signal. The simplest version is a diode rectifier which, when the r.f. component is filtered out, gives a varying d.c. output which follows the amplitude variations (modulation) of the signal. With conventional amplitude modulation these variations represent the complete intelligence-bearing part of the signal.

Consequently, the diode envelope detector is used for a.m. reception.

A product detector is one whose output theoretically is obtained by multiplying two signals together. The received signal modulates a local oscillator, producing sum and difference frequencies as in any modulating or mixing process. If the signal and local-oscillator frequencies are separated by only a few hundreds of cycles per second, the difference frequency is in the audio range. The sum frequency, being approximately twice the signal frequency, is a radio frequency and is filtered out in the detector output circuit. Product detection is used for reception of unmodulated c.w. signals and suppressed-carrier s.s.b. signals, the modulation of the latter type not being in a form suitable for envelope detection.

The local oscillator (b.f.o.) is the distinguishing feature of a product detector as compared with an envelope detector. Any envelope detector can be converted into a product detector by the addition of a b.f.o. to switch it into and out of conduction at a radio frequency rate. For optimum detection with a product detector the conduction time should be short compared with the non-conduction time; that is, the b.f.o. amplitude should be many times that of the incoming signal. This reduces distortion and, in the case of detectors which in the absence of a b.f.o. would be envelope detectors, practically eliminates simultaneous envelope detection.

(E) How can a receiver be adjusted for s.s.b. reception when the receiver does not have a product detector?

Product detection *must* be used for s.s.b. reception. That is, an s.s.b. signal cannot be properly demodulated without a local oscillator (b.f.o.). If the receiver has no b.f.o., one must be supplied before s.s.b. reception is possible. If it has a diode detector and b.f.o., product detection is automatic when the b.f.o. in switched on. For optimum detection in such case the r.f. and i.f. gain of the receiver should be reduced until the signal level at the detector is considerably below the b.f.o. level.

(E) How does the beat-frequency oscillator affect the tuning of a single sideband signal?

In s.s.b. reception the suppressed-carrier frequency of the incoming signal, as translated to the receiver's intermediate frequency, must be the same as the frequency to which the beat-frequency oscillator is set, for proper demodulation of the signal. If the signal has been properly tuned in and the b.f.o. frequency is subsequently shifted, the receiver tuning has to be readjusted to compensate for the b.f.o. frequency shift. That is, the tuning and b.f.o. adjustments interlock. The b.f.o. control may, in fact, be used for fine tuning, but with receivers having high-selectivity filters, this is usually inadvisable since the relationship between b.f.o. frequency and filter passband determines the audio-frequency response band of the receiver. It is usually better to set the b.f.o. permanently at the frequency that results in best demodulation in the important voice-frequency range, approximately 250 to 2500 c.p.s., and do all tuning with the regular tuning control.

(E) How would the reception of a single sideband signal be affected if the carrier is not completely suppressed?

If the carrier is not completely suppressed, a continuous tone may be generated in the receiver whenever the transmitter is "on," whether or not there is voice modulation. The tone results from heterodyne action in the detector when the incoming signal is not properly tuned — i.e., when the partially-suppressed carrier is not in zero beat with the local oscillator (b.f.o.) used for demodulating an s.s.b. signal. The tone can be eliminated by exact tuning of the receiver and thus need not cause difficulty in detection. However, the radiated carrier can cause interference to other s.s.b. signals using slightly different suppressed-carrier frequencies.

(A) How can receiver sensitivity and selectivity be improved?

If the receiver is known to be lacking in sensitivity and selectivity, possible avenues of improvement might be:

a. Addition of a tuned r.f. amplifier (that is, preamplifier) preceding the existing first stage in the receiver, and using a low-noise r.f.-amplifier tube or transistor. This should improve the signal/noise ratio of the receiver, overall, and the additional tuned circuits will improve the selectivity against image response and other off-channel interference. If the receiver already has an r.f. amplifier stage and the overall gain is such that additional amplification is not needed, the substitution of a lower-noise amplifier tube in the r.f. stage may effect a worthwhile improvement in effective sensitivity.

b. If the receiver already has a low-noise r.f. amplifier stage, replacing the (first) mixer by a lower-noise type — such as substitution of a triode mixer for a multigrid tube — should improve the overall signal/noise ratio, at the cost of lower gain which might have to be made up elsewhere in the receiver.

c. Insufficient adjacent-channel selectivity can be overcome by any measures that will reduce the i.f. bandwidth to the minimum necessary for the mode of communication. This might be accomplished, in some cases, simply by the addition of one more tuned i.f. stages. In some receivers, it should be possible to improve i.f. selectivity by substituting better interstage transformers (higher-Q coils, looser coupling) without otherwise changing the intermediate-frequency circuit. An alternate method would be to convert the output of the existing i.f. amplifier to a lower frequency, in the vicinity of 50 to 100 kc., where relatively high selectivity can be obtained without difficulty in one or two tuned amplifier stages.

A separate detector can be provided at the new intermediate frequency, or the existing detector and audio stages can be used by appropriate rewiring. In general, the adjacent-channel selectivity problem is handled best by the use of mechanical or crystal filter in the i.f. circuit. The filter should have the lowest possible shape factor for maximum discrimination against adjacent-channel signals.

d. Regeneration can often be employed to advantage in improving selectivity and gain. A regenerative "front-end" stage, for example, will increase the gain of the stage and thus improve the signal image ratio in a superheterodyne-type receiver. Regeneration also may be used in an i.f. stage to increase selectivity and gain. A "*Q* multiplier" works on this principle, and in addition may provide an adjustable null response for "notching out" an undesired signal.

e. The addition of a notch filter in the i.f. system will help by eliminating or reducing the interference caused by a signal that falls inside the passband of the receiver.

(E) How should a wave trap be connected to a receiving antenna circuit to attenuate an interfering signal?

A parallel-tuned trap should be inserted in series with the antenna lead to the receiver. When tuned to resonance with an interfering signal it has high impedance at that frequency and will attenuate the interference. The trap has relatively little effect on signals having other frequencies because its impedance decreases rapidly as the frequency is moved off resonance.

A series-tuned trap should be connected between the antenna and ground terminals of the receiver. When tuned to an interfering signal it acts like a short-circuit for that frequency and little of the interfering energy reaches the receiver. Signals of other frequencies are attenuated comparatively little, because the trap impedance rises rapidly as the frequency is moved away from resonance.

(A) What types of emissions can be received with selectable sideband receivers?

A selectable sideband receiver can be used to receive most amplitude-modulated signals, whether c.w. or voice. For maximum results on standard a.m. voice signals it should have sufficient carrier insertion to achieve "exalted carrier" reception. Its selectivity is such that it is particularly useful in switching from one sideband to another on the same phantom carrier, such as independent sideband emission.

(E) How do receivers for remote control of objects and regular type communications receivers differ in basic operation?

Receivers to be used in the remote control of objects are generally fixed-tuned on discrete channels, while regular communications receivers are tunable across broad bands of frequencies. Also, communications receivers actuate a loudspeaker or headphones, while remote control receivers are designed to actuate a mechanical control device upon receipt of a signal.

Examination-Form Questions

Q1. Why should the decay time-constant of an a.g.c. system used in s.s.b. reception be long?

A — A long time constant prevents rapid fading.
B — It prevents blasting by strong signals.
C — It reduces interference from transmitters on nearby channels.
D — The voice quality of the received signal is better.
E — To prevent changes in receiver gain during variations in speech level in the received signal.

Q2. What order of receiver bandwidth would be expected to give the optimum signal-to-noise ratio in s.s.b. reception?

A — 10 kc.
B — 5 kc.
C — 2.5 kc.
D — 1 kc.
E — 500 cycles.

Q3. On which of the following types of radio noise would you expect a noise clipper to be most effective?

A — Natural static.
B — Splatter from overmodulated transmitters.
C — Electric-motor noise.
D — Automobile ignition noise.
E — A.c. hum.

Q4. Which of the following affect the signal-to-noise ratio of a receiver?

A — Thermal-agitation noise.
B — Shot noise.
C — The receiver's bandwidth.
D — Alignment of the receiver circuits.
E — All of the above.

Q5. What is the principal distinguishing eature of a product detector?

A — Elimination of diodes.
B — Use of more than one tube.
C — Use of a beat-frequency oscillator.
D — Inability to receive amplitude modulation.
E — Lack of regeneration.

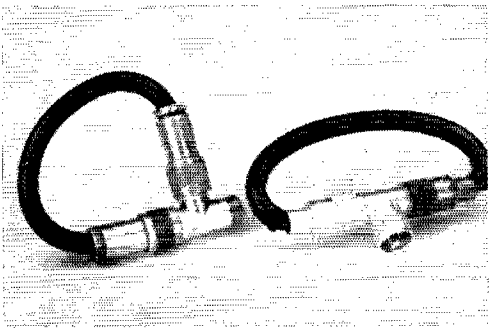
Q6. Under what circumstances is a squelch circuit most useful?

A — When tuning for weak DX signals.
B — When the band is crowded.
C — When the family objects to the sound from the loudspeaker.
D — When reception is desired from a particular station on a known frequency.
E — In mobile operation.

(Answers on page 138)

Strays

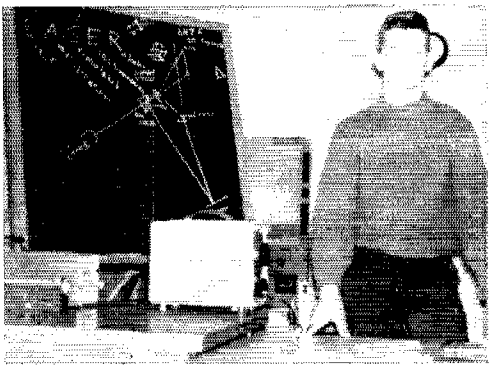
This is WA4BRS/R3 aboard the U.S. Coast Guard Cutter *Bering Strait*. The ship is a weather/oceanographic station which also serves as an aircraft checkpoint and search and rescue facility in the north Pacific. All amateur operating is on 10-, 15-, and 20-meter s.s.b. and c.w.



We thought that the note about making a circlet from a 10-inch length of RG8/U in the April article "Dummy Loads from the June Box" would be enough of a tip-off to the unwary. However, we were proved wrong by Bob Bawker, KH6YL/6 who sent us an actual 10-inch loop of RG8/U using an N-type "T" connector and fittings. K1QQX here at Headquarters put one together (right) using standard u.h.f. fittings. See "Correspondence From Members" column in the June issue for more comments on the April articles.

You don't need an expensive airline ticket to far away places for a poor man's DXpedition. Thanks to the Secretaria de Comunicaciones y Transportes, Mexico is now issuing temporary operating permits to licensed U.S. hams during 1968. Shown here is Phil Mendel, K6RYI, with a 2-watt all solid-state 40-meter transceiver operating as XEØDMK in Baja, California, Mexico. Phil and Jack Rasor, W6DMK, worked over 50 c.w. and s.s.b. stations last March. Included in the c.w. contacts was JA1PZO in the early hours of one morning.

Amateur experimental efforts continue to push higher into the electromagnetic spectrum. Here Dennis Mattison, K7SCU is shown giving a talk and demonstration to members of the North Seattle Amateur Radio Club of a laser built by Dale Lawrence.



W5NW, the League's First Vice President, is making a collection of antique vacuum tubes. Here he is shown receiving an 803 (circa 1941) from New England Division director W1QV, during the course of the recent Board meeting.

Correspondence From Members-

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

APPLIANCE OPERATORS

¶ The June Editorial stated that the vast majority of us are indeed "Appliance Operators." I think this article should have been in the April Fool issue. — *K. R. Rietman, WAØFBP, Elk River, Minn.*

¶ I am an appliance operator. I do not like the expression. I operate 50 MHz. *only*. I use a Swan 250. I could not care less for those that call one another an appliance operator.

I tinker with other little gadgets.

Have you, the caller of other guys "an appliance operator," ever had a construction article in *Radio**, *Radio/Television News**, *Antenna*, *CQ*, *QST**, or *Ham Radio*? I have.

I have had calls in four US call areas and have operated portable in all plus Hawaii and the Philippine Islands. I am about to receive a KL7 call to operate in Alaska later this summer. My Swan "appliance" will be with me.

Why do not you "appliance operators" that call others this, get on the stick and build something and send it to one of the magazines — you will then find that the color of the pot is black? — *Everett G. Taylor, W6DOR/W7BYF, North Highlands, Calif.*

[EDITOR'S NOTE: *Yes.]

¶ I have been a Technician for fourteen years — one who has always regarded an amateur who makes his own equipment more of a true ham than those who buy that ready made stuff, regardless of license class.

Now I know why your reasoning rarely makes any sense to me — your June issue is in support of the appliance operator, even for those with a lack of inclination! It seems to me that a lot of theory and a fat pocketbook does not make a ham, only the ARRL version.

I would suggest that you appliance operators at Hq. examine your own status, perhaps read a few of the old-time *QSTs* and think a lot. It's not too late to change your ways. — *Robert Tynemouth, W1DOB, North Conway, New Hampshire.*

¶ In your June editorial, you say," . . . the vast majority of us are indeed appliance operators." It needn't be that way.

Over ten years ago, I constructed a phasing type s.s.b. exciter, following a schematic from an ARRL *Handbook* of the '50s. I wouldn't recommend it as a first project, and it might take some people a month or more, but the job is certainly not a formidable one.

The point is, 95% of today's hams forego 95% of the enjoyment of their hobby by relying on some factory engineer to build and design their equipment for them. Nothing can compare with using your own creation on the air, in my estimation. Mine is not pretty (except to me) and may not come up to the specifications for the factory-built jobs, but still puts out an acceptable signal.

Since most already have commercial equipment, the construction of one's own exciter can be a leisurely affair to occupy one's time during those periods when the meaningless yak-yak that constitutes so many QSOs ceases to yield any satisfaction. After completion and checkout, the chrome-plated factory job can be peddled to those lacking the time or guts to "roll their own." — *W. S. Skeen, W6WR, Brentwood, Calif.*

¶ The appliance operator is not just an occasional person. From my observations in three widely separated areas in Minnesota, seven to eight out of ten can't build nor repair the electronic equivalent of the wheel-barrow.

These people are continually bringing their repair work to hams like myself who have built and serviced our gear since away back. Today I use manufactured gear. These are just a microphone-happy *bunch of lids* — who hold all classes of ham licenses. — *Sam J. Main, WØHQW, Brainard, Minn.*

¶ Your editorial on the appliance operator misses the entire point of existence of amateur radio. For most, amateur radio is a hobby, not a profession. As such, the measure of the beast is taken in the pleasure derived by the majority of participants, not in the professional standards of the minority. — *Stanley Jaffin, WB4IRK, Arlington, Virginia.*

[EDITOR'S NOTE: The June editorial neither supported the "appliance operator" who wants only to "plug in and go on the air" nor rejected the "appliance operator" who is a technically competent operator of commercially-manufactured equipment. What we questioned is the worth (to amateur radio) of the individual, who knows not what goes on behind the panels and dials of his equipment.

It is true that each of us enters ham radio for the pleasure we receive from participation, and not necessarily for the service we render (intentionally or otherwise) to the nation and the world. However, Congress says that every radio station must operate "in the public interest." So, just as broadcast stations may monetarily profit from their activity so long as it serves the public interest, amateur stations may derive pleasure from their operation — so long as it serves the public interest. And, one of the ways defined in law for amateurs to provide a service, is through possession of skills in both the communication and technical phases of the art.]

OPEN-BOOK EXAM?

¶ Consider the relative educational levels in the various license classes as compared to the general education presented in our national school system:

1) The Novice license compares with elementary school.
2) The General class license, with high school.
3) Advanced and Extra are the college courses of amateur radio.

I, therefore, suggest that the League sponsor a docket for presentation to the FCC for their permission for the use of any aid the examinee may feel necessary during examination (Elements 3, 4A, 4B). I make this suggestion for several reasons:

1) When the amateur is home working out a problem in design of a particular piece of gear, he has access to various aids and references.
2) Any specialized knowledge he will gain for use during an examination will be forgotten in the

months and years that follow, except where to find whatever information he may require.

3) Professional engineering examinations are conducted in the manner suggested. — *Al Mumby, WB2MCP, Rochester, N. Y.*

160 METER EXPANSION

Hail the new 160 Regs.!

Hail the ARRL.

On to 1715 kHz.!? — *Bill Keating, W4KE, Forest Park, Georgia.*

QSO MANAGERS

What appears to be on the increase for DX stations, lately, is a "QSO Manager." Although no official title as such has been coined, I can't at present think of a more suitable term.

Twice within the past month, I have attempted to work a rare DX station using a QSO Manager. The procedure is generally such that the manager, over the air, collects a list of stations desiring to work the rare DX. This is supposedly at some predetermined time and frequency for the collection. Then at a later time and frequency, the manager meets the rare DX station on frequency and relays to that station the list in batches of ten or twenty. Then the rare DX station works down the list to the stations who are QRV for a QSO. When one batch is completed, a second batch is relayed by the manager and the procedure repeats itself. . . .

If anyone can totally justify this means of working DX station, I will be the first to listen to them. In my estimation however, it stinks. It is a total waste of time, causes additional delays when the skip is favorable only to certain areas, is prejudiced, unreliable at best, and very unsportsmanlike. It makes, in addition, a "guinea pig" out of both the DX station and the one who is working him. Why is he needed at all?? It is a classic case of unnecessary and undesirable red tape being added to a system that is already complex enough and full of chance. — *"Oak" Oksheen, W9EXE, Richton Park, Illinois.*

SENIOR CITIZEN LICENSE?

If there were to be a special category of ham license for qualified people over 65 years of age, we would have an outlet for many such people impossible to duplicate elsewhere. I have in mind a special license, to be made available on much the same terms as the present Novice Class license. But, whereas the Novice has many years of life remaining to him, in which he can develop his talents, and whereas his capacity to learn is still great, the oldster is not so fortunate. He can neither learn quickly the code and higher levels of technology, nor safely consider that he may have many years left, in which to develop his talents. I therefore feel that a code speed of 5 words per minute would suffice, and there would be no objective in setting up a time limit, such as there now is, in the case of the Novice Class license. Furthermore, since commercial gear is now available, that is virtually foolproof, and can be operated by people with no technical knowledge at all, such equipment could be made available to the senior operator over 65, with no more chance of misuse than now is the case with marine and aviation situations. And not as much chance of misuse as now is a fact of life on the citizens' band.

Unless one has had the privilege of visiting one of the senior citizen clubs, or a retirement center, it is utterly impossible to visualize the enormous psychological lift that this suggested program could provide to a group of U.S. citizens, who can vote for every office in the land, but who are presently legislated out of business, in so far as getting into ham radio is concerned. — *M. Crosby Bartlett, W9MC, Indianapolis, Ind.*

HAM 'N' GRAVY

It was heartening to note that Connie Evans (page 77 June *QST*) was unaware of two highly-developed techniques for acquiring new ham gear. At the risk of revealing the methods to the "enemy," they are:

1) Try to purchase new gear just prior to a hamfest. Leave it in the trunk of *your* car until you return from the hamfest. Such equipment may then be declared as the prize you won!

2) On other occasions, leave all new ham gear in the car for several hours after you arrive home. After dark, or when the XYL is busy, remove the gear and place it in a basement window well. Very nonchalantly walk through the house and go to the basement. After determining that the way is still clear, open the basement window and bring the gear inside.

Note: These two methods are not for those whose anxiety to check out new equipment does not permit leaving it in a car for prolonged periods; nor has No. 2 been found to be useful when the shack is not in the basement! — *Walter B. Varnum, W2OH, Collingswood, New Jersey.*

INTERFERENCE

I read with interest the recent article, "Interference and the V.H.F. Mountain-Topper," by J. G. Botts, which appeared in the June issue.

The Federal Aviation Administration has experienced very few instances in which interference to our facilities has been caused by radio amateurs. Nevertheless, the possibility of inadvertent interference is always with us, the consequences of which could well be very hazardous to the flying public.

I wish to express my appreciation for the author's concern, and I feel you have performed a very beneficial service to our agency by directing the attention of your fellow amateurs to our installations. — *M. M. Martin, Director, Systems Maintenance Service, Department of Transportation, Federal Aviation Administration, Washington, D. C.*

ARRL QSL BUREAUS

My father is a volunteer worker for QSL Bureau Chief Hurley O. Saxon here in W5 land. I help my father by sometimes sorting the cards and sealing the envelopes and stamping the return address. I ask all hams who send cards to the bureau to write neatly, (some hams write like first graders), prominently display the call of the person receiving the card and sending stamped self-addressed envelopes. Also please use zip codes. — *Bruce Anderson, WN5UBU, El Paso, Texas.*

This letter is directed to the crew at the North Jersey DX Association (ARRL W2-K2 QSL Bureau). I wish to express my many thanks to all for a job well done handling 36,000 cards per month. — *Harry Lee Moore, Sr., K2VNW, Paterson, New Jersey.*

[EDITOR'S NOTE: Hq. wishes to express thanks to all the volunteers who operate the ARRL QSL Bureaus. For details about your Bureau, see page 96.] QST

The World Above 50 Mc.

CONDUCTED BY BILL SMITH, *WB4HIP

Noise—Part II

THIS month we conclude the two-part series on impulse noise reduction by Al Burson, K5WXZ. These articles were not intended to detail construction of noise-limiting devices, but rather to present some of the problems v.h.f. amateurs face in noise reduction and suggest ways to overcome them.

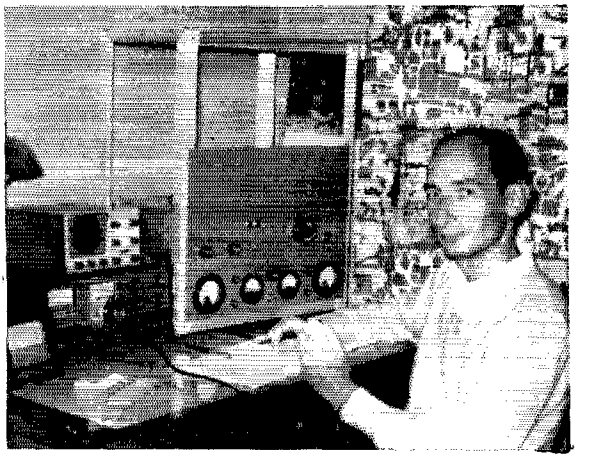
A design I have used has two 2N404 transistors connected to adjacent filter sections of a 300-ohm delay line, having a 15-MHz. cut-off frequency. Using it at 10.7 MHz., the attenuation with the transistors switched on is in excess of 80 db.

The delay time through the transistor shaping stages, around 200 manoseconds, added to the delay time through the tuned-noise amplifier, depending upon bandwidth, totals approximately 300 nanoseconds. The delay line must have a delay greater than this, to insure the gate's disabling the signal path before the noise pulse traveling through the signal channel reaches the gate. One should not reduce the delay time in the shaper stages by using faster transistors. With faster transistors the faster rise and fall times could produce noise at the gate output, lowering the output signal-to-noise ratio.

To prevent the desired signal, or any other signal within the bandpass of our noise amplifier, from turning off the signal at the gate by carrier rectification, a.c. coupling between the noise detector and transistor shaper stages becomes necessary. If d.c. coupling is used there would be the problem of setting a threshold for the blanking action in the presence of strong local signals. The a.c. coupling makes the unit automatic in operation. The time constant of the coupling circuit should be such that it will pass high-frequency or short noise pulses, but will not pass audio frequencies. A peak detector is used for automatic gain control in the noise channel, to prevent strong noise or strong signals from overloading the noise stages. A high-gain multistage amplifier without a.g.c. would act like a limiter and not produce output noise pulses. Back-to-back diodes are connected across the input of the last noise i.f. amplifier to prevent the strongest line-noise pulses from developing enough a.g.c. voltage to lower gain to the point where weaker noise pulses do not operate the unit. Most power line noise comes from several different sources. Without this "clipper" it is possible to make the first layer or highest-level line noise disappear, and then discover there is another weaker layer that still bothers.

Now for a test, point your antenna at a strong line-noise source and put the unit into operation. If it is working properly the line noise will disappear and leave just the smooth receiver noise. We can now hear those weak signals missed before. Then suddenly line noise may again appear, sending CQ at us. Tuning around we find a local 50 kHz. from where we were listening. Every time he presses the key we hear the line noise. What is happening?

At the gate input we are looking at a wide bandwidth which is really our converter bandwidth. The output of the gate goes to our 3-kHz.-bandwidth filter. The noise circuits are still working and putting out a gating pulse for every line-noise pulse. It is not only punching holes in the desired signal but also modulating the strong signal, 50 kHz. from where we are tuned. This is downward modulation by the blanking pulses, which is in essence the line noise. This pulse-modulated signal down the band is producing sidebands which sound like line-noise pulses, and the average level will be some 40 db. down from the peak carrier level. Any signal that appears at the gate input and is around 40 db. or



This is one of the most popular DX men on 50 MHz., Michael Czysch, LU3DCA, Buenos Aires, Argentina. The Swan 350 feeds 14 MHz. to a mixer which in turn drives three 4CX250Bs in parallel, producing 500 watts output on six meters.

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

LU3DCA's 4-element 50-MHz. Yagi has been in use for more than eight years during which time he has worked 34 states, 31 countries and all continents except Europe.

more above the receiver noise will have this effect. We do not have to worry about the noise we generate from our desired signal, since the average noise level will be some 40 db. below the desired signal, and will have no noticeable effect. We should note, however, that the desired signal is not affected. There will be no reduction in signal level and no cross-modulation, but the signal-to-noise ratio becomes poorer by an amount depending on the strength of the unwanted signal.

In the Lamb silencer we should look at the same noise in both the signal channel and the noise channel. Since we use high-gain antennas it is essential that the noise channel be able to see this same noise, and develop a blanking pulse for it. Operating the noise amplifier at a different frequency than the signal channel, and using a small antenna, could lead to poor performance.

By operating the noise channel on our signal frequency we can use the a.g.c. line in the noise channel to aid the automatic action. When a strong local signal is present the a.g.c. action tends to surpass the pulse output. This prevents the sidebands from pulse modulation of the unwanted carrier, generating more noise than we had originally.

During the past several years, I have used a 30-kHz.-bandwidth crystal filter, which can be switched in or out ahead of the noise blanker. There seems to be only a few db. difference in signal-to-noise ratio between the wide (about 2 MHz. total bandwidth) and the 30-kHz. bandwidth. It appears that one could not go below 30-kHz. bandwidth and still effect any real signal-to-noise-ratio improvement. With the filter in, any signal more than 15 kHz. from the wanted signal does not affect the operation. Since the noise pulses are now longer, the time constant of the coupling capacitor between the pulse detector and pulse-shaper stages must be made larger to pass the longer pulses. It would be desirable to switch the value of this capacitor when the filter is switched in and out.

The filter will also work with the limiter type of device, but the signal-to-noise ratio will not be quite as good with the narrow bandwidth.

One conclusion has been made after several years of working on noise reduction devices. *There is no perfect answer.* No matter what the approach, the signal-to-noise-ratio improvement is greater with a wider bandwidth. This leaves us open to interference from stations other than the one we are trying to receive.

The major difference is what happens when this interference comes on. In a wide-band limiter the desired signal will be depressed with severe cross-modulation. With hard limiting, s.s.b. and a.m. signals will be greatly distorted. Another approach is a wideband amplifier with a.g.c. to prevent overloading in the amplifier. Noise reduction can be secured by diode clippers, with automatic carrier control of clipping level. This works fine on the desired signal, although there may be some difficulty with clipping of s.s.b. The clipping action adjusts to the strength of the interfering signal and permits more noise on the wanted signal. If we tried manually lowering the clipping level we would turn the device into a limiter with its cross-modulation.

The Lamb-type silencer can be built to not cause any ill effects on the desired signal. It will not change the overload or cross-modulation capabilities of the receiver it is used with. It can be made automatic in operation. When a strong interfering signal comes on, the line noise reappears, with no other effect on our receiver performance.

I'm sure K5WXZ will be pleased to assist with specific questions, but be sure to include a stamped, self-addressed envelope with your inquiry. His address: Allen Burson, 1013 Bandera Lane, Garland, Texas.

Our thanks to Al for preparing this series.

An Antenna of Note

During his recent tour of the United States, Australian moonbouncer Ray Naughton, VK3ATN, and this writer discussed at length the problems facing a would-be moonbouncer. The antenna is the primary problem for two reasons; achieving enough gain and proper aiming of the array.

In the April 1967 edition of this column, K6MYC told how by adding directors he improved the gain of a popular commercial collinear antenna. The manufacturer of that antenna has now modified his product to include the directors. Eight of these 20-element collinears, properly fed and matched, are capable of moonbounce. The cost, however, is approximately $250. While I'm not in the business of selling antennas, the initial cost may seem high until

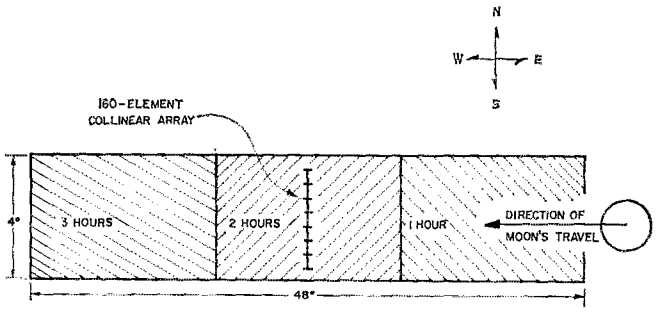


Fig. 1—A view from "space "looking down upon the fixed-position collinear array. The shaded area is the antenna pattern and the moon's movement through it. The moon passes through the 4° wide pattern five to seven days each month.

one begins searching for antenna materials. In some parts of country this is no problem, in others it is of major concern. It depends upon where one lives and what is available.

Without delving into the pros and cons of linear antennas and the choice of 144 MHz. (we recognize that most current e.m.e. activity is on 144 MHz. but that 1215 MHz. might be a better choice) here is how eight 20-element collinears form a 160-element array having a forward gain of somewhere between 20 and 23 db. over a dipole.

A single 20-element collinear has a half-power vertical beamwidth of approximately 26°. Stacking eight collinears, one above the other, lowers the vertical beamwidth to the order of 4°. The horizontal half-power beamwidth of a single 20-element collinear is about 48°. Stacking the antennas as described does not alter the horizontal pattern. There is, however, a catch to this seemingly simple method of achieving adequate e.m.e. gain in a 4° beamwidth. The assembled array is nearly 105 feet long and only 6 feet wide! Tower mounting such an array would be a formidable task, not to mention trying to rotate it. But there is a solution. The array can be mounted a few feet off the ground with proper attention being given to keeping the supporting 105-foot boom on an even plane so not to skew the radiation pattern. There is an advantage to having an essentially ground-mounted antenna: you can *work* on it. And in e.m.e. antenna height is of no major concern as long as the array is clear of surrounding objects.

This also solves the problem of aiming the array. You don't because it is fixed — you let the earth's rotation bring the moon through the array's pattern at an easily determined 3-hour period five to seven days each month. Fifteen to twenty hours of "moontime" each month is adequate for even the serious experimenter. There will be other work to be done on the total system, such as improving reception techniques, and maintenance.

There are three points in space at which a fixed array can be pointed with a 26° north declination, which allows the moonbouncer to "choose" his contacts between continents. They are 37, 157 and 277 degrees west longitude. The 37° point, roughly over the Canary Basin west of Africa's west coast would allow contacts between approximately the eastern one-half of the U.S.A. and most of Europe, Africa and South America. The 157° point, nearly overhead at the Hawaiian Islands, would cover the western half of U.S.A., the South Pacific and the Far East, and the 277° point, over Nepal, would cover Australia, Asia and parts of Africa and Europe. A north declination was chosen because all present e.m.e. stations are north of the equator with the exception of VK3ATN; 26° was selected as it allows the most moontime each month.

Therefore the 105-foot long antenna would be mounted stretching north and south on a line with the North star and the north end elevated exactly 26° higher than the south end. The supporting boom is rotated so the array is facing the selected 37 or 157° west longitude point. The array is fixed in this position. The resultant antenna pattern is 4° wide north and south, and 48° east and west. In North America the 277° point is useless. It is nearly over the opposite side of the earth, and the antennas at both stations must be able to see the moon to work the e.m.e. path. The moon travels across the sky at roughly 14.5° per hour, so the target will be within the 48° by 4° pattern about three hours each day the moon is plus or minus 2° of 26° north declination. This happens some five to seven days a month. See Figure 1.

If the stateside moonbouncer is interested in contacts with states unreachable by more conventional modes of propagation, a point midway over the U.S.A. could be selected and the antenna so aimed. Something like 95 to 100° west longitude, 26° north declination, would be a reasonable choice. The other principles remain the same.

This all may sound confusing, but if you sit down with a globe you'll soon visualize what we're discussing. It's so simple, it's confusing! There are other configurations possible, but the one shown here is optimum for the given member of elements.

OVS and Operating News

50 MHz. handed out the usual *Es* contacts through late spring and early summer — and even an offering of some unusual DX. About midnight, May 11, VE4MA at Winnipeg, Manitoba was working K8DOC, Ohio, when a station signing KL7FRD broke in and called K8DOC. The Buckeye worked the station, but VE4MA could hear the DX station only with his beam southeast. Pointing the antenna at Alaska produced no signal. The signal was widely copied in the eastern states. Attempts to confirm the legitimacy of KL7FRD by W2BOC, K8DOC and myself have been unsuccessful. My letter to KL7FRD was returned "addressee unknown." K8DOC, a newcomer to 50 MHz., has his fingers crossed.

But there is at least one legitimate Alaskan, KL7FNL at Fairbanks, who was worked by K6RNQ and WA7FJQ, Kingman, Arizona, the night of June 3rd. K6EDX couldn't get his rig warmed fast enough, so his 50th on 50 MHz. will now have to wait awhile. Bob is in the Virgin Islands for one year, signing KV4FU. He'll be operational about the time you read this, and is looking forward to *TE* studies from a more favorable *TE* location than central California. His address is Robert B. Cooper, General Delivery, Fredriksted, St. Croix, Virgin Islands.

KL7FNL, Tanana, Alaska, confirms the QSOs with WA7FJQ and K6RNQ, and adds other information on work done by his wife, KL7FNM, and himself on 6. Elaine worked WA5FPS and WA5RYX, Albuquerque, between 0300 and 0330 GMT, June 5, and answered K7ICW. VE3FHU and VE5US were worked between 0440 and 0730 the 11th. WA9HUX and WA9DSC were worked, and W7FN heard on the 13th, and VE5US was worked on the 17th.

W1HDQ says HI8XDS, Dominican Republic, is planning s.s.b. operation on six meters soon. He is ex-VE7AFL. That one should cause a pile-up that would rival 20 meters! W7JRG, Montana, has returned to 50 MHz., looking for an elusive African QSL to complete 50-MHz. WAC. Ken and others worked ZS3G during solar cycle 19 but did not obtain confirmations. And while on the subject of QSLs, if you have worked stations outside the United States it would probably be to your advantage to send self-addressed, stamped envelopes to your call area ARRL QSL Bureau. The address may be found in *QST*. Because of postage costs many DX stations use the bureaus and your awaited QSL may be there. LU3DCA is one station using the bureaus and there is a fistful of his cards awaiting California claimants in the sixth call area bureau.

The ARRL V.H.F. QSO Party weekend, June 8–10, saw excellent single and multi-hop *Es* and a proton flare, predicted last April by W2BOC (K6EDX wonders what kind of crystal ball Mel has), added a touch of F_2. On the 9th, *Es* opened the band from everywhere to everywhere. W1HOY/KP4 worked stateside from Puerto Rico for hour after hour. Helen should have some score! And it was on the 9th the proton flare errupted causing F_2 and backscatter on the 10th for nearly five hours from California to Puerto Rico.

Throughout this last reporting period there were several days when multi-hop *Es* occurred. One of the more notable was May 26 between 1700 and 1800 GMT when K4MGX and WA4KSD, both Miami, worked or heard stations in Washington, Oregon, California, Nevada and Arizona — all more than 2000 miles. Thanks to these stations for their *Es* reports received prior to deadline: WA1DPX, K2TXB, WB2VFX, K7ZOK, WA7GFP, W8CVQ, W8NOH, WA8EFC, WA8EOW, WA9SDT, and WAØLSH.

WB6NMT is serving in Viet Nam and would like to hear from his 6-meter friends. His address is Lt. Louis N. Anciaux, USN; 673270/1100; Southern Surveillance Group; NAU/CSC; APO; San Francisco 96291.

Finally, WØPFP at Ames, Iowa says he has worked and confirmed the 48 contiguous states on 50 MHz. s.s.b. Jim claims to be the first to accomplish the feat on s.s.b. A contact in May with Oregon capped-off his search.

144-MHz. news is highlighted by the widespread *Es*. On May 29, from about 0130 to 0230 GMT, the band was open over a southwest to northeast path bounded by Galveston, Texas, and Wichita, Kansas, northeast to a line from southern Michigan through Pennsylvania and Maryland to Norfolk-Virginia. That's an area of some three-quarter of a million square miles! The path distances are around 1200 miles. Here is a sampling of the contacts made during that frantic hour: K5WXZ, Garland, Texas worked K4QIF and K2GGA/4, Norfolk, Va.; W8IDU, Carsonville, Mich., and K4MHS, Salisbury, N. C. K4QIF worked three Texans, W5ML in Louisiana and heard KØCNZ, Wichita. W3KWH near Pittsburg worked K5PTK, Hitchcock, Texas. W3TFA in Maryland heard Texas, Louisiana, Oklahoma, and Kansas. The band opened again the following day between 1630 and 1700 GMT. W3KWH says W8IDU and W8IDT, both Michigan, worked WØJYC in Colorado. Thanks to the following who submitted reports on the openings: K3CFA, W3KWH, W3TFA, K4QIF, K5PTK and K5WXZ.

K5TQP, Tijeras, New Mexico, noted conditions favorable for *Es* on May 14, 15, 21, 28, 30 and 31, but the first identifiable amateur signals were heard June 10. Fred and his wife, Lee WA5MFZ, heard WB6CXF, near Los Angeles, from 2000 to 2030 GMT but the Californian couldn't copy Fred's 500 watts. During this period, WB6CXF worked WØJYC, at 2013 GMT.

All this was just a prelude, for June 20 and 21 brought 144-Mc. *Es* openings that far surpassed anything in previous 2-meter experience. As reports flooded us after normal column deadline, they are

2 METER STANDINGS

W1JSM	33	8	1398	W5AJG	33	9	1360
W1AZK	33	8	1384	W5UKQ	29	8	1150
K1ABR	32	8	1374	W5HFV	27	10	1285
K1WHT	25	8	1300	K5TQP	27	7	1254
W1HDQ	24	7	1040				
K1WHS	23	8	1300	W6GDO	17	4	1326
K1UGQ	22	7	1250	W6NLZ	12	5	2540
K1MTJ	19	6	1225	K6HMS	11	4	1258
K1JIX	18	6	800	K6JYO	9	4	1240
K1RJH	16	6	675				
				W7JRG	27	6	1320
W2NLY	37	8	1390	K7NII	24	5	1290
W2CXY	37	8	1360	K7ICW	16	4	1246
W2ORI	37	8	1320				
W2BLV	36	8	1150	W8PT	41	9	1260
W2AZL	35	8	1380	W8IDU	27	8	1150
K2HLA	32	8	1300	K8ZES	22	8	675
WA2FGK	31	8	1340	WA8VHG	12	6	415
K2YCO	20	7	750	K9SGD	42	9	1300
WB2FXB	20	6	915	WA9DOT	41	9	1200
K2DNR	19	6	1010	K9UIF	41	9	1150
WA2PMW	19	6	1000	W9AAG	37	9	1200
W2CRS	19	6	710	K9AAJ	37	9	1200
				W9YYF	32	8	1050
W3RUE	36	8	1100				
W3GKP	32	8	1108	WØBFB	45	10	1350
W3KWH	27	8	1335	WØDQY	41	9	1300
W3BDP	23	8	1100	KØMQS	41	9	1150
K3OBU	21	7	930	WØNXF	40	10	1326
K3CFA	21	6	950	WØLFE	36	9	1040
W3LHF	19	6	700	WØEYE	34	8	1380
W3HB	18	6	677				
				F8DO	1	1	5100
W4HJQ	39	9	1150	KH6UK	2	2	2540
W4WNH	38	9	1350	OH1NL	1	1	5850
W4HHK	38	9	1280				
K4IXC	36	8	1403	VE2HW	11	5	600
K4EJQ	36	8	1125	VE3AIB	29	8	1340
W4FJ	33	8	1080	VE3EZC	29	8	1150
K4QIF	31	8	1225	VE3ASO	21	7	850
W4AWS	27	8	1350	VE3EVW	20	7	600
W5UGO	42	10	1398				
W5RCI	41	9	1280	VK3ATN	3	3	10417

The figures after each call refer to states, call area and mileage of best DX. Revised May, 1968

220-and 420 MHz. STANDINGS

220 MHZ.				W3RUE	13	6	585
W1HDQ	13	5	450	W3UJG	9	4	400
K1JIX	11	4	600	K3IUV	9	4	310
K1BFA	7	3	225	W4FJ	11	4	465
				K4QIF	10	4	500
K2CBA	16	5	660	K4EJQ	8	4	500
W2SEU	12	5	325				
K2DNR	7	3	175	W5ORH	11	4	700
				W5AJG	7	3	1010
W3UJG	14	5	460	W5WAX	3	2	222
W3RUE	10	5	480				
K3IUV	10	4	310	K7ICW	4	2	225
				W7JRG	2	2	420
W5AJG	3	2	1050				
W8PT	11	6	660	W8PT	13	7	715
				W8RQI	10	6	425
VE3AIB	7	4	450	K8DEO	10	6	350
				W8HVX	9	6	465
420 MHz.				W8MNT	9	6	465
K1JIX	10	4	385	K8REG	9	5	375
W1HDQ	10	3	250				
K1BFA	6	2	250	W9AAG	12	4	600
				K9AAJ	11	5	425
W2BLV	13	5	500	WA9NKT	9	3	400
K2CBA	11	5	3000	WØDRL	10	4	565
K2ACQ	9	6	525	WØEYE	5	2	425
K2UYH	9	4	350				
WA2EUS	9	4	260	VE2HW	2	2	350
K2YCO	8	6	550	VE3EZC	7	5	510
W2SEU	6	4	220	VE3AIB	5	4	450

inserted in condensed form below, without comment or analysis, by V.h.f. Editor, W1HDQ. The band was open over most of Eastern USA and Canada, for about two hours beginning at around 2230 GMT, both nights.

K1ABR, Cranston R. I. — Worked K4TAG W7JCU/4 W4UUF W4IID (using 75-meter vertical!) W5MCC.* Heard WB4ACV, and backscatter from W3LUL W2CRS and W1GJZ (Maryland to Maine).

W1AZK, Chichester, N. H. — Worked W5MCC* W4EHM W4UUF. Heard W4LSU W4LSQ W4VHH.

W1DZA, Stratford, Ct. — Heard Florida, Alabama and Louisiana.

W1GJZ, W. Bath, Me. — Worked W4LSQ WB4DCV K4SJG. Heard W4UUF.

K1FKW, Simsbury, Ct. — Worked W4LSQ W5MCC K4TAG WB4DCV W4UUF. Heard W7JCU/4, and fixed-frequency f.m. stations W4SMF K4SZG K5GKR and WA4EVU, who was heard through f.m. repeater, W1VVK.

K2BWR, Pleasantville, N. J. — Worked W5MCC W4UUF K4TAG K5WXZ W5GVE W5ML W7JCU/4. Heard K5PTK W5UKQ.

K2HLA, Cutchogue, L. I. — Worked W5MCC* W4LSQ. Heard many 4s.

W3TFA, Takoma Park, Md. — Worked K5BDQ* K4MHS and W3EMD/4, these two by backscatter. Heard W4UUF W4IID W5ML K5WXZ K4TAG W5MCC.

W4AZZ and WA4BMC, Lake Worth, Fla. — Worked 2 Ohio stations and heard Michigan, above 145 Mc.

W4ISS, Augusta, Ga. — Worked K2CBA above 145.

K4QIF, Portsmouth, Va. — Worked W5WAX W5HFV K5WXZ W5ML W5GUG*. Heard W5MWW W5NCE and much backscatter from eastern stations.

W4ZVK, Orlando, Fla. — Worked W2CNS VE3s ASO BVC DSQ GCM ATB HW EQX.

W5MCC, Galliano, La. — Worked K2RTH K2HLA W2AZL K2UKE K2BWR W1JSM W2KDX W1YQI K1ABR W2CNS K1FKW W1FEQ K2DNR W1AZK K2YFE W3AIR W1JDF W2CRS WA2FGK W2AQT W2LFL K2GUN W3BHG W1AJR.

K5PTK, Hitchcock, Texas. — Worked W3LUL W3HB WA2EMB K4MHS K8AXU K4GL K3ARN K4YYJ K3OPB K4SUM K4QIF W8BKI W4HJZ K2GGA/4 W4VHH.

W5WAX, Muskogee, Okla. — Worked W4HJZ K4MHS K4QIF.*

K5WXZ, Garland, Texas — Worked Pa. Ohio NY NJ Va. and NC.

WA9DOT, Grafton, Wis. — Worked W4AWS W4ZXI W4CKB.

VE3HW, Don Mills, Ont. — Worked W4ZVX.* Heard many Florida and Georgia stations on both a.m. and f.m.

That proton flare of June 9th reported in the 50 MHz. section was followed by a June 10th aurora, noted by WØNXF in Lincoln, Nebraska. Between 2330 and 0200 GMT (June 11) Bob worked stations in Colorado, Minnesota, Wisconsin, Illinois, Michigan and Ohio. The same opening was reported by VE3EVW. WØNXF also noted minor auroras on May 19, 20 and 23 and June 11.

WA9DOT notes exceptional meteor scatter activity on May 5th between Wisconsin and Louisiana. Jim worked W5UKQ between 1200 and 1239 GMT hearing more than 100 pings, letters and bursts up to 15 seconds duration. May 5th is during the Aquarids shower. And a random meteor contact is reported by W4WQZ, Tennessee, who worked K1ABR, Rhode Island, June 1st at 1100 GMT. Several 5 to 10 second and one 30-second burst was heard on the Tennessee end of the path.

There were several periods of good to excellent tropo during early summer. June 6th is a good example, K2HLA on Long Island worked into North and South Carolina and Tennessee, W3HB in Maryland worked Tennessee and W4WQZ worked Michigan, Ohio, Indiana and Ontario while W9IFA, Illinois, was working W3KWH in Pennsylvania.

The states-worked boxes are run again this month, with the latest standings. Please check yours and let me know if it is incorrect. I'm confident the boxes are in good order now, and there have been many additions since June.

There has been a strong indication that readers like to see holders of outstanding records listed, even if they are no longer active. Several of these have been returned to the boxes on this account, and in the interest of historical perspective.

220 MHz. apparently will receive much attention during the August Perseids meteor shower, just a few days off, as most of you read this. K7ICW, Las Vegas, says that K4IXC's desire to make the first 220 meteor scatter contact has posed a challenge to western DXers. Those who have schedules arranged include K5TQP, W6WSQ, W7JRG, W7TQZ and WØEYE — all well experienced in 144-MHz. m.s. Others that may participate are K6IBY, K7ICW, K7NII and K7ZIR.

At Billings, Montana, W7UFB has lowered his antennas for 144 and 432 preparing for the assault on 220. His 4CX250Bs put 200 watts on 220.02 with 1000 volts on the plates. The antenna is an 11-element homebuilt Yagi. K6IBY says 222.1 is the Southern California s.s.b. calling frequency and that 222.074 is being used by the f.m. contingent. K6IBY is scheduling K7PRS, Phoenix, and says at least three stations, K6SQH, K6ZRV, and WB6PMP have high power and large antennas. K6IBY runs 600 watts.

From New England comes K1YON's regular report listing recent contacts with W1ALE, New Hampshire, several stations in Massachusetts, Connecticut, New York and New Jersey. K4GGI/1, is looking for schedules with New Jersey. His address is 305 Memorial Drive, Cambridge, Mass. 02139. Any takers?

420 MHz. receives the undivided attention of W4FJ and others. Ted is now up to 11 states on 432 after raising his Yagis to 55 feet. The June 6 tropo reported in the 144 MHz. section allowed Ted to contact W8HVX in Ann Arbor, Michigan over a 465-mile path. The same night K8REG, Dayton, Ohio, worked K2ACQ, Lockport, New York. Tropo conditions on 432 were reported good throughout the northeast during the June contest as the scores, when published, will attest.

Moonbounce is being planned by a recently organized group of amateurs in the Chicago, Illinois area. K9RVG, W9IPO, W9VWY and WA9SPA have 15 and 22-foot dishes along with two kilowatt finals.

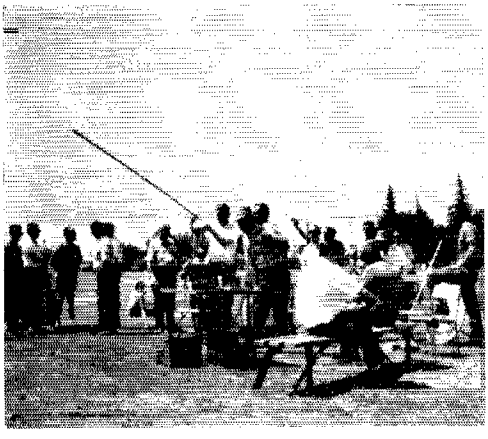
The Central New Jersey V.h.f. Society is staging another Antenna Measuring Party, as part of their August 18 Hamfest, at Johnson's Park, New Brunswick, N. J. Antennas for both 432 and 1296 will be entered. For more information, check with Paul Wade, WA2ZZF, 48 Warrenville Road, Middlesex, N. J. 08846.

(Continued on page 140)

* New state for reporting station.








The 1968 West Coast V.h.f. Conference was held in Fresno, California May 25–26. Left to right, K6MYC's 6-element 432-MHz. cubical quad showed promise; W6MMU's 432 horn placed second in the antenna gain contest to his 32-element extended-expanded collinear; WB6IOM displayed his 1296 moonbounce gear; K6HCP tests his Yagi as W6BJI reads the results; K7ICW entered a 28-element 1296-MHz. Yagi, and WA7CJO, dark coat, brought his PL-172 50-MHz. amplifier to show W7CNK/KL7GGS, hand on rig, W6ABN and W7FN/W6PUZ. Photos compliments K6EDX.

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU* WB6BBO

The 5th Annual YLRL Convention, Denver, Colorado, June 13–16, 1968.
(Photo by Tom Ross, Bloomfield, Colorado.)

Denver '68

WE came by bus, by car, by plane. We saw YLs from almost all of the fifty states, as well as from Puerto Rico, Chile, and Canada, and the Colorado YLs conquered all of us with their hospitality and charm, and that very special ingredient all perfect hostesses have for planning never-to-be-forgotten affairs.

The Fifth YLRL International Convention was a kalaidescope of souvenirs, eager greetings, guided tours, and serious business. It was a luncheon, and a banquet and a forum. It was a style show, and a magician. It was YL meeting YL, some, old friends we'd known from other conventions and other meetings, and it was: "So you are WA?XXX, I've been so anxious to meet you!"

There was the bell hop who said to another "This is the Young Ladies Radio Club Convention, but none of them are teen-agers, they're all ladies." And they were for the majority of the 167 YLs registered had been licensed for at least 10 to 15 years, with the 15 to 20 bracket of licensees running a close second.

KØYL was the special call assigned by FCC for the Convention with Val, KØZSQ, and OM Howard, KØCDW, as custodians; and room 814 sounded like Field Day without the intensity of a contest, as the operators, both YL and OM, logged contact after contact. There were the times when the steady operating of call after call stopped to let the gals keep skeds with home and make sure that the OM and family were managing to survive without them.

From Thursday to Saturday morning, the Airport Holiday Inn, in Denver, was one vast rag chew, with no ionisphonics, no rig problems to interfere, but oh! the QRM! We gathered in little groups swapping QSLs and souvenirs from ourselves as individuals, and from our clubs. Buckeyes from Ohio, and what else but miniature cars from TASYL in Michigan? Oil wells from Texas, and buttons from San Diego. Potato tie tacks from Idaho, and note books and address books and tote bags to carry it all.

Friday was the all day tour of the Garden of the Gods, the Air Force Academy, Palmer Lake,

*YL Editor *QST*. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001

WA6AOE, Maxine, YLRL President, opening the YLRL Forum in Denver.

Van Briggles Pottery works, and Colorado Springs. Friday night was a YLs dream of YL-AP, with calls from everywhere working calls from everywhere face to face in little "round tables" of idle chatter.

Saturday morning the Convention opened with WA6AOE, Maxine, the YLRL president presiding. K1LCI, long time International Membership Chairman has resigned and K7UBC, was appointed to the office. Jackie, W6YKU, will replace Irma, K6KCI as the new Publicity Chairman.

The slate for the 1969 officers was presented with the following nominees:

President W4TVT, and KØEPE
Vice President VE5DZ
Secretary VE3EZI
Receiving Treasurer K8PXX
Disbursing Treasurer WB2JCE

The ballots will be mailed to the membership in August for these offices, as well as for DC for each YLRL District for the coming year.

The LA-YLRC's invitation for the sixth annual Convention to be held in Los Angeles in 1972 was accepted. Louisa Sando, YL editor of *CQ* magazine, and author of *CQ-YL*, announced her plans for updating the book with additional supplements to cover the past four years since the last revision.

The luncheon was highlighted by a Wig Show, and recognition of the seven gals who founded YLRL twenty-nine years ago.

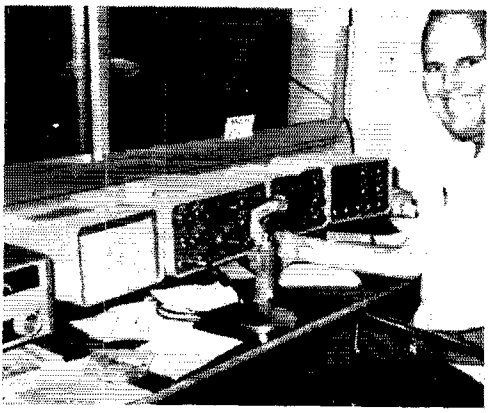
Saturday night was the banquet when the OMs came out of their hiding places and joined the ladies. The Variety Show, included a special style show, dances, a "Salute" from the BAY-LARCS, prizes galore, and, with the magic of Bob, WØITB, the MC, was the perfect touch to end a perfect meeting.

It took four years to plan. It took a club of active interested women, each dedicated to her own special part to make the plan work. It took committees, and meetings, and ideas, and plain hard work. This is the "must" of any convention and this was the Colorado YL Club's formula in order to give all who attended as perfect a time as can be imagined. Perfection, according to the dictionary, is a state of supreme excellence without defect or blemish. No better word can be used to describe the Fifth Annual YLRL Convention. All of us who attended will agree that there never was such a perfect three days.

Plan Ahead

The end of summer laziness is almost here, so take it easy for one more month and then the activities calendar begins. YLRL Howdy Days — September 26, 27, 28, 1968. Complete rules will be given in the September issue of *QST*. YLAP c.w. October 16, 17 GMT, phone November 6, 7 GMT. Complete rules will be given in the October issue of *QST*.

And it isn't too early to think about the next YL get together. The Midwest YLRL Convention will be May 16 through May 19, 1969, in Toronto, with the Ontario Trilliums as hostesses.



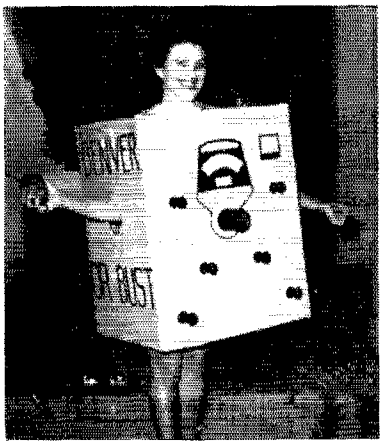
KØYL, official Convention station, KØCDW at the mike.

K1GSF, Peggy, Editor of *YLRL Harmonics*.

W5RZJ, Louisa Sando, author of CQ-YL telling the Convention about plans for revisions of the book.

KØEPE, Marte, presenting the 1967 YLAP cup and Corcoran Award to the 1967 winner, VE3EZI, Ivy.

Martha Edwards, W6QYL, the "silent" YL with Tony Woolford, ZC4CN, one of the few lucky amateurs permitted operating privileges on Cyprus.



K6KCI, Irma Weber modeling the "YL Transmitter" in the MINOW Net Style Show.
(Photo courtesy K6IPJ)

Martha Edwards, W6QYL

What's it like to be a ham without a "voice?" Ask Martha when she returns from her enforced "silent period" on Cyprus next month.

Martha was licensed W6QYL in June 1953, because of her being a registered nurse. Her patient, W6KYY, now a "silent key," got his ticket, and she had helped him study and practice code. She made first place in YL-AP that year, and met the OM, Noel, ex-W6RDQ, now W6IF, on the air. They were married, of all times! on Field Day week end in 1954!

Now a past president of YLRL, Martha had a hand in the first YLRL Convention in 1955. That first one was the result of an OM telling her, W6CEE, and W6UHA that such a thing couldn't be done.

On account of Noel's work taking him all over the country, as well as far away places with DX prefixes, W6QYL is ex-OD5CH, a life member of WAYLARC, BAYLARC, holds 13 WAS-YL, former chairman of the YLRL 6th District, YLRL, ARRL, and simultaneously vice president of LA-YLRC and YLRL, then, again simultaneously, president of both Clubs, which should be some sort of a record.

Martha's slightly more than two-year stay on the island of Cyprus has been filled with amateur archeology, church work at the English Church, sewing, trying to teach the 3 and 4½-year olds to read, and, because of the frustration of not being on the air, practicing with the electronic key, and studying to upgrade that unused license.

On Cyprus amateur radio licenses are held only by a few British amateurs on the island, so Martha and Noel can visit friends and listen to, but not touch all the lovely DX. QST

NEW BOOKS

Electronic Circuit Design Handbook, 2nd edition, No. T-101, by the editors of EEE Magazine. Published by Tab Books, Blue Ridge Summit, Penna. 17214. 320 pages, over 600 illustrations, 8½ by 11 inches, cloth cover. Price, $14.95.

This second edition now contains well over 500 "proven and tested" circuits. With over 600 illustrations, the circuit descriptions contain all component values and other needed data. Contents include information on control circuits, regulator circuits, protection circuits, filter and suppression circuits, pulse circuits, comparison circuits, amplifier circuits, oscillator circuits, indicator and alarm circuits, counting and timing circuits, test and measurement circuits, generator and simulator circuits, converter and inverter circuits, power supply circuits, detection and sensing circuits, display and readout circuits, gating and logic circuits, relay and switching circuits and miscellaneous circuits.

Radio and Television: Principles and Applications, by J. P. Hawker. Published by Hart Publishing Co., Inc., 510 Sixth Ave., New York, N. Y. 10011. 416 pages, well illustrated, 6¼ by 9 inches, cloth cover. Price, $12.50.

This book offers a complete introduction to radio and television for the beginner. Starting with the fundamentals of matter and electricity, a.c., and radio waves, the book goes on to explain the function and operation of the various components such as resistors, capacitors, diodes, tubes and transistors. There are also chapters on f.m., tape recording, and antennas. Apparently, this book was originally published in Great Britain but it doesn't take long to get used to seeing "valve" for tube and "aerial" for antenna! American television techniques and standards are discussed.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

At a time when so many worthy basic values are disregarded or distorted merely for the fault of being "old" it's heartening to see certain trusty solidarities ringing through crisp and true with bell-like clarity. Remember *your* first DX QSO? Did you fear, perhaps, that such a traditional emotional experience might also be fading into insignificance among blasé younger generations? Well, ex-WN4GTI, obviously a born storyteller and DX hound, can set your mind at ease on this point. Here, let him help you relive your own first thrilling moments of wireless triumph. Picture a subdued ham shack lamp flicking on in the wee small hours when you can actually *smell* DX in the frosty stillness while others sleep. . . .

> It was a Tuesday morning, and the Bristol (Tenn.) public schools were out for the Easter holidays. I got out of bed at four A.M. and fired up the rig. Immediately I called CQ KH6. I was disappointed to hear only a speedy WN6 answering me. But I kept calling on 7170 kHz. until 4:51 A.M. Then I tuned up a few kHz. and heard a very slow 569 CQ CQ CQ DE WH6GMW. You should have been there to see me freeze up under my headphones! [We *are* there, John!]
>
> With my xtal still on 7170 I switched on and called him. Then I heard him come on again with another CQ. I knew I wasn't near enough to his frequency, so I put in my 7180 xtal. Then I prayed and proceeded to call him when he finished his CQ. *Got him!* We spoke for about an hour and then signed off.

Naturally a guy's got to prove his first DX wasn't just a lucky fluke. So a little later we find John once more grabbing his alarm clock in the DX-flavored predawn. . . .

> . . . It was Mothers' Day. I got up at 4:00 A.M. For about forty minutes I tuned, called CQ, and tried everything I could but nothing doing. Then I tuned to 7155 kHz. It was there that it happened! I could hear a VE6 talking to a WN2 but other stations were looking toward another special station on frequency. Everybody (almost) was calling KL7AIZ.
>
> At the time KL7AIZ was talking to a WB6. When they finished I called and called and called that Alaskan station. Back came CQ CQ CQ DE KL7AIZ KL7AIZ. Then I figured my 60 watts, dipole and surplus receiver wasn't making it. But I didn't give up. I kept right on calling until finally: WB4GTI DE KL7AIZ! We exchanged reports, etc., then went QRT.
>
> KL7AIZ is on Adak, an island very close to the International Date Line. My parents stopped at Adak on their way back to the States from Japan. That was thirteen years ago, before I was even born.

(Ah, so long ago and far away.) As you see, this lad wasted little time in getting his General. With his interest, spirit and determination we foresee another early Extra down Bristol way. And who knows what lies beyond? The world is already yours, OM — er, young fella.

—•••—

Speaking of Extra Class tickets, time's a-wastin' for any eligible ham interested in working DX on our best lower-frequency bands. Even if you can live without those low-edge goodies there's plenty of incentive to avoid the nuisance of installing crystal markers, v.f.o. dial stops, etc. [Okay, supermouth — where's *yours*? — *Jeeves*.] (Still waiting for you to find our straight key, dimwit.)

What:

Our "How's" Bandwagon can cool its axles this month while we catch up on a little *vox DX populi*. After all, sticky August is a better month for moonin' than tunin'. Let's just sit back comfortably and read more mail. . . .

"Maybe I'm starting to mature at 61. Lately DX hogs just give me a chuckle." — *W8YGR*. . . . "Reached 100 countries on 160 meters but three are pre-1945." — *W1BB*. . . . "ZS9Q is looking for a good used receiver to handle his pile-ups." — *WA1DJG*. . . . "Been trying for an Iceland QSL for almost two years." — *WA8EFH*. . . . "Looking forward to lots more DX after finally graduating from Carnegie Tech." — *K8BCK*. . . . "Those UW9s mystified me for a while." — *WA9UMQ*. . . . "What about Kingman reef in the central Pacific?" — *P. Kilroy*. . . . "Wasn't Kilroy *there*, too?" — *W9BRD*. . . . "WB2s PCA and SHZ help with the DX log here." — *WB2ZFG*. . . . "Portuguese great-circle maps, courtesy CR6GS, make a strange-looking world." — *W1ARR*. . . . "Surprised to work Europeans on 21 MHz. at midnight here, and they're just as surprised to work me." — *K6OZL*. . . . "Your 'What' section should be in three parts — east, central and west U.S.A." — *W1AFK*. . . . "Fifteen phone is my best band here, followed by 20. Ten has declined but is not altogether quiet!" — *KP4DBJ*. . . . "Don't count out 3.8-MHz. phone yet." — *K4IEX*. . . . "Pago Pago's department of education keeps producing KS6s." — *W1DAL*. . . . "New outfit has me sticking mainly to s.s.b." — *W3HNK*. . . . "After being WN8VBY the FCC computer mistakenly made me WA8UBY but this has been corrected." — *WA8VBY*. . . . "Hope to have a quad to go with my new SB-101 this summer." — *ex-WA8UBY*. . . . "VK2ON has a full-size 40-meter cubical quad!" — *WA1FHU*. . . . "More DX stations should relieve on-frequency QRM by telling callers 'up 10', etc." —

—Reprinted from September, 1954, QST

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

CEØAE keeps very QRL on Easter island, usually using 14,280 or 21,340 kHz., with assorted DX pile-ups and heavy phone traffic. Operator Gerald is in the pilot's seat while a shack visitor talks with home. Another client awaits his turn. (Photo from WA5OFT of Arkansas DX Association via W1CW)

WA8MCQ. . . . "WH6GLB hunts South Carolina on 21,130 kc." — *W4YOK*. . . . "When the long path is open to Asia our morning DX is sometimes disturbed by the Five gang rag-chewing around 14,205 kHz." — *W4NJF*. . . . "I like 15, 20 and 40 c.w. and a little sideband, but power-line noise makes the third-layer DX hard to get at my Utah location." — *W7ZC*. . . . "May wasn't a bad month for 20 c.w." — *W3HMR*. . . . "A doublet and 350 bring me back to DX after a ten-year layoff. Next come a linear, a tower and rotary beam after our new home is finished." — *K1DRN*. . . . "Eighty watts to a Challenger and 4-el. beam work plenty of straight-a.m. DX on 28 MHz. I was a Tech for nine years before getting my General." — *K1HDO*. . . . "Doubt if I'll change to a two-letter call even though qualified. After 37 years this one is attached to me." — *W5BUK*. . . . "Been QSL manager for several DX stations for six years now and I've enjoyed every bit of it despite consistent s.a.s.e. omissions." — *W6BCT*. . . . "In Italy 7-MHz. phone, 7096–7150 kHz., is almost a total loss due to SWBC noise." — *WB6JKQ of I1DFE*. . . . "The alternate QSL route to 9G1HM is through the Czech bureau attention OK3MM, not OK3HM, although 9G1HM is former OK3HM." — *W4JUK*. . . . "No startling DX here but I don't want to break the reporting habit." — *W2DY*. . . . "Now trying s.s.b. after a strict nonsideband diet." — *WA5MIN*. . . . "Wrote WN1HVL to offer a Utah sked but no reply." — *W7BE*. . . . "Sincere thanks to all who answered your 'How's' item regarding my needing Utah and Delaware for WAS. Got 'em!" — *WA1HVL, ex-WN1HVL*. . . . "Next year's VK/ZL/-Oceania DX Contest will be super, helping to celebrate New Zealand's bicentenary." — *ZL2GX*. . . . "DM3GO scored 43,710 points as a multioperator entry in the 1968 ARRL DX Test." — *DM2ATL*. . . . "WN4HUO and I discussed the feasibility of a 15-meter Novice net." — *WN1ISH*. . . . "DU1FH was my No. 100, LX1BW No. 101." — *WA9TFM*. . . . "Got a peek into the Collins salvage house at Dallas. Gear? Wow!" — *WA5PPZ*. . . . "Mornings here sometimes poor on 20 lately." — *I1ER*. . . . "I use 21-MHz. sideband mostly." — *F3VN/W2*. . . . "Very good DX in Atlanta these days." — *W4GTS*. . . . "Twenty c.w. here, of course. What would an ex-Mackay Radio man of the '30s be doing on phone?" — *W6EAY*. . . . "Any Stateside fellows interested in 1804-kc. schedules?" — *VK9GN*. . . . "My Japanese is FB for QSOs but falls down in ordinary chit-chat. Not enough radio terms in chit-chat." — *WA6IVM*. . . . "The command set of HK3ASJ is hard to raise on 40." — *WN4GTI*. . . . "FP8CS is no ordinary St. Pierre type — he's on Miquelon." — *WA8SLW*. . . . "Started as WA9NHZ in Wisconsin and have been DXing on 15 s.s.b. from Albany for two years now." — *WB2YEM*. . . . "CE9AT responds well to c.w. when working 14,190-kHz sideband." — *W9LNQ*. . . . "WV4FN, 21,117 kHz. around 0100 GMT, is one of those rare Virgin Islands Novices." — *WA8VRB*. . . . "New quad brought my 180 watts close to the 100-mark." — *WA8KRE*. . . . "Nice stack of s.w.l. series received through the ARRL QSL Bureau in late April." — *L. Waite of NNRC*. . . . "Hertz did not invent or discover audio, so are we really using 60-Hz. a.c. and 200-Hz. filters?" — *W4ZZ*. . . . "My 160-meter antenna, good for ZL3RB, 5Z4LE and other goodies, is a 133-ft. wire sloping down from a twelfth-floor Baltimore apartment window." — *W3DPJ*. . . . "I fear my November '67 *QST* was lost in transit." — *VU2JN*. . . . "Was a non-s.s.b.er till July." — *WA9LIO*. . . . "New DXCC members have been averaging about 100 per month." — *W1CW*. . . . "VP5CB will work most of the contests till he returns to K3NAU next March." — *K8WUW*. . . . "Thanks for the *QST* coverage the boys gave me as W3DWG/VR6." — *K4DWU*. . . . "We keep active on 10, 15 and 20, c.w. and s.s.b." — *K7YUC of I1DFE*. . . . "Fifteen DX at 1000–1500 GMT and forty at night keep me busy." — *WN2FOR*. . . . "Enjoyed a visit from OX3FS after many interesting QRP c.w. QSOs with Finn." — *WB2OZW*. . . . "I think 14-MHz. conditions to the U.S.A. will be excellent for the next few months." — *HM1AJ*. . . . "I'm interested in the whereabouts of former XZ2KN, Tara Singh." — *W0CSZ*. . . . "HS3TN has QSLs from nearly 100 countries." — *K5UZZ*. . . . "Got a few nominees for the next DXHPDS DX Hog of the Year." — *K5YUR*. . . . "Your 'for the fun of it' approach should help not only my attitude but also many other locals whose flagging interest in our wonderful hobby is very noticeable." — *K9EGQ*. . . . "It's high time somebody pointed out that ham radio *is* a hobby, primarily for fun." — *W8BKK*. . . . "Now have thirteen ADP-suffixed DX QSLs." — *W2ADP*. . . . "Added my 46th 160-meter country and a big beard for our Illinois Sesquicentennial." — *W9PNE*. . . . "Used to push traffic at WPDA, Tulare P.D. and KRBU, California Highway Patrol. Still after my 280 DXCC sticker." — *W6BIL*. . . . "HK3ASJ and WP4DAJ wisely work around 7175 kHz. above most of the 40-meter Novice QRM." — *WN3INI*. . . . "Plenty of DX is there to work if you only give it a try." — *WN4GSS*. . . . "Managed to make DXCC from Portland as K7YBI before QRT there." — *W6HUQ*. . . . "W9 Central Division Century Club membership numbers 550 as of March 1st." — *W9EWC*. . . . "Used to sign W9HXM in Chicago where I was born and raised." — *W0CA-VP2KW*. . . . "Don't know how W2CTN keeps up with all those QSLs." — *W1DTY of* Ham Radio. . . . "Let's all be more careful of details when QSLing." — *W0TCF/8*. . . . "How can Grommethead Schultz stand those anchovy pizzas?" — *WA8VRB*. . . . "I'm frustrated in my DXCC quest by DX operators who promise QSLs during QSOs but who fail to answer repeated s.a.s.e. and/or IRCs." — *WA9UVP*. . . . "G3s HTA RUV RUX and TJW sign G3WYX as our Exeter RSGB Contest Group." — *G3RUV*. . . . "PJ2MI is an engineer for Netherland Antilles Radio and Telegraph Administration, and PJ2ME works for the U.S. Weather Bureau." — *W9IGW*. . . . "There is no radiotelegraph examination for a ham license in Nicaragua, hence the relative rarity of YNs using code." — *W9GZZ*. . . . "The CEØAE fellows really appreciate Stateside help with their phone traffic." — *WA5OFT*. . . . "I'm particularly concerned over the question of safe transit of QSLs to the United States and the safe return therefrom." — *ZC4GM*. . . . "My friend WN8YQO works Gs and VKs." — *WA8QJK*. . . . "Being an EE freshman at Pasadena City College leaves little time for DXing." — *WB6VVS*.

We'll probably resume spectrum inspection next month with the generous help of (20 c.w.) Ws 1AYK 1DAL 2ICO 3HMR 3HNK 4YOK 6EAY 7BE 7ZC 8IBX 8YGR 9LNQ, Ks 4IEX 8BCK, WAs 1DJG 1FHU 1ION 3HRV 5PPZ 6JDT 8MCQ 8NGD 8QJK 8VBY 9TFM, WBs 2BCI 2ZNZ 6VVS, KP4DBJ, I1s DFE ER, VE3GTW; (20 phone) Ws 1AYK 1DAL 2DY 2VOZ 3HNK 4GTS 7BE 8IBX 8YGR 9LNQ, Ks 2UPD 4TWJ 9UIY, WAs 1DJG 4WIP 5PPZ 5PUQ 6JDT 8KRE 8MCQ 9TFM, KP4DBJ, P. Kilroy, J. Stevens; (15 c.w.) Ws 1DAL 4YOK 7BE 8YGR 9LNQ, K8BCK, WAs 1DJG 1FHU 5PPZ 8MCQ 8VBY, WBs 2BCI 6VVS, WN4IIF, KP4DBJ, I1DFE; (15 phone) Ws 2DY 4AJJ 4GTS 8YGR 9LNQ, WAs 1DJG 3IRV 5MIN 5PPZ 6JDT 8QJK 9TFM, KP4DBJ, F3VN/W2, J. Stevens, another chap from Indian Orchard, Mass., whose name and call became detached from his report; (10 c.w.) Ks 1HDO 8BCK, WAs 1DJG 8MGD, KP4DBJ, I1DFE; (10 phone) Ws 2VOZ 4YOK 8YGR, Ks 4TWJ 8BCK, WAs 1IED 3HRV 8MCQ 8MGD 9TFM; (40 c.w.) WAs 1DJG 1FHU 8MCQ; (80 c.w.) W1SWX, K4IEX; (75 phone) K4IEX; and a solid briefing by Mr. 160 DX, W1BB, plus others in process of filing. Getting used to those new 1.8-2.0-MHz. rules? Check pp. 71-73, June *QST*, to see how your area is affected.

Where:

ASIA — FEARL's *News* announces, "KG6I calls issued for the Bonin, Volcano and Marcus islands will be terminated, and KA1 calls will be issued through Hqrs., U.S. Forces Japan, to security forces personnel stationed in these islands." That's as of June 26, 1968. New address for correspondents: FEARL *News*, Editor Bob Rhodes, KA2LL, Box 38, FPO, Seattle, Wash., 98762 . . . . ZC4GM indicates that the on-again off-again 5B4 prefix, recently displayed by 5B4SS/p in field day activity, may soon represent Cyprus DXtensively once more. Gordon adds, "By the time of *QST* publication of my plea for a QSL manager W2CTN had already taken me under his

large and comforting wing. I have had a number of offers of assistance and have written individually to the kind people concerned. If you have space I would be very grateful if you could relay my sincere appreciation of the fact that so many ARRL members rushed to my assistance." . . . . "I'm still managing all 9M8MS-9V1MS QSLs," reminds K1UHY. "Many cards arrive without self-addressed envelopes or International Reply Coupons, the majority apparently from new hams unaware of routine QSLing procedures." . . . . From K6OZL: "I continue to handle cards for VU2DI, formerly VU2DIA. Just received 51 cards from Panjim to answer a total of 400. Not having Hegde's logs, I forward a batch every few weeks to him and he replies 100 per cent." . . . . "In the wake of another deluge of misdirected HL9TM QSLs I'm breaking out my typewriter," prefaces W8QZR. "I used that call only from April 9 through December 9, 1967. The previous holder, during most or all of 1966, was and is WA2SPL. I'm out of formal QSLs here but will be happy to send postcard confirmations in response to s.a.s.e. or IRCs for my own HL9TM QSOs only." Note, however, that Peter lost the logs for contest work in late '67 . . . . K4EPI suggests, though the official bureau address for Turkey is TRAC, P.O. Box 699, Karakoy, Istanbul, that QSLs for TA stations be sent via individual QSL managers whenever possible . . . . AP5HQ tells VE3GTW he has no QSL manager. "All cards must come direct or no answers," learns John. "He does answer promptly, five days each way for U.S. air mail, up to ten days for Canada." . . . . In the HKARTS *Newsletter* we see that VS6FZ is the Hong Kong QSL boss at the society address . . . . WA4WTG affirms, "I've taken on QSL management for 4X4DX as of May 1, 1968, and for 4X4UF as of April 8th, s.a.s.e. or IRCs requisite." Bob points out that many QSL helpers also are stamp collectors who respond favorably to unusual or commemorative postage . . . . "After July 15, 1968, I am no longer QSL manager for VK7SM, VU2s KV LE and 4X4MZ," warns W6BCT. "I'll be leaving for a three-year stay in Israel." . . . . KR6NR, according to the *DX News-Sheet* of G. Watts, is proprietor of the Okinawa bureau . . . . QSLs for the current Macao junket of several VS6 DXers go via the Hong Kong bureau.

AFRICA — "There is no QSL bureau functioning in the Congo at present," testifies 9Q5GE, "and from what I have seen there wasn't good distribution of QSLs when the old bureau was active. Went down to Elisabethville and found cards strung all over, no possible way of sorting them or much hope that they would be sent." Glen feels that the rapid turnover of 9Q5 calls is the main problem, causing insufficient continuity for effective club or bureau work . . . . WA3EFH says, "YL EL2NA, who was Liberia QSL manager until April, tells me there are no authorized EL0/mm stations. Cards for 'mm' ELs thus cannot be forwarded." Thayer finds former FB8YY operator F9MS busily supervising current 'YY QSLing . . . . W3HNK's confirmational labors in behalf of CR6KT deal with QSOs after May 20, 1968, and for CR6LF after this April 16th . . . . "I'm still QSL manager for Brother Lawrence, former EL6B and now signing EL6A," informs WA4ULE. "I believe he's the only Liberia Six now active." . . . . On the W4NJF QSL front: "No word from 7Q7LC regarding QSOs after January 29, 1968, and I do hate to see cards piling up for him. ZE1CX took time out for a few weeks in CR7-land with his family." . . . . WA2CRD, who aids 9U5HI's QSLing, says TL8DL does his own confirming from Bangui, no assistance designated . . . . "I recommend QSLing directly to 9G1HM in Ghana with IRCs and s.a.e. rather than through OK3MM, the alternate route," states W4JUK.

OCEANIA — Patience pays, albeit sometimes slowly. "Took me eleven years to get my first QSL from the Philippines," exclaims K1DRN. "It confirmed a DU6IV QSO of '57." . . . . WA6KGP now acts as QSL tender for DU7SV, the customary s.a.s.e., IRCs and use of Greenwich time required . . . . WAØKKR/KG6 says he has no connection with KG6FAE QSLing despite indications to the contrary . . . . "The bureaus become too expensive when a QSL manager has to ship world wide," declares W4NJF. "Please reiterate that requests to me for QSLs from YJ8BW, ZE1CX, EL2AG and LJ2X *must* include s.a.s.e. or IRCs." . . . . If DXpeditionary plans materialize, K9JJR is to handle VK8AV's Timor QSLs, and VE6AO will do the job for the operational odyssey of VE6AJT and buddies who expect to head for rare Pacific points next month . . . . W8SRK says W6BC has no QSL managerial arrangements, 5W1 or otherwise . . . . "Sure having a hard time getting VKs to QSL," laments K1HDO. You'll find them quite thorough via the bureau, Maurice. Which reminds us that it's time to remind W/K/VE/VOs to keep s.a.s.e. on file with their hard-working ARRL QSL Bureau branch managers. Helping them keep the hook clear helps you get better service.

YN1s RMP (left) and FR enjoy a spot of tea in the latter's Managua shack. Both regularly appear on 21,425 kc. around 0100 GMT. (Photo via W9GZZ)

EUROPE — From W2ICO: "IT1AGA, an avid certification hunter who holds 369 awards earned via QRP, has sent s.a.s.e. to many W/Ks for QSLs that have not arrived. Gius particularly needs answers from New York, New Jersey, Utah and Sixland." . . . . Disclaimers: WB2BXL knows nil about TF2WKS QSLs, G3SEA has no CT2AY confirmational connections, and the Irish bureau tells W3HMR there is as yet no EI9LG . . . . Further clarification of EA6ITU QSL routing from W4BW: Cards for c.w. QSOs go to Prose, those for s.s.b. contacts to W3MR —s.a.s.e., natch . . . . "Have assumed QSL managership for all LJ2X QSOs after May 28, 1968," notifies W4NJF. "S.a.s.e. or IRCs are essential." . . . . "I now have a 17/0 countries worked/confirmed total toward 'DXCC-BL'," reports K8BCK. "Easiest by far: Albania."

SOUTH AMERICA — According to CDXC's *Long Skip*, FY7YM's recent three-month trip left QSL helper VE1KG without up-to-date logs. Hence QSLs for QSOs after last December will be tardy . . . . VP8IY, recently evicted from the South Shetlands by an "extinct" volcano, addresses W6RGG in NCDXC's *DXer*: "I don't want to repeat that experience. A Chilean navy ship saw the eruption from 75 miles off and took us all away by helicopter. Under the circumstances radio logs were the last thing I was thinking about. They are still there. I understand I shall receive them next year and I will QSL all contacts then." . . . . To nobody's great surprise RCC (Chile) labels CEØXE unauthentic . . . . W4NJF advises, "I will handle QSLs for ex-VS9ABL's new Falkland Islands assignment, still awaiting word on Brian's VP8 call at this writing."

HEREABOUTS — Your "QSLers of the Month" include CR6EI, ET3REL, HC1RH, HKØAI, KJ6CF, KR6KQ, KS6CN, KX6DC, LU2DJB, TG9CD, UB5MZ, UH8DC, UL7CG, UO5PK, UR2EJ, UWØIQ, VR3DY, VU2LE, YJ8BW, YN1RMP, ZB2BC, ZE1BP, ZP9AC, ZS9Q, 4X4BL, 5U7AN, 6O6BW, 8P6AF, 9J2s NX W and 9K2AM, plus QSL aides Ws 4HKJ 4NJF 4OPM 5LEF 6BCT 9GZZ 9RKP and 9WHM, each applauded by "How's" correspondents Ws 1ARR 1MBX 1SWX 8SRK, K1HDO, WAs IDJG 1FHU 2BPL 5MIN 8MDG, WB6VVS, KP4DBJ and W. P. Kilroy for particularly prompt pasteboard pushin'. Any reliables you'd like to commend here? . . . . K5LNN is trying to trace VS6DO, and K8BCK is puzzled by TA1IR, VP2LH and doubtful YI3D. Hints? . . . . WB2ZFG and WA6VUS are willing to take on QSL responsibilities for overseas DX ops seeking such assistance . . . . WB6FCR is told by XE1CCP that only Mexico's nationals are authorized to use the 4A prefix, so A1 disqualifies his own springtime 4AØFCR work . . . . VE2DR tells Ws 1CW 4WHK, K6OZL and others he has no connection with 8X QSLing, and WA3EFH finds that W2BLL doesn't handle VP2AZ cards . . . . KZ5THN writes in NNRC's *DX Bulletin*, "My first QSL, confirming contact with KZ5FU, was delivered personally 20 minutes after QSO." . . . . W6GGR terminated his YS1THM operation last month. "I'm keeping my logs and a small stock of Salvador QSLs with me. In the fall I'll be able to resume verification of contacts." . . . . "Back in '65 my friend WA5KQF spent three weeks in Grenada as VP2GL," recalls W5QMJ. "Paul made 500 c.w. contacts on 20 meters. Now we keep getting cards for VP2GL QSOs made later on various bands and modes. Authentic VP2GL work has been QSLd to all who sent us stamped envelopes and IRCS. One of these days we will probably commence mailing out the others. Meanwhile, if anybody really needs a card, s.a.s.e. will get it pronto." We suspect some of this spurious VP2GL QSL input comes from carelessness in QSOing VP2GLE . . . . For those still unaware, be advised that the *Callbook* now includes a section on QSL managers, and W6GSV still offers his *OSL Managers Directory* with quarterly supplements . . . . A few specific suggestions, now, but bear in mind that each recommendation is necessarily neither "official", complete nor accurate:

FG7TI/FS7, manned by PJ2s MI and ME (operating) caused a furious flurry in late April with a TR4, 2B and 14-AVQ on rare French St. Martin. Jose and Vincent are very helpful to many W/K/VE DXpeditioners visiting their area. PJ2MI, holder of the FG7TI/FS7 license, intends more DXtensive action here in the near future. (Photo via W9IGW)

AP5HQ (see text)
CE3AEV, Box 13130, Santiago, Chile
CEØAJ (to DL9KRA)
CN8HD (via AAEM)
CR6KT (via W3HNK; see text)
CR9AK (via CT1BH)
CT1QFP, Box 446, Porto, Portugal
CT2AA (via WAØOMN)
CT2AS (via K2AGZ)
DL4CE, V. J. Smith, Det. 4, 601st TCS, APO, New York, N. Y., 09036
DU7SV (via WA6KGP)
EA6ITU (see text)
EI0RF (via EI2AW)
EL6A (via WA4ULE; see text)
EP2EE, MAAG 500, APO, New York, N. Y., 09205
F2VT/FK8 (via REF)
ex-FH8CD, A. Lienard, 19 rue Poncelet, 75 Paris 17, France
ex-FL8RA (to F9NI)
FO8BY, Box 545, Papeete, Tahiti
G5AGA (to WA4IKU)
GC3SVK (via G3TZZ)
HK9GQ (to HK3GQ)
HL9KQ (via W4YWX)
HL9TM (see text)
HR1HEH, P.O. Box 279, Tegucigalpa, Honduras
HS1NB, Box 2008, Bangkok, Thailand
IT1ARI, Box 300, Palermo, Sicily, Italy
JT1AK, Box 92, Ulan Bator, M.P.R.
ex-JX6RL (via NRRL)
KA1s IJ MI (see text)
ex-KA2LK, Capt. L. Allbright, Bldg. 583, Apt. 7, W. New Mexico Av., Holloman AFB, N. Mex., 88330
KC6CQ, F. Brown, Peace Corps, E. Carolines, 96942
KG4DO, Base Amateur Radio Office, Box 12, FPO, New York, N. Y., 09593
KR6CL, CMR 2, Box 7028, APO, San Francisco, Calif., 96235
KX6EN (to W1MV)
KX6GJ, W. Race, Box 8515, APO, San Francisco, Calif., 96555
LJ2X (via W4NJF; see text)
MP4DAT (to G3USK)
OA7MP (via RCP)
OX5AQ, F. Thornburgh, CMR 1279, APO, New York, N. Y., 09023
PA9GC (to ON5JM)
PJ2CB, Box 692, Curacao, Netherlands Antilles
PJ5AH (to W3EH)
PK7s MAA MAD, Box 88, Semarang, Indonesia
PX1GS, P.O. Box 220, Madrid, Spain
SK1AQ (via SM1CXE)
SK3AK (via SM3CZS)
SK6BZ (via SM6CTC)
SK0AL (via SL1CF)
TA1QR, c/ TRAC, Box 699, Karakoy, Istanbul, Turkey
TF2WKW (to WA2PUA)
TF2WKX (to WA6IJG)
TI2CBZ, Box 1307, San Jose, C.R.
UA1CK, V. Couplon, GPO Box 2, Leningrad, U.S.S.R.
VE7IR/YB1 (via MARTS)
VK4ZK/VK9 (to VK4ZK)
VK6KP (to W4HCX)
VK7SM (see text)
VK9RJ (via K6UJW)
VP2GL (see text)
VP8HO (via RSGB)
VP8JX (via GD3HQR)
VQ9s B/f V/f, Box 191, Mahe, Seychelles
VR1L (via K6UJW)
VS5MH (via VK6EZ or W1A)
VS6AD, Box 97, Hong Kong
VU2DI (via K6OZL)
VU2s KV LE (see text)
W4WTU/KS6, Dept of Education, Pago Pago, U.S. Samoa
W6BCT/4X4 (via W6KTE)
WA0KKR/KG6, Sgt. D. Haarsager, CMR Box 53, APO San Francisco, Calif., 96334
WA0TBD/KL7 (to WA6TBD)
XE3OC, Box 956, Merida, Yucatan, Mexico
YA1HD (to DJ9DK)
YA1ZC, P.O. Box 638, Kabul, Afghanistan
YA2HWI (via W9FLJ)
YN1RMP (via W9GZZ)
YN2RAC, C. Cuadra, P.O. Box 75, Granada, Nicaragua
YS1THM (to W6GGR)
ZD8JW, J. Walch, c/ BBC, Ascension Island
ZS3HF, Box 1100, Windhoek, Southwest Africa
4A1WS (via LMRE)
4A3AT, Box 329, Merida, Yucatan, Mexico
4A3JG, Box 956, Merida, Yucatan, Mexico
4M7AV (to YV7AV)
4W1ADO (to HB9ADO)
4X4s DX UF (via WA4WTG; see text)
4X4MZ (see text)
5B4SS/p, via CARS, Box 216, Famagusta, Cyprus
5R8s AF CJ (via K7HCD)
9G1HM (see text)
9K2BG, Box 5979, Kuwait
9M2US (to K3JJG)
ex-9M8MS (via K1UHY)
9Q5EP (via VE3DLC)
9Q5s GE EL (via W8WBT)
9U5HI (via WA2CRD)
9V1OQ, J. Van Lear, (VE7IR), United Geophysical Corp., Box 116, Killiney Rd. P.O., Singapore 9

Donors of the preceding glossary: **Ws** 1AYK 1DAL 1SWX 2DY 3HNK 4BW 4YOK 6BCT 7ZC 8YGR 9LNQ, **Ks** 4BAI 4EPI 6TDR 7YUC 8BCK, **WAs** 1DJG 1FHU 2BPL 2CRD 5MIN 5PPZ 8MGD, **WBs** 2BCI 2BPL 6JKQ, **KH6**BZF, **KP4**DBJ, 11DFE, **4X4**JS, P. Kilroy, Canadian DX Association *Long Skip* (VE3DLC), 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 Warward 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), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025; attn. K6CQF), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (W7LEB), VERON's *DXpress* (PAØs FX LOU TO WWP) and West Coast *DX Bulletin* (WB6UJO). Encore!

Whence:

ASIA — India's ARSI and Ceylon's RSC invite all DX buffs to indulge in the Fifth VU2/4S7 DX Contest, a fracas scheduled to run (c.w.) from 0600 GMT September 7th to 0600 the 8th, and (phone) the 14th–15th, same times. Traditional RST001, RST002, etc., serials will be exchanged (no "T" on voice, of course) at two points per band-contact with VU2-4S7 stations, one point per band-contact with others. Logs showing GMD, GMT, stations worked, name and address of operator, equipment details, total points claimed, and a signed declaration that rules and regulations were observed, should be postmarked no later than October 15, 1968, for mailing to ARSI Contest Committee, Box 534, New Delhi 1, India, to qualify for possible certifications of performance . . . . . W8QZR writes from BV-land: "The Taiwan situation continues grim so far as U. S. hams getting on the air is concerned, due to local regulations in effect since the fall of '66. My own State Department assignment here will end next April after which I hope to be active from some other far east QTH." . . . . . "Not living on a Government base, I do not have a KA station authorization," explains W6WBP from Japan. "but I do hold a permit which authorizes me to operate USFJ AMRS stations here." Santo tells ARRL's WA2INB of attending a most enjoyable meeting of the Nagoya DX Club . . . . . "K3JJG of the Peace Corps just got on 20 c.w. as 9M12US," notes W7ZC. "Ed uses a KWM-2 and dipole near the Thailand border." . . . . . W4YOK says UAØZB, 14,025-kHz. c.w. at 1100 GMT, is beset by TVI in Kamchatka of all places . . . . . "Was issued the call HL9KQ in late May," pens K4BAI. "I'll be on 10 through 80, c.w. and sideband, especially in contests." . . . . . According to K1UHY, 9M8MS-9V1MS shuts down for return to G3KAM where an NCX-5, VX-501 and NCXA will

keep him in touch with DX pals . . . . "WB2ZMK is the first U. S. station to win the Cyprus award," salutes ZC4GM, "the 100th amateur to qualify." . . . . VE3GTW finds AP5HQ active almost daily around 0100 GMT, 14,010-14,030 kHz., from Kohat, W/K/VE/VO callers welcomed . . . . From the peppery *Newsletter* of HKARTS: OZ7SM finally signs VS6AD after an eight-year wait, and DJ4NF becomes VS6BA after a similar eternity. DJ5BV, OE1MEW and ZL1TZ were recently issued the society's Firecracker award for eight VS6s worked. VS6AA, a new club council member, signed DLs 2PA 5YW, GW3NWQ, VS1MK and 9V1RS since he was first licensed in 1956 . . . . W6BCT/4X4 will radiate from Tel-Aviv for a few years with TR4, RV4, TA-33 jr. and 5DBQ apparatus . . . . K9HWI totes an SB-101, SB-200 and triband twirler to Afghanistan where he intends to regale DX friends as YA2HWI during a two-year sojourn. Peyt represents USAID at Kabul Tech . . . . Still want Macao? Well, VS6AD proclaims: "A group of VS6 hams will go to Macao on August 2nd-5th to take the sideband pressure off CR9AK." . . . . Dispatches from the near and far east courtesy aforementioned clubs and groups: MP4BGS-MP4DAU-MP4QEX (ex-4S7IW) flies juicy routes that sometimes permit visits to even rarer regions. Ian occasionally operates from MP4s DAT and TCD. . . . VU2OLK is GI3OLK on a three-year Bangalore tour, 15-meter s.s.b. preferred. . . . JT1s AG AH KAA, with neighbors UAØEH, UVØs EB and EH, display rarer Asia on 15 and 20, phone and code. . . . 9K2BJ claims to be within strolling distance of 9K3-land but tickets are taboo at present. . . . New or renewed Far East Auxiliary Radio League memberships are claimed by KAs 2BD (W2OJC), 2FL (K5LLK), 2GH (K2JJA), 2HT (K9UAH), 2IJ (KH6IJ), 2SF (WA4WMC) and 7YL (K9YLD) who is no YL.

All-Asian DX Contest (Aug. 24-25) rules late but the same as on p. 86, Aug. 1967 *QST*.

AFRICA — F5OJ alerts WA3FWL: "This club plans a DXpedition to 3V8-land in August. Watch 14,225 and 21,225 kHz." *That* we will . . . . "5R8AF closes down this month," warns K7HCD, "but 5R8CJ will remain active for some time. Cliff likes c.w. and s.s.b. on several bands with a long-wire." . . . . "ZS9Q uses a homemade 6146 rig, homebrew receiver and a TA-33 beam," observes WA1DJG. "He's a 29-year-old bank teller and accountant in Francistown where electricity is quite expensive." . . . . W4NJF learns that EL2AG expects to leave Monrovia for the States by the end of this year . . . . Ex-EL2s D and NA now head for Thailand, according to WA3EFH . . . . Africa oddments thanks to club newshawks: ZD8JW joins the Ascension gang with 90 watts and a TA-33 jr. . . . Bad weather hampered the Farquhar results of VQ9s B and F in May. . . . Fresh talent may pep up ZD9BE's 14,260-kHz. performance. . . . 9X5GG's shutdown subtracts a Rwanda regular. . . . TL8DL still gives priority to callers using French and still has no liking for the pile-ups around 21,305 kHz. at 1130 GMT. . . . 9L1s SL and TL are popular Sierra Leoners on 15 c.w. while neighbor 9L1JP capers on ten a.m. . . . VQ8AD is shipping the W9WNV-LIDXA transceiver to FR7 sea rovers for possible Europa, etc., DXcursions.

OCEANIA — "We leave in September from Vancouver aboard the *Oriana*," enthuses VE6AJT, describing a substantial DXpeditionary project that goes like this: "Our first stops are planned for British Phoenix, Tokelau, Niue and other south Pacific points. Then through Indonesia to Sikkim, Nepal, etc., followed by the west Africa coast — Rio Muni, Fernando Poo, etc. — and finally such European spots as Rhodes, Monaco and Andorra. We plan to operate from as many countries as we can get operating permission from, some sixty possible, most of which are fairly rare." Ambitious, no? . . . . "YJ8BW still prefers rag chews to contest-style QSOs," comments W4NJF . . . . Next month we'll run participation particulars on the gala VK/ZL/Oceania DX Contest scheduled for October's first two week ends . . . . Pacific addenda via the clubs press: VS5RCS collected 2180 sideband contacts and 1170 c.w. QSOs in Brunei thanks to 9M2NF and team. Mike and Trevor of VS5MH hope to keep the place workable on 14,235 kHz. at 1530 GMT. . . . Indonesian call areas will be numbered 1, 2, 3 and Ø for west Java, central Java, east Java and Djakarta, respectively. Prefixwise, YBs are first class licensees (500 watts maximum, v.f.o. allowed, 12-w.p.m. code minimum), YCs second (75 watts crystal-controlled) and YDs third class (10 watts). In a year or so the present PK prefix should be just about extinct. . . . KX6GJ makes that big 21-MHz. voice noise with an FL-2000X and four-element quad. . . . VK3AEJ expects to sign a VK4 call from Willis for the remainder of the year, 14 and 50 MHz. favored. . . . KH6GLU of VR3DY fame is willing to be talked into another DXtravaganza out his way. . . . 'Tis said that one VK9KC may appear on Cocos-Keeling, and VK9RJ's new Nauru beam should easily shame his spring-time dipole signal.

EUROPE — Notes on Yanks in Italy courtesy WB6JKQ of I1DFE: "We use one of the few calls assigned to Air Force posts, all in the I1DF- series. No mobile or third-party traffic is allowed. It is possible for U.S. hams, General Class or higher, to obtain 'second operator' privileges at I1 stations. As for San Marino DXpeditions, M1B says his government no longer lets foreign amateurs operate there, at least for the present." Ks 6TDR and 7YUC collaborate with Gordon to keep I1DFE humming . . . . Among Yanks in Germany: DL5JX (W5LPO) returns to Texas for military retirement, but DL4CE (W4CJD, ex-KA2AB) remains on the watch for Stateside friends. DJs 4WG and 9MF joined Vern in June field day sport. Fine public relations work by DLs 4FS 4IC 4RM 5LP 5OM and 6QX produced "Radio Club Promotes Scouting" headlines in local press releases . . . . "GC2AAO is moving from the farm to a cottage by the sea on Jersey," remarks W4NJF. "Since he doubts that he will be able to erect his tower there, the beam may give way to a vertical." . . . . ARRL Assistant General Manager W1IKE notes that short-wave listener clubs in Denmark, Germany, Holland, Norway and Sweden have banded together to form the European DX Council with headquarters at Klippgatan 1-119, S-451 OO, Uddevalla, Sweden. S.w.l.ing is a very serious and popular pursuit on the Continent . . . . "We made a thousand EA6ITU QSOs in two weeks," discloses W4BW concerning May operation with W3MR on Palma de Mallorca . . . . WA1FHU finds HA3MB enjoying a new transceiver thanks to W4GRG . . . . K4IEX understands that LZ9FWY represents a Festival for World Youngsters in Sofia, an attraction closing shortly . . . . Don't forget the c.w. section of DARC's 14th WAE DX Contest due the 10th-11th of this month, details in July's "How's." Mike men take over on September 14th-15th. Then, too, there will be the WADM c.w. affair sponsored by East Germany's society on the third October week end . . . . Continental comment culled from club literature: I1KDB and cohorts rang up some 1800 IZ6KDB two-ways from Ponza isle. . . . G3RXC offers the Isle of Wight on 14,250 kHz. around 0800 GMT. . . . JX6RL closes shop after an impressive DX program. . . . Loads of Corsica QRM come from FC2CD (20 s.s.b.), FC6ABP (15 a.m.), F5RVØFC (20s.s.b.), F8TTØFC (20 c.w.) F9RYØFC (multiband s.s.b.) and F9VNØFC (20 c.w.). . . . GI3OLJ, in ISWL's *Monitor*, protests restrictive U.K. mobile-marine regulations and denounces multimode encroachments into the pinched 40-meter c.w. slot. . . . SVØWY grants Rhodes diplomas to DX scholars near 14,010 and 29,540 kHz., c.w. and straight a.m. respectively.

SOUTH AMERICA — HK3RQ of LCRA describes the whopping turnout for last year's Colombian Independence Contest. Top scorers by U.S. call area were K9CVO/1, W2ZV, WA3HAN, K4BAI, W5MSG, WB6KBK, WA8TYF, W9YB and WAØKKA (no sevens applied). WA2IRS and WB2JXE racked up an impressive multiop tally at W2GTF. Stateside ranking by score: WAØKKA, K4BAI-WB6KBK, W9YB, Ks 4IEX 9CVO/1, WA9s QXY ITB, W2ZV, WA9MMT, Ws 4JUK 2HL ØGAX 2NCG, WA8TYF, W4OMW, WAs 6JDT 3HAN, WBs 2HEY 6VVS and W3UHN-W5MSG. In Canada, 3C2DCW and VE2BSS ran one-two. Highest single-op entries per country include CO8AC, CR4BH, CT1OI, DJ6QT, EA1IY, EI5SF, EP2BQ, G3TXF, GM3JZK, HA5KDQ, HB9AHS, HC1BY, HI8JGM, HP1JC, I1PER, JA1KVT, KP4CLB, KZ5MF, LA6U, DJ6SI/LX, LZ2RF, OA4KX, OE4SZW, OH3WW, OK2RZ, ON5KD, OZ1QW, PAØVB, PJ3CL, PX1PA, PY1ADA, SM5BNX, SP8AJK, TG8IA, TI7HI, UAs 2KBD 3KWB 9KAB, UC2KGF, UD6BW, UG6JJ, UH8BO, UI8AI, UL7CG, UM8BA, UP2KBC, UQ2GA UT5EH, VK2APK, YO8DD, YU1SJ, YVIQA and 8R1G. Call area toppers on the home front: HKs 1AAH 2AMX 3BAE 4RCA 5MO 6AWX 7AXD 8AYL and ØAI. Ouch —

(*Continued on page* 138)

XE2YP wants to leave this comfy Obregon layout for the remote and inhospitable Revilla Gigedos. Only temporarily, of course, Jorge and DXpeditionary friends will be signing 4A4A this fall if their plans jell. (Photo via W1CW)

Operating News

GEORGE HART, W1NJM, Communications Manager
ELLEN WHITE, W1YYM, Deputy Comms. Mgr.
Administration: LILLIAN M. SALTER, W1ZJE
Contests: ROBERT HILL, W1ARR
DXCC: ROBERT L. WHITE, W1CW
Training Aids: GERALD PINARD

An ARRL Working Frequency? Ever since the old National Calling and Emergency Frequencies (NCEFs) were de-emphasized, a small contingent of amateurs has kept insisting that there ought to be some kind of general calling and working frequency, somewhere, that the reason the NCEFs weren't observed was because they were monitoring frequencies, not working frequencies, and no amateur is going to be satisfied with just listening. Some of them, apparently, don't listen at all!

We have been very hesitant to raise this subject again, but now on the West Coast an independent group of amateurs has formed the West Coast Amateur Radio Service, a long-hours service manned by whatever stations happen to be "on frequency" and controlled by an NCS. Just by being on and being known, this group has been able to be of service in any number of instances, many of which are and have been mentioned in the ARPSC column. We understand similar groups are being formed in the midwest and east, to operate in a similar manner.

The question is raised, then, about ARRL frequencies for general contact, traffic, emergency, or what have you, in each of our bands. They could also be used as gathering places for ARRL appointed and elected officials, especially in such activities as CD Parties and LO Time, for discussion of problems, answering of questions, even general ragchew. In the northeast, a bunch of sidebanders lives dangerously on 3999 kc., and occasionally it is surprising who happens to be listening but not saying anything until something comes up that interests him.

The selected frequencies would be general *operating* frequencies, however, not just listening frequencies. Something would be happening on them all the time, maybe 24 hours a day, no matter where you happen to listen, in the U.S. and Canada and maybe even more internationally.

What frequencies? Well, this can come later, if it be determined that the basic idea is a good one. One suggestion, of course, is the old NCEFs, because they are mostly free of nets. Others strongly make the point that they should be easily remembered frequencies, such as at even 100 kc. points (e.g., 3600, 3900, 7100, 14,100, 14,300, etc.) or frequencies with repeated digits such as 3666, 3888, 7111, etc.

Does the idea grab you? Remember, this is not a proposal to reactivate the old NCEFs, but an entirely new idea for setting up some general ARRL operating frequencies, one in each c.w. and phone band, where the gang can congregate — and incidentally, where a call for help will meet with lots of listeners.

New Operating Aid. A recent check of stocks of our current operating aids indicated that three were in short supply and needed reprinting. Followed the usual procedure of hmmming over them to decide whether or not any changes were needed. Then W1YYM came up with an idea:

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

August	September	October
2 **Qualifying Run, W6OWP**	5 **Qualifying Run, W6OWP**	4 **Qualifying Run, W6OWP**
3-4 Md.-D.C. QSO Party (p. 104, July QST).	7-8 **VHF QSO Party** (p. 49, this issue).	5-6 VK/ZL Contest, phone Massachusetts QSO Party
4 **LO Time** (League Officials only)	VU/4S7 Contest, c.w. (p. 92, this issue).	5-7 RTTY SS
10-11 WAE DX Contest, c.w. (p. 98, July QST).	8 **LO Time** (League Officials only)	12-13 VK/ZL Contest, c.w.
17 **Qualifying Run, W1AW**	11 **Frequency Measuring Test** (p. 95, this issue).	12-14 **CD Party** (phone)*
17-18 Indiana QSO Party (p. 105, July QST).	14-15 VU/4S7 Contest, phone (p. 92, this issue).	16 **Qualifying Run, W1AW**
New Jersey QSO Party (p. 101, this issue).	WAE DX Contest, phone (p. 98, July QST).	16-17 YLRL Anniversary Party, c.w.
24-25 All Asian Contest, c.w. (p. 93, this issue).	17 **Qualifying Run, W1AW**	19-20 Boy Scout Jamboree
	26-28 YLRL "Howdy Days"	19-21 **CD Party** (c.w.)*
	28-29 VE/W Contest	* League Officials and Communications Dept. Appointees only.
		Nov. 9-11 **SS**, phone 16-18 **SS**, c.w.

instead of reprinting three different postcard-size op aids, why not print them all on a single card the size of Op Aid 9A, perforated so they could be detached from each other if desired? Sounded expensive, but further investigation revealed that it would be less expensive to do this than to reprint the three that needed reprinting.

The new Operating Aid will be designated No. 14, and will replace former Op Aids 1 (phonetic alphabets), 2 (ending signals), 3 (RST) and 10 (time conversion chart), all of which numbers will be discontinued when they run out. Anyone who requests any of these former Op Aids will now get the new No. 14, which will include the one he asked for along with three others which he may also find helpful. This combines a move toward better efficiency with more dissemination of the League's Op Aids. We hope Op Aid 14 will be available in quantity by the time you read this.

This reminds us that it has been some time since a list of currently available numbered ARRL Operating Aids has been given on these pages. Here they are:

1. Phonetic alphabets, both ARRL and ICAO. Now combined with No. 14.

2. Ending signals. Newly revised, this aid now includes ARRL-recommended phone as well as c.w. ending signals. Included as a part of No. 14.

3. RST system of reporting. A lot of criticism, but no one yet has come up with a better reporting system (except in the opinion of the inventor). Now a part of No. 14.

4. Emergency operation. A check list of things to do before, during and after an emergency.

5. DX Operating code. For W/VE amateurs on one side, for DX amateurs on the other.

	45	58.5	
	40	52	
	35	45.5	
33⅓ r.p.m.	30	39	45 r.p.m.
	25	32.5	
	20	26	
	15	19.5	
	10	13	
	5	6.5	

Equivalent speeds in w.p.m.

Daniel Walsh of Puerto Rico suggests that you get a bit more mileage out of your standard code records by running them at 45 r.p.m. The above nomograph illustrates the point. For example, the regular 10 w.p.m. speed on your 33-⅓ r.p.m. disc would give you 13 w.p.m. practice when run at 45 r.p.m.

6. Duplicate sheet, for use in contest operation to prevent duplicate contacts.

7. DXCC Countries List and rules. This is revised from time to time.

8. List of states for WAS and an application form for same.

9A. Traffic form, QN signals, HX signals, other info useful in traffic and net operation.

10. Time conversion chart, newly revised to show conversion to and from GMT and all U.S. and Canadian time zones, including "daylight saving" time. Now a part of No. 14.

11 and 12 are obsolete.

13. Emergency Ready Reference list. Standard emergency info to be posted in your shack for ready reference.

14. Combined in a single 6 × 9 card, includes phonetic alphabets, ending signals, RST system and time conversion chart on perforated stock for convenient separation if desired.

The catch? No catch. These Op Aids are available free to anyone asking for them, a service of ARRL to the amateur radio fraternity.— *W1NJM.*

FREQUENCY MEASURING TEST SEPTEMBER 14

ARRL invites every amateur to try his hand at frequency measuring when W1AW transmits signals for this purpose starting at 0130 GMT, Sept. 14. *CAUTION:* Note that since the date is Given in Greenwich Mean Time the early run falls on the evening previous to the date given by local time. *Example:* In converting, 0130 GMT, Sept. 14 becomes 2130 EDST Sept. 13. 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 3507, 7042 and 14,045 kHz. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 0136. It is suggested that frequencies be measured *in the order listed.* Transmission will be found within 5 or 10 kc. of the suggested frequencies.

At 0430 GMT, September 14 W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies will be 3594, 7075 and 14,110 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 become eligible for appointment 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 appropriately 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 overall *average* accuracy, as compared with readings made by a professional lab. If you're troubled by GMT, send for Operating Aid 10.

A.R.R.L. 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[1] — Hampden County Radio Association, Box 216 Forest Park Station, Sprinfield, 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., Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.

WA4, WB4, WN4[1] — 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.

WØ, KØ, WAØ, WNØ — Alva Smith, WØDMA, 238 East Main St., Caledonia, Minnesota, 55921.

DX CENTURY CLUB AWARDS

From May 1, through May 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

ZL3AAD....201	K7NHG....118	4X4VE....110	LA9OE....104	W7FF....102	K3MNT....100
W7GVX....163	UA3KBA...115	VE2AXZ....109	UA1DF....104	WA8VFK...102	K4TBN....100
W7NYO....159	W2CIY....114	UA1ZL....108	DJ4BG....103	WØLXQ....102	K9WMV....100
K4EEK....150	W4AOU....113	W5ORH....108	DJ7ZZ....103	K7JLF....101	KØCML....100
SM5BFC...141	WAØPKX...113	DJ4WG....107	DM3XED...103	UT5RO....101	WA1BLC...100
VE3WB....141	YO8AP....112	K4TWJ....107	UB5LS....103	VE3GHL...101	WA3BME...100
FP8CY....138	WA2RSX...111	K9KXA....106	WAØPLR...103	W3BAB....101	WA3DSD...100
SM2COP...137	PY2GFK...111	KP4CRD...106	DF9JJ....102	WA7BPS...101	W6OL....100
HC1LC....135	JA1MUZ...110	UAØRV....106	GM3KPD...102	W8CNL....101	WB6LZP...100
DJ3NK....133	K2AHQ....110	5N2AAJ....106	K1YGX....102	WA8SRQ...101	WB6PCF...100
WA4JJY....133	K3ZZD....110	JA7DY....105	W3CD....102	WAØNBZ...101	W8FXP....100
WA5MYR...130	UA4QM....110	W6BPW....105	W3VLG....102	DM3JZN...100	W8RVD....100
WB4FIN...125	UL7RL....110	WA8CKY...105	WB4HFJ...102	G3UYK....100	WA9MGK...100
K9QFR....119	VE5GG....110	K3PZU....104	W6FL....102	K1LIH....100	WA9REC...100

Radiotelephone

TI4JP....259	H1BER....134	3C3GNM...111	GM3TDS...103	WB6FGT...101	OA4JR....100
W4CYC....224	H1CLC....134	DJ9GZ....110	WA5REB...103	WØUGV....101	VE7NH....100
W3VLG....199	DJ9PH....132	WA6YMG...108	WA9KYK...103	DL8RM....100	W1TOU....100
ZL3AAD....195	FP8CY....131	W7MSI....108	6Y5JR....103	DJ9MZ....100	W2LEJ....100
OE1MEW...173	W7NYO....124	YV4UA....108	DL4QG....102	G3RRD....100	WA2RSX...100
YN1RTS...168	VE5QK....122	VE2AXZ....107	K4CEE....102	K1EIN....100	WB2OUZ...100
WA9IVL...152	W9UEM....121	DJ3OC....106	KP4CRD...102	K1IQI....100	WB2UZU...100
OA4BS....142	K9QFR....119	K7MDH....106	K9WEH....102	K5EFW....100	W5FDI....100
W7GVX....142	WA7DRP...119	W9DRL....106	WA8VFK...102	KH6BZF...100	W5FUR....100
W8VHY....141	DJ9ZB....118	H1CRH....105	W9SCN....102	K7JLF....100	W8GXR....100
W8YGR....139	SM5BFC...115	WA1DJG...105	DJ3NK....101	K7TIC....100	WA9NJB...100
	WA5MYR..112	WAØPKX...105	K9DCG....101	K9TSY....100	

Endorsements

Endorsements issued for confirmations credited from May 1, 1968, through May 31, 1968, are listed below. Endorsements listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

340	**300**	W3WPG	W7MVC	**180**	K3EUR	SM5FC	**120**
W8JBI	JA1BN	WAØKDI	W8LUZ	DJ9NX	K4RSM	SM6BDS	DL5NI
	K8DYZ		W9IGW	K2LBB	K8UHB	SMØBPZ	K1KNQ
	K9BVR	**260**		K4CIA	SM7BHH	K2SBW	K2HWF
320	PY4OD	W1MDO	**220**	K4RSM	VO1HH	K3FDQ	K2PTU
K4ASU	WA2DIJ	WB6GMN	KR6UD	K6EBB	WA2CCF	K4RBZ	K8LSK
K4PDV	W5PIO	W9WNB	LA1KI	K6TZX	WB2PCF	K9GEL	KØAXU
W5WZQ	WA6KNE	JA8ADQ	WB2YQH	K9WEH	WB2ZKJ	KZ5GN	UA3HC
W8YCP	W8ARH	**240**	W8DCH	W2ll	WA4PFD	VE3DLC	VE2DCW
	W9FKH	DJ3BB		W6NZ	W5OER	WA2OIL	VE3AHU
		DL3BJ	**200**	W6SUD	W5TXN	WB2NZU	WA2VSQ
310	**280**	K1OZR	DJ3CG	WB6IUH	W6EJJ	W4DJT	WB2HNO
HB9EO	JA1ADN	W1RLV	KP4BJD	W7HO	WA6ZQU	W4JUK	WB4EWU
KØEZH	K2JWM	WB2UKP	PY4AJD	WA8GXP	WA8YPL	WA6THG	WA8THV
OH1TM	K6AO	W4HEG	SP3AIJ		WØDAD/6	W7CRT	W9DDL
W2GQN	OZ7BG	WB4BDO	WA4KXC	**160**		W7DH	WA9NSR
WB2FSW	SM6CAS	W5ACL	WA4LSK	DL1DAA	**140**	W8MKE	WA9TFM
W5KTW	VE3DDR	WA5DAJ	W7FBD	HB9ADP	DLØBT	WA9OVU	WAØOTE
W8EVZ	W1RLQ	W6ANB	8P6BU	JA8GR	F2VX	WØYFT	

Radiotelephone

330	WØTJ	WA6KNE	SM4CMG	W5KTW	W7MVC	W7HO	**120**
W1JFG			W4ASW	WA6AHF	YV3KV	WA8OSE	DJ4ZD
	280	**240**		WA8GKW			K6IPV
310	W8ARH	W1SEB	**200**	W9WIO	**160**		K7UXS
W6REH		W4TRG	EA7IR		**DJ3BB**	**140**	LU2CF
W7CMO		W8WC	H1WT	**180**	JA1BN	SMØBPZ	W4OKO
	260	WAØKDI	IS1VAZ	K4UFE	VE3CUS	WA1IHN	WA8DEX
	JA1ADN	XE1YG	OZ7BG	OA8V	WA2CCF	W4LXL	WA8GPX
300	SM6CAS	K4PQV	W1HOO	PY2CTL	WB2UKP	WA4WHP	WA8YPL
W6KTE	W4QBK	KH6BB	W4FWG	W4BA	WB2ZKJ	W5FFW	W9DDL
W8EVZ	WA5LOB	OE3SAA	WA4LSK	W6SUD	W5LDH	WØDAD/6	W9VNG

VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
VE2 — John Ravenscroft, VE2NV, 353 Thornerest Ave., Dorval, Quebec.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, 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.
KH6, WH6 — John H. Oka, KH6DQ, P.O. Box 101, Aica, Oahu, Hawaii 96701.
KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.
SWL — Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

[1] **These bureaus prefer 5×8 inch or #50 manila envelopes.**

ELECTION NOTICE

To all ARRL members in the Sections listed below:

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

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

Each candidate for Section Communications Manager must meet the following requirements prior to deadline date listed below: (1) Holder of amateur Conditional Class license or higher. (2) A licensed amateur for at least two years immediately prior to nomination. (3) An ARRL full member for at least one year immediately prior to nomination. Petitions must be received on or before 4:30 P.M. on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, *zip code* and station call of the candidate and signers should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

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

The following nominating form is suggested. (Signers should be sure to give city, street address and zip code.)

Communications Manager, ARRL [Place and date]
225 Main St., Newington, Conn. 06111

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

You are urged to take the initiative and file nominating petitions immediately.

—*George Hart, W1NJM, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Santa Barbara	Aug. 15, 1968	Cecil D. Hinson	Aug. 10, 1966
East Bay	Aug. 15, 1968	Richard Wilson	Feb. 10, 1968
Idaho	Aug. 15, 1968	Donald A. Crisp	Aug. 17, 1968
Nevada	Aug. 15, 1968	Leonard M. Norman	Oct. 22, 1968
New Hampshire	Aug. 15, 1968	Robert C. Mitchell	Oct. 26, 1968
San Francisco	Sept. 10, 1968	Hugh Cassidy	Nov. 19, 1968
NNJ	Oct. 10, 1968	Louis J. Amoroso	Dec. 9, 1968
Southern Texas	Oct. 10, 1968	G. D. Jerry Sears	Dec. 10, 1968
Mississippi	Oct. 10, 1968	S. H. Hairston	Dec. 15, 1968
Maryland-D.C.	Oct. 10, 1968	Carl E. Andersen	Dec. 19, 1968
Alabama	Oct. 10, 1968	Edward L. Stone	Dec. 26, 1968

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for May Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	5159	2172	1975	197	9503
W3CUL	328	1226	1103	96	2753
K5TEY	113	1132	1031	0	2276
K0ONK	57	1015	996	34	2102
KH6GHZ	431	762	694	68	1955
W7BA	11	946	865	77	1899
W6GYH	125	650	629	6	1410
W6RSY	17	666	345	200	1228
W5OBD	28	583	576	7	1194
K9IVG	8	541	469	3	1021
W6LCX	31	476	400	8	915
WA2UWA	20	450	440	2	912
W3EML	31	490	374	4	898
WB6GGL	5	446	422	24	897
W7DZX	18	463	398	4	883
W3VR	104	397	272	7	780
K5BNH	11	400	339	20	770
WA7DXI	33	365	312	27	737
W6MLF	271	231	228	1	731
K3MYS	30	335	295	9	669
K7NQX	28	308	0	308	644
W6KVQ	8	313	313	8	642
W3FGQ	18	325	228	70	641
WA4SCK	31	295	301	7	634
WB6BBO	133	234	201	5	573
W9AOW	37	263	239	26	565
W2FR	19	260	241	8	528
W6VNQ	19	250	237	0	506
K3NSN	18	240	240	3	501
Late Reports:					
WA2UWA (Apr.)	20	440	400	2	862
WB6PCQ (Jan.)	17	319	304	13	653
WA2IGQ (Apr.)	52	271	228	43	594

More-Than-One-Operator-Station

WB6TYZ/6	283	131	48	52	514
Late Report:					
K6QEH (Apr.)	0	304	0	304	608

BPL for 100 or more *originations-plus deliveries*

WA7ICA 231	WA8MCQ 140	W9KII 113	
WA5PPD 186	WA4HCW 131	WA3AFI 109	
WB6UMT 178	WA1EEJ 125	WA3IYS 108	
WA9QNI 171	W3MPX 124	WA5QQQ 103	
WA1GGN 169	WB6HVA 122	W6DSC 102	
		Late Reports:	
W3TN 160	WA5QQR 118	WA4DYL (Apr.)	137
WB6INO 150	W9ESJ 117	WA1HXF (Apr.)	112

More-Than-One-Operator-Station

W1KBN 350	K2US 288	K6QEH 195
		K1CG 154

BPL Medallions (See July 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listing: WB2DDQ, WB2NSV, WA3CQO, W3FGQ, K4HJX, WB6INO, KH6GHZ.

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

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Louisiana	J. Allen Swanson, Jr., W5PM	June 10, 1968
Eastern New York	Graham G. Berry, K2SJN	June 10, 1968
Quebec	James Ibey, VE2OJ	June 11, 1968
Eastern Massachusetts	Frank L. Baker, Jr., W1ALP	June 15, 1968
Utah	Thomas H. Miller, W7QWH	July 15, 1968
Western New York	Richard M. Pitzeruse, K2KTK	Aug. 17, 1968

In the Santa Clara Valley Section of the Pacific Division, Mr. Edward T. Turner, W6NVO, and Mr. Edward A. Gribi, Jr., WB6IZF, were nominated. Mr. Turner received 394 votes and Mr. Gribi received 175 votes. Mr. Turner's term of office began May 28, 1968.

In the Nebraska Section of the Midwest Division, Mr. V. A. Cashon, K9OAL, and Mr. Gerald Corning, K9QIX, were nominated. Mr. Cashon received 158 votes and Mr. Corning received 75 votes. Mr. Cashon's term of office began May 29, 1968.

In the South Carolina Section of the Roanoke Division, Mr. Charles N. Wright, W4PED, and Mrs. Elizabeth Y. Miller, WA4EFP, were nominated. Mr. Wright received 159 votes and Mrs. Miller received 119 votes. Mr. Wright's term of office began June 26, 1968.

In the Wyoming Section of the Rocky Mountain Division, Mr. Wayne M. Moore, W7CQL, Mr. Dale Ruland, W7TZK, and Mr. G. Palmer Long, K7POX, were nominated. Mr. Moore received 53 votes, Mr. Ruland received 26 votes and Mr. Long received 18 votes. Mr. Moore's term of office began June 25, 1968.

W1AW SCHEDULE, AUGUST 1968

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.–1 A.M. EDST, Saturday 7 P.M.–2:30 A.M. EDST and Sunday 3 P.M.–10:30 P.M. EDST. 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

GMT*	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0020–0100[4]	.....	.....	3.555[6]	14.1	14.1	7.08[6]	14.1
0100	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]
0105–0130[4]	.....	145.6	3.945	145.6	50.7	1.82	21.41
0130	**Code Practice Daily[1] 15–35 w.p.m. TThSat., 5–25 w.p.m. MWFSun.**						
0230–0300[4]	.....	.....	3.555	7.08	1.805	7.08	3.555
0300	RTTY-OBS[3]	.....	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]
0310–0330[4]	.....	.....	3.625	14.095	3.625	14.095	3.625
0330	Phone-OBS[2]	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone OBS[2]
0335–0400[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0400	CW-OBS[1]	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0420–0500[4]	.....	.....	3.555[6]	7.08	3.945	7.08[6]	3.555
1700–1800	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900–2000	.....	14.28	7.255	14.28	7.255	14.28	.....
2000–2100	.....	14.1	14.28	14.095	21/28[5]	7.08	.....
2200–2300	.....	21/28[5]	21.075[6]	21/28[5]	7.255	14.28	.....
2300	.....	.....	.....	RTTY-OBS[3,7]	.....	.....	.....
2330	**Code Practice Daily 10, 13 and 15 w.p.m.**						

[1] CWOBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21,075, 50.7 and 145.6 MHz

[2] Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 MHz.

[3] RTTY OBS (bulletins) on 3.625, 7.045,14 .095 and 21.095 MHz. 170/850 cycle shift optional in RTTY general operation.

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

[5] Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 MHz.

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

[7] Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.

Maintenance Staff: W1QIS W1WPR. * All times/days in GMT, general operating frequencies are approximate.

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 Aug. 17 at 0130 GMT. Identical texts will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Aug. 2 at 0400 Greenwich Mean Time on 3590 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, 0130 GMT Aug. 17 becomes 2130 EDST Aug. 16. 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 qualifications is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code practice is sent daily by W1AW at 2330 and 0130 GMT, simultaneously on all listed c.w. frequencies. At 0130 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. An additional 10 minutes each of 20 and 25 w.p.m. will be transmitted on a temporary trial basis during the 0130 GMT period. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 2330 GMT daily, speeds are 10 13 and 15 w.p.m. The 0130–0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130–0220 GMT practice on those dates:

Date Subject of Practice Text June *QST*.
Aug. 19: *It Seems to Us*, p. 9
Aug. 22: *Some Observations With V.h.f. Yagis*,* p. 31
(*Cont. next column*)
Aug. 28: *Interference and the V.H.F. Mountain-Topper*, p. 34
Sept. 10: *Recognition*,* p. 60
Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition
Sept. 11: *The Balanced Modulator*, p. 90
Sept. 13: *Effect on Plate Heating*, p. 91 QST—

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

Strays

In commemoration of the celebration of the 250th anniversary of the founding of the City of New Orleans, the Greater New Orleans ARC is offering a commerative Certificate to any amateur who submits a log extract indicating two-way communication on any bands, any mode, with three metropolitan New Orleans area amateurs during 1968. If you qualify, send a large self-addressed stamped envelope to the Greater New Orleans ARC, 2935 International Trade Mart Tower, 2 Canal St., New Orleans, La. 70130.

—···—

The radio amateurs of Greater Vancouver are having another display at the annual Pacific National Exhibition in the Hobby Building this year. This will make the 21st year that the group has been in the show and the theme this year is Public Service. The display station, VE7PNE, will be on looking for contacts, especially with other exhibitions in the U.S.A. and Canada. Look for them on 14.200 MHz. from 0100 GMT daily until no further activity, from August 17 until September 2. (*VE7FB*)

August 1943

. . . Cover picture shows three students from Scott Field in and around the cockpit of a training plane. They are presumably discussing a flight plan but there is some indication they are actually talking over their ham rigs.

. . . WERS is making progress. In spite of severe handicaps such as lots of red tape, lack of equipment, many hams in service and a poor initial image caused by the inconsiderate operating tactics of a few "clowns," there are now over two hundred WERS licensees successfully operating a number of well organized nets. Some of these nets have been described in *QST*.

. . . Wing Commander K. R. Patrick, VE1BO, Chief Instructor of No. 1 Wireless School in Montreal, tells about their program and how wireless was instrumental in defeating the enemy in the Battle of Britain. In reading this piece, I am struck by the high caliber of the instruction and equally high standards which must be attained to obtain a rating. Both men and women are engaged and the latter must meet the same requirements as the men. Many photos are shown.

. . . Wired Wireless is being successfully used in Prince Georges County, Maryland by the local Civilian Defense people. Complete details of the apparatus used are given. Successful voice communication is being maintained over several hundreds of miles using a twenty watt rig.

. . . Hams in Combat is really exciting reading. This article is a sort of omnibus of stories concerning true incidents all over the world. *QST* offers a twenty-five dollar War Bond for such stories as are published in the magazine. Better dig this one out and read it.

. . . Like some math? Harry E. Stewart, W3JXY, takes us on a little tour of transmission lines. I see a few coshes and sinhes in the text. This is basic theory and you also have to know a little about complex quantities, as well. Of course you don't have to understand all this as simpler, practical formulae are given. For instance, a ten year old might readily solve the equations for skin effect resistance of a two-wire transmission line.

. . . WERS and the Military supplied emergency communications during the Mississippi Flood. Hundreds of messages were handled to good effect.

. . . George Grammer, W1DF, winds up his series of "Elementary A.C. Mathematics" with a piece on Power, Power Factor and Losses in Reactances. I think this whole series should be available in booklet form. — *W1ANA*

Strays

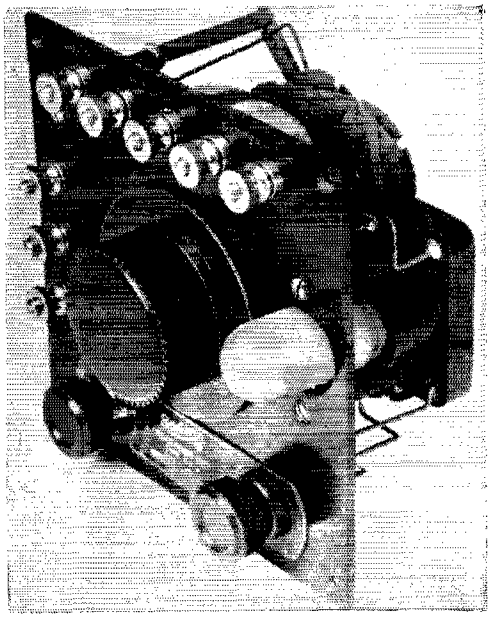
Feedback

OOPS! Wrong caption with the photograph in last month's "From the Museum of Amateur Radio." The caption should have read as follows:

How about this little breadboard receiver made from largely boughten parts. Originally a crystal detector rig, the Paragon audion control box accommodated a UV 200 tube. The loading coil is a Chelsea. The loose-coupler is described as a "three circuit" job for either crystal or audion and was made in 1919. Maker unknown. — *W1ANA*

From the Museum of Amateur Radio

A great many hams now operating will remember the famous sodion tube—the one with the yellow glow. Here is a complete receiver made by Connecticut Tel. and Tel. Company, Meriden, Conn. Tuning is accomplished by means of a pancake type variometer. It appears that it was never advertised in QST although the sodion tubes were. The tuning range started about 200 meters and embraced the broadcast band. — *W1ANA*



ATLANTIC DIVISION

DELAWARE—SCM, John L. Penrod, K3NYG—SEC/PAM: W3DKX. RM: W3EEB. W3DKX has been appointed SEC for our section and all ECs are requested to report to him each month. Officers of the First State ARC are K3VWP, pres.; W3LQE, secy.-treas.; K3JXR, act. dir. and trustee; W3KET, pub. dir. WA3DUM has been doing DJ work at WSER. W3BHG is now 2-meter s.s.b. WA3GSM has been keeping a weekly sked with HK3AIR. Appointees and station operators are becoming very lax about sending in station reports each month. What say, gang? Let's get into the habit of sending the SCM a Form 1 each month. Net reports: DEPN, QNI 50, QTC 2: DSMN, QNI 48, QTC 8. Traffic: W3DKX 25, WA3GSM 8, WA3DUM 7, K3NYG 2, W3HKS 1.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3AES. RMs: W3EML, K3YVG, W3MPX. K3MVO. PAMs: K3MYS, K3WAJ. V.H.F. PAM: W3FGQ. PFN, QTC 501. EPAEFTN, QNI 585, QTC 278. PTTN, QTC 284. EAP V.H.F., QNI 160, QTC 161. EPA, QNI 315, QTC 390. OO reports: W3KEK, W3FGQ, W3BFF, K3NOX, K3MYS, K3WEU, K3RDT. OVS reports: W3FGQ, WA3BJQ, WA3IAZ, WA3EEC, WA3EMQ, W3NNC, WA3HIT. OBS reports: WA3AFI, K3WEU, K3RDM, WA3EEC, WA3HGX. FMT reports: K3PSW, W3NNC, W3JET, W3BFF, K3EMA. The EPA section held its fall dinner meeting at Reynolds, Pa. with 46 sending in reservations and 62 attending! WA3GNL got his big "G." New officers of the Harrisburg Radio Amateurs Club are K3SWZ, pres.; WA3IKK, vice-pres.; WA3HUP, rec. secy.; W3MNK, corr. secy.; W3ADE, treas. W3CUL reports tomatoes growing slow like traffic. Those making the BPL: W3CUL, W3EML, W3VR, K3MYS, W3FGQ, K3NSN, W3MPX, WA3AFI. W3EML says traffic is holding up OK. Work is cutting into K3MYS's operating time. W3CID reports he will be off for a short time, new QTH. WA3EEC graduated from high school with a 4-year average of 93.28! WA3ATQ had to give up the NCS job, just too many skeds. WA3CKA is DXing on 15. W3AXA is going on a 3-months trip to KL7-Land. WN3JCJ is going to try for his G ticket. K3WEU will be portable/1 Maine for the summer. There was a nice write-up in the *Philadelphia Inquirer* about W3ABT. WA3EWV's first DX was G3GHB. W3YPF is working 6-meter RTTY. WA3CTW and WA3GBM are attending MIT. WA3CTW received a National Society of Professional Engineers Scholarship and WA3GBM won a National Merit Scholarship. WA3CTW was given an HW-32A for graduation. EPA section plans are for a fall dinner meeting in the Scranton area in Oct. Keep your ear peeled to the nets for details. Traffic: W3CUL 2753, W3EML 898, W3VR 780, K3MYS 669, W3FGQ 641, K3NSN 501, W3MPX 332, W3CID 252, WA3CTP 238, K3MVO 195, WA3AFI 191, K3VBA 174, K3YVG 132, WA3GAT 121, WA3HGX 111, WA3GLI 108, WA3EEC 101, WA3ATQ 97, WA3EXN 94, K3PIE 94, WA3HMU 83, K3WAJ 82, WA3FPM 81, WA3CKA 74, WA3CFU 57, WA3INC 53, WA3FCP 51, W3FPC 50, W3KJJ 50, W3AES 44, W3HK 37, W3NNL 37, W3KTH 35, WA3HGX 29, W3AXA 28, W3VAP 26, K3BHU 24, WA3HIT 23, WN3JCJ 23, K3FOB 16, WA3IGD 16, K3WEU 16, WA3EMQ 15, WA3EXB 14, W3ABT 12, WA3EMQ 10, WA3JGS 9, W3OY 9, K3HKW 7, W3HNK 6, WA3CND 4, WA3EWV 4, WA3IAZ 4, W3ADE 2, W3BFF 2, WA3BJQ 2, WA3BSV 2, W3OML 2, W3ZRR 2, W3AIZ 1, W3BUR 1, W3EU 1, W3FAF 1, W3ID 1, W3KEK 1, K3NOX 1, W3YPF 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Carl E. Andersen, K3JYZ—SEC: W3LDD. This will be the final report of activity for W3UE for on June 1 he joined the ranks of Silent Keys. He was one of the pioneers of the NTS, providing 10 years of leadership for 3RN as the RM. Prior to this he was the SCM of Virginia as W4FF. At his death, W3UE was still an active ORS carrying out the NCS duties on MDD each Sun. evening. The Pallbearers were all members of the PVRC who had been friends and associates of his through the later years of his amateur radio activity. Lindy will be surely missed by all traffic men in this area.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Mgr.*
						Ave.	
MDD	3643	2300Z	Daily	31	328	10.7	WA3HTQ, RM
MDDS	3643	0030Z	Daily	29	85	6.7	W3CBG, RM
MEPN	3920	2200Z 1700Z	M-W-F S-S	22	125	25.1	K3IAG
MDCTN	3920	2200Z	T-T-S-S	17	73	12.6	W3SRC, PAM

New appointments: WA3JBY as ORS; WA3HTQ as Asst. SEC for MDD activities; K3IAG as Asst. SEC for MEPN activities; K9ZPP/3 as Baltimore County EC; K3ZVM and WA3ELO as Asst. EC for Cecil County. Endorsed appointment: W3LDD as SEC. For the past year your SEC, W3LDD, has done a fine job in getting this section organized for emergency operation. To this end he has enlisted 16 new ECs who have turned to and enlisted many new AREC members and formed county emergency nets. W3TN has ceased to be our "lone wolf" BPLer, as he was joined this month by WN3IYS/WA3IYS. WA3FRL and K3VGX have both joined the military service. W3GN reports renewed activity as OVS/OO. W3EOV is recovering from hand surgery. W2NIY/3 has applied for a new 3rd district call. W3ECP reports that the FAR Hamfest will be held Sept. 22. WA3CBC assisted in the rescue of 15 persons from a grounded cabin cruiser by contacting W3KOU via 2 meters for relay to the Coast Guard. WA3JBY is a new holder of a WAC certificate. WA3GLP won a 3rd place award in physics at the International Science Fair in Detroit, Mich. WA3IRQ passed the Advanced Class exam. WA3JAM, OO Class III, is returning to his home in N.N.J. as W2GRD. WA3EOP is now active on 220 Mc. WA3IYS placed second in the Montgomery Co. Science Fair. W3GKP is up to 2,304 GCs. W3FU continues his "solo effort" from MDC in reporting interference on the amateur bands. Traffic: (May) WA3EKP 331, W3TN 319, WA3HTQ 285, W3CBG 236, K3JYZ 136, K3GZK 133, W3ATQ 131, WA3IYS 128, WA3JBY 113, W3PQT 84, K3ZLE 82, W3SRC 60, WA3ERL 46, WA3IRQ 43, W3PRC 39, W3ECP 34, WA3CBC 21, W3FA 17, W3EOV 16, WA3FRL 15, K3ORW 12, WA3GLP 8, K3LFN 8, W3ZNW 8, WA3EOP 3, W3FU 2. (Apr.) WA3GDG 7.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2LVW. RMs: WA2KIP, WA2BLV. PAM and NJPN Net Mgr.: W2ZI. NJN reports QNI 416, traffic total of 352. NJPN reports QNI 486, traffic total 144. K2SOL has been appointed EC for Gloucester Co., replacing W2LVW, who is the new SEC for S.N.J. WB2UVB was appointed V.H.F. PAM and OBS. WA2ILB graduated with an E.E. degree. W2ZI left on June 5 for the Scandinavian countries and the "Land of the Midnight Sun." Ed and his XYL will return about July 10. We sure will miss old reliable W2SJI who has moved to Florida. Our former SEC, W2FK, also has taken off for the Sunshine State. W2YPZ is operative on 2 meters, and making progress organizing a 2-meter traffic net. WA2KIP is on active duty with the Naval Reserve in Puerto Rico. Sorry to lose WB2GBH to a new QTH in Maryland. W2ORS is putting together a Heath SR-301 with 2- and 6-meter converters. We are happy to welcome WA2ASM and WB2WNZ as new members of the N.J.PN. W2FK is in the hospital with a heart attack. He is making steady progress. WA2ASM, our new NCS for the Sun. morning session of the NJPN, activated the net on May 29 covering flood conditions in the Ramapo River area. WB2NHZ recently completed his Air Corps service and installed a tri-band quad. WA2ANL Gloucester Co. EC, spent several weeks on a trip to Florida and the Bahamas. Keep in mind the N.J. QSO Party Aug. 17 and 18. Traffic: WA2KIP 177, WA2ABY 151, W2YPZ 136, WA2BLV 105, W2PU 86, W2ZI 83, WB2BGH 55, WA2ANL 53, W2CVW 39, WB2VEJ 30, WA2DVU 15, K2SHE 14, W2ORS 12, W2CKF 10, K2MBW 5, WB2SFX 5.

• 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.

NINTH NEW JERSEY QSO PARTY

August 17-18, 1968

The Englewood Amateur Radio Association, Inc., invites all amateurs the world over to take part in the ninth New Jersey QSO Party.

Rules: 1) The time of the contest is from 1900 GMT Saturday August 17 to 0600 GMT Sunday August 18 and from 1200-2300 GMT August 18. 2) Phone and c.w. are considered the same contest. A station may be contacted once on each band. Phone and c.w. are considered separate bands. New Jersey stations may work other New Jersey stations. 3) General call is "CQ New Jersey" or "CQ NJ". New Jersey stations are requested to identify themselves by signing "DENJ" on c.w. and "New Jersey calling" on phone. Suggested frequencies are: 1810 3530 3740 3900 7030 7250 14075 14275 21100 21300 28800 kHz., 50-50.5 and 144-146 MHz. Suggest phone activity on the even hours. 4) Exchanges consist of QSO number, RS(T), and QTH (ARRL Section or country). N.J. stations will send county for their QTH. 5) Scoring: Out-of-state stations multiply number of complete contacts times the number of New Jersey counties worked (maximum of 21). New Jersey stations: W-K-VE-VO QSOs count as 1 point; DX stations (including KP4, KH6 and KL7) count as 3 points; multiply total points times the number of ARRL sections (including NNJ and SNJ), maximum of 74. 6) Certificates will be awarded to the first place station in each N.J. county, ARRL section, and country. In addition, a second place certificate will be awarded when four or more logs are received. Novice and Technician certificates will also be awarded. 7) Logs must also show GMT date and time, band, and emission, and be received not later than September 14, 1968. The first contact for each claimed multiplier must be indicated and numbered and if possible, a check list attached. Multi-operator entries should be so noted and calls of all operators listed. Logs and comments should be sent to Englewood Amateur Radio Association, Inc., 303 Tenafly Road, Englewood, New Jersey 07631. A size #10 s.a.s.e. should be included for results. 8) Stations planning active participation in New Jersey are requested to advise the EARA by August 3rd of your intentions so that we may plan for full coverage from all counties.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVI. RMs: W2MTA and W2RUF. NYS C.W. Net meets on 3675 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 2200 GMT, NYS C.D. on 3510.5 and 3993 kc. at 0900 Sun. and 3510 kc. at 1930 Wed., TCPN 2nd Call Area, on 3970 kc. at 0045 and 2345 GMT on Mon. WB2SMD has been appointed ORS. K2INP, K2LWR, W2PDB and WB2YQH are new OOs. Endorsements: WA2ANE as OPS, K2IMI and WB2OYE as ORSs, K2TXB as OVS. The Squaw Island ARC elected WB2YHD, pres.; W2EHA, vice-pres.; WB2BAM, treas.; and K2KLP as secy. K2LMV has a new SB-101. 2RN certificates went to W2FEB, W2HYM, W2MTA, W2RUF, W2QC, K2JBX, K2KIR, WB2OYE and WB2SMD. The W.N.Y. Hamfest and V.H.F. Conference, sponsored by the RARA, broke all records this year. Over 1500 attended and more than 600 stayed for dinner. K2KIR won the code contest by turning in perfect copy at 43 w.p.m. K2KTK and W2YPV got 2nd and 3rd, both at 40 w.p.m. The Utica ARC has changed its club call from W2WUX to K2IQ in honor of a deceased member. I have been your SCM for 12 years and I have decided that I will not run for election this year. I have enjoyed the experience and have made many friends through the section, which now contains 2500 ARRL members. I know my successor, K2KTK, will find it a pleasure to deal with you. Congratulations to W2FR on making the BPL this month. Traffic: (May) W2FR 528, WB2OYE 312, WB2GAL 249, W2MTA 194, WB2SMD 181, W2RUF 91, K2JBX 79, K2RYH 79, WB2VND 77, W2HYM 73, W2FEB 56, K2OFV 25, W2RQF 25, W2PVI 24, W2FCG 21, K2IMI 20, WA2ANE 13, W2BLO 12, WA2GLA 11, W2PNW 10, WB2RWR 9, W2TPV 6, W2CFP 5.

WESTERN PENNSYLVANIA—SCM, Robert E. Gawryla, W3NEM—SEC: W3KPJ. PAM: K3VPI (v.h.f.). RMs: W3KUN. W3MFB. W3UHN, K3SOH. Traffic nets: WPA, 3585 kc. daily at 7 P.M. local time. KSSN will resume operation Oct. 1, 1968, at 6:30 P.M. local time. It is with deep regret that we announce W3WXX, of Indiana, Pa., as a Silent Key. The WPA-KSSN Annual C.W. Traffic Men's picnic/business session will be held Sun., Sept. 8, 1968, at the "Rustic Lodge," located about one mile south of Indiana, Pa., on Route 286. The lodge can easily be reached from U.S. Route 22. Signs are posted all over giving directions. Everyone is invited and additional particulars can be obtained from W3IYI or WA3IPU. K3SJS, the XYL of K3EXE, took 3rd Region honors with better than 11K points in the March C.W. YL-OM Contest. WPA is continuing to show its mark in contests. K3OUK recently received the Army Commendation Medal for his services as a radio transmitter repairman in Vietnam during the entire year of 1967 for performing his duties under extremely adverse conditions while obtaining consistently superior results. The true nature of the radio amateur again shows its face. WN3KKT and WN3KFX are new Novices in the Erie area. W3PIV is resting in Florida. The Radio Association of Erie announces a new slate of officers for the coming year: WA3HRJ, pres.; WA3GJH, vice-pres.; WA3HDK, secy.; K3KJN, treas. W3MFB, RM WPA, reports a slowdown in May with 31 sessions, 377 QNI, 248 messages handled, 32 stations reporting in with 4 visitors. Traffic: (May) WA3IPU 150, WA3HLI 141, W3NEM 123, W3KUN 113, W3LOS 100, WA3BLE 91, K3HKK 75, (W3NEM, W2KAT, K3AHT ops), W3MFB 75, K3PYS 56, WA3EPQ 22, WA3GQJ 22, WA3HSI 22, K3SOH 22, WA3AKH 20, W3KPJ 20, K3SJN 17, K3EXE 16, W2KAT/3 13, K3HCT 12, K3SMB 12, K3ASI 10, W3GJY 8, W3LOD 7, WA3GPK 6, K3RZE 4, W3YA 4, (Apr.) WA3BLE 345, WA3EPQ 58.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. RM: W9EVJ. PAMs: WA9CCP and WA9RLA (v.h.f.). Cook County EC: W9HPG. Net reports:

Net	*Freq.*	*Times*	*Days*	*Tfc.*
IEN	3940 kc.	1400Z	Sun.	11
ILN	3760 kc.	0000Z	Daily	98
NCPN	3915 kc.	1200Z	Mon.-Sat.	
NCPN	3915 kc.	1700Z	Mon.-Sat.	
Ill. PON	3915 kc.	1615 CDT	Mon.-Fri.	
Ill. PON	3915 kc.	1645 CDT	Mon.-Fri.	600
Ill. PON	3915 kc.	0830 CDT	Sun.	
Ill. PON	145.5 Mc.	0200Z	MWF	55
TNT	145.36 Mc.	0200Z	Sun.-Fri.	no report

The Hamtesters 34th Annual Hamfest will be held Sun., Aug. 11, at Santa Fe Park. The Theme this year is the Illinois Sesquicentennial. The Ninth Regional Net had a traffic count of 494, according to W9QLW. RM/9RN. WA9SDT has a new vertical for the h.f. bands and WA9TCW has been working with a new three-element monoband for 15 meters. The North Central Phone Net was very active in relaying messages on May 15 when a tornado devastated Waynesville and Wapella, Ill. The Rock River Radio Club held its 2nd Annual Spring Hamfest June 16 and many eyeball QSOs were held. WA9EXP was appointed EC for Cook County with jurisdiction north of O'Hare and west of Harlem Ave. This column's sympathy is extended to the wife and family and friends of John (Jack) G. Doyle, W9GPI (who was Central Division Director for many years), who passed away May 19. WA9UNR received his Advanced Class ticket. WA9FGP, WA9ORK, W9FBD, WA9MZY and W9SKX are the new officers of the Wheaton Community Radio Amateurs. W9REC, K9TPC, W9WYB, K9RAS, W9JUV/K9OSO, W9GFF and K9DQU participated in the recent ARRL Frequency Measuring Test. WA9FTY made the Dean's list at the U. of I. for the past two years. New officers of the Skokie Six Meter Indians are K9AMG, W9BOD, K9BDJ, K9KLI, W9-AKR, WA9FIY, WA9KJX and K9YOA. WA9KIO received a full engineering scholarship at Northwestern U. K9GOY is doing dispatch work in Ostenburg, Germany. The Peoria Radio Club Hamfest will be held Sun., Sept. 15. WA9UUU, who recently was elected president of the Notre Dame High School ARC (WA9-BWU), has a new SB-101. The new headquarters of the Ninth Area Radio Club is in the Old Field House of Portage Park. New calls heard were WA9VYM, WA9-WCC, WN9YQF, WN9YQG, WN9YQJ, WN9YQK, WN9-YQH, WN9YQI, WN9YSK and WN9YSL. W9KII is the only BPL recipient this month. Traffic: (May) K9KZB 401, WA9MHU 397, W9KII 311, WA9TUN 170, WA9OTD 117, WA9WNH 105, W9HOT 104, W9YH 97, W9EVJ 85, WA9QBM 60, W9LDU 53, WA9PPA 40, WA9LDC 18, WA9SPA 15, W9PRN 14, WA9BWH 12, K9HSK 9, K9-HRC 6, W9IDY 6, W9LNQ 4, W9SXL 4, K8RAS 3, (Apr.) WA9SPA 30.

INDIANA—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: WA9-KWH.

Net	Freq. Time	May Tfc.	Mgr.
IFN	3910 1330Z Daily 2300Z M-F	280	K9IVG
ISN	3910 0000Z Daily 2300Z S-S 2130 Daily	602	K9CRS
QIN	3656 0000Z Daily	200	W9HRY
Ind. PON	3910 1245Z Sun.	45	K9EFY
Ind. PON	V.H.F. 50.7 0200Z Thurs., Fri.	69	WA9NLE

I regret to report as a Silent Key Wayne H. Peters, Deputy Sheriff of Rushville, Ind. Endorsements due in Aug.: WA9BWT, W9PPD, K9HSL as EC's; W9DOK as OPS: WA9ECX as ORS; K9DOF as OBS. New officers of the SARC of Seymour are K9DZS, pres.; W9YDP, vice-pres.; W9RTH, secy-treas. W9YB's v.h.f. group is going to 2 meters. W9YB has formed an AREC corps. WA9EBR is Asst. EC of this group. K9KRE's repeater on 52.250/146.94 is being used by K9AHX to check into the Mon. net. W9CYG graduated from the Indiana School for the Blind May 24. He went to the Chicago Lighthouse for the Blind College Prep. June 24 and plans to enter Vincennes University this fall. WA9ITB and W9HRY passed the Extra Class exam. The Ninth Regional Net meets at 0045 and 0230 daily on 3640 kc. W9QLW wants more to check in as band conditions are very poor this time of the year. Don't forget the Indiana QSO Party Aug. 17-18 starting at 2300 GMT the 17th and ending at 2300 GMT the 18th; also the ARRL Central Division Convention at Springfield, Ill., Aug. 3-4. W9ILU, mgr. of the Great Lakes Emergency Net, reports Apr. traffic as 88. W9PMT, mgr. of the Hoosier V.H.F. Net, reports May traffic as 54. QIN Honor Roll: W9BDP 30, WA9MTY 30, WA9FDQ 29, K9VHY 28, W9QLW 25, WA9VZM 19, WA9KAG 18, W9UQP 18, WA9KOH 15. *Amateur radio exists because of the service it renders.* A BPL certificate for May traffic went to K9IVG. Traffic: (May) K9IVG 1021, WA9MTY/WA9LTI 336, K9HYV 311, K9FZX 291, WA9FDQ 177, W9QLW 162, W9HRY 101, K9STN 97, WA9MXG 92, WA9LGQ 87, K9CBY 82, K9CRS 66, W9BUQ 50, W9UEM 45, W9YYX 35, W9CUC 33, K9ILK 33, W9SNQ 32, K9VHY 28, WA9IPS 26, K9OXA 26, K9EFY 25, WA9GJZ 25, W9RTH 22, WA9AXF 21, W9FWH 19, K9HVY 17, K9HZY 15, K9RWQ 14, K9YST 13, K9FUJ 9, K9QVT 9, W9UQP 9, W9DOK 7, WA9QKM 6, WA9KYG 5, K9WGN 5, WA9WME 4, W9WWI/9 4, W9AQW 2, W9BDP 2, K9HBR 1. (Apr.) W9QLW 88, W9CMT 11, WA9BIG 9, WA9TJS 6.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9NGT. PAMs: W9NRP, WA9QNI, WA9QKP, WA9IZK and K9DBR. RMs: K9KSA, W9CBE and W9DND.

Net	Freq.	Time	Days	QNI	QTC	Mgr.
BWN	3985 kc.	1145Z	Mon.-Sat.	410	228	W9NRP
BEN	3985 kc.	1700Z	Daily	731	185	WA9QKP
WSBN	3985 kc.	2200Z	Daily	1317	305	WA9QNI
WIN	3662 kc.	0015Z	Daily	227	56	W9DND
WSSN	3780 kc.	2330Z	Daily	261	42	K9KSA
WRN	3625 kc.	2330Z	Sat.	22	0	W9CBE
SWRN	50.4 Mc.	0200Z	Mon.-Sat.		4	K9DBR
SW2RN	145.35 Mc.	0130Z	Daily	321	46	WA9IZK

Net certificates went to W9AOW, WA9FFV, K9FHI, K9KSA, WA9LRW, WA9PKM, WA9QKP, WA9QNI and WA9TXW for WSSN; to WA9EZU, W9API and W9UEG for WSBN and to WA9HHL for BEN. Renewed appointments: K9ZYS as OVS and WA9OMO as ORS. K9CUT and his emergency generator assisted after the tornado at Elma, Ia. Bring 'Em Back Alive! WA9SYD has a new SB-200 in his shack. WA9RAK is holding NCS duties on 9RN and CAN. K9GDF led the OOs with 27 notices sent. WA9RAK received a 40-w.p.m. certificate. BPL for May was earned by WA9QNI, W9AOW and W9ESJ. New Novices reporting are WN9YVC and WN9YCY, who has 19 states worked since Mar. Traffic: (May) W9AOW 565, W9ESJ 395, WA9QNI 341, WA9QKP 266, K9CPM 187, W9DND 166, W9DYG 153, W9CXY 149, W9RAK 102, K9KSA 72, WA9TUP 67, K9FHI 66, W9DXV 60, WA9SYD 54, WA9VNJ 51, W9NRP 43, K9JPS 42, WA9PKM 40, K9GSC 36, W9AYK 32, W9IHW 29, K9TBY 26, W9CBE 25, WA9YGH 17, W9ODD 9, W9RTP 6, WA9KFL 4, K9GDF/9 2, WA9SAB 1. (Apr.) W9KRO 22, W9RTP 5. (Mar.) WA9SYD 76.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopishke, Jr., WØTCK—SEC: WAØIEF. RMs: KØORK, WAØEPX. PAMs: WAØMMV, WAØHRM. MSN meets daily on 3685 kc. at 2330Z. MJN meets Tue.-Sun. on 3685 kc. at 0000Z. Noon MSPN meets Mon.-Sat. on 3945 kc. at 1705Z, Sun. and holidays at 1400Z. Evening MSPN meets daily on 3945 kc. at 2315Z. WAØEZQ renewed his OPS appointment. WAØHRM is now mobile with a Galaxy 3 and a Hustler antenna and has upgraded to Advanced Class. WØBE has a new Galaxy and is active on 2, 6, 10, 15, 20, 40 and 80. WØPAN reports spending 40 hours of operating at the Charles City emergency. WAØDOT reports 6 Albert Lea ARC members operated there for some 20 hours. Mankato ARC sent 11 members over the week end. Grapevine information indicated some 50 Minnesota amateurs participated directly from Iowa in the emergency, including 17 from the Viking ARC, 4 from the Rochester ARC and other individuals. Many more helped relay and deliver traffic through their home stations. This is a fine record. Hope you all reported to ARRL with copies to the SEC and SCM. Piconet conducted a drill near Zumbrota May 26 and has moved its frequency to 3934 kc. A good time was had by all at the annual Worthington ARC picnic June 2. We understand the St. Cloud picnic will be held Aug. 11. WØIYP has been running code practice on 3810 kc. at 10 A.M. Sat., sponsored by the Minneapolis ARC. The newly-organized Northern Lakes ARC elected KØQIH pres.; WAØPPY, vice-pres.; WØBUC, secy.-treas. WØTJA and his XYL recently returned from an extended vacation in Mexico. Traffic: (May) KØZRD 227, WAØIAW 211, WAØOEJ 167, WAØMMV 146, WØPAN 94, WAØEPX 65, WAØHRM 48, WAØODB 45, KØSNC 45, WØTCK 35, WØIYP 30, WØHEN 29, WAØIYM 25, WØBUC 24, KØZBI 21, WØKNR 20, WAØKWO 18, WAØJPR 16, WØUMX 16, WAØDOT 15, WØKLG 15, WØISJ 14, WAØDFT 10, KØICG 9, WØKYG 7, WAØNQH 5, WAØSSN 5, KØFLT 4, WØBE 2. (Apr.) KØCNC 18, KØFLT 14.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH. PAM: WØCAQ. RM: WAØELO. KØMSP, WAØUKD, WA5TNI/Ø and WA5NMP/Ø are active on all bands at the Minot AFB. They also are working on 2-meter gear and have RTTY going on that band. WØHSC originated messages from Gov. Guy to all the other Governors during Amateur Radio Week in North Dakota. WAØELO and WAØHUD helped with the bulk of it. Officers of the NDSU Club for the ensuing year are WAØFNS, pres.; WAØHYI, vice-pres.; WAØIEP, hamfest chmn.; and Dave Littlejohn. WAØPFG took the trip to St. Paul and came back with a General. WAØBIT got married in June. KØSPH is spending some time at the lake and K.C., Mo., so WØGFE took over on RACES for him. WØDM and family went to Oregon for most of June, using the Empire Builder for the driver. He has the SBE-34 and the Bandspanner tuned up to use as a portable for traveling when he gets back. The Forx Radio Club's theory and code classes have been discontinued until fall. WØEFJ and WAØMND spent some time in the Minnesota Northwoods trying their luck fishing. Old Timers in N. Dak. will regret the passing of Lyle Beebe, of the FCC in Va. He was a charter member of the Forx Amateur Radio Club.

NDCW Net 11 Sess. 34 QNI 13 Tfc.
WAØELO, WAØHUD

ND RACES 18 Sess. 393 Check-ins 31 Tfc.
WØFGE, WAØTBR, WØHJU

Traffic: WØHSU 70, WAØHUD 60, WØDM 12, WØEFJ 12, WØBF 9, WAØJPT 4, WØGFE 3, WAØTBR 3.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WAØCPX. RM: WØIPF. PAM: WAØCWW. Your SCM and SEC have, with cooperation, been updating the AREC. The interest of the ECs is very much appreciated. We hope we do not need it for emergencies but want to be prepared. The Prairie Dog ARC will sponsor the Annual Picnic again Aug. 17 and 18. Please listen for details on the S.D. nets. WØHOJ will assume management of the Morning Net since WAØPZA has other commitments during the summer. Two stations with new s.s.b. gear, WAØNWM and WAØSKJ, are heard daily. Late Session Net, WAØPNB, mgr. 1156 QNI, 48 QTC, 144 informals. Early Session Net, WAØRIQ mgr. 405 QNI, 19 QTC, 51 informals. NJQ Net, WAØLLG mgr. 422 QNI, 130 QTC, 34 informals. Morning Net, WAØPZA mgr. 448 QNI, 20 QTC, 39 informals. Traffic: WAØPNB 334, WAØRIQ 334, WAØMYS 63, WAØPZA 13, WAØCKH 10, KØVYY 10, WØDVB 9, WAØLLG 9, WØZTV 3.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: WA5IIS. PAM: WA5PPD. RM: W5NND. K5VBF has been reappointed EC for Cross, Crittenden and St. Francis Counties. North Arkansas ARS member WN5TAF placed 10th in the nation in the NR with 365 QSOs. WA5PPD and W5OBD made the BPL in May. All amateurs who helped at the time of the Jonesboro Tornado are commended on a job well done. The Severe Weather Net meets during alerts on 3990 kc. and 50.5 Mc. Join in and offer your help during these periods of bad weather. WA5OOY is a new Asst. EC for Central Arkansas. WA5AER did well in the May FMT. W5NND welcomes W5MYZ and W5QOO to OZK. I would like to

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.

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TYPICAL OPERATION
CLASS B RF LINEAR POWER AMPLIFIER, GROUNDED GRID

	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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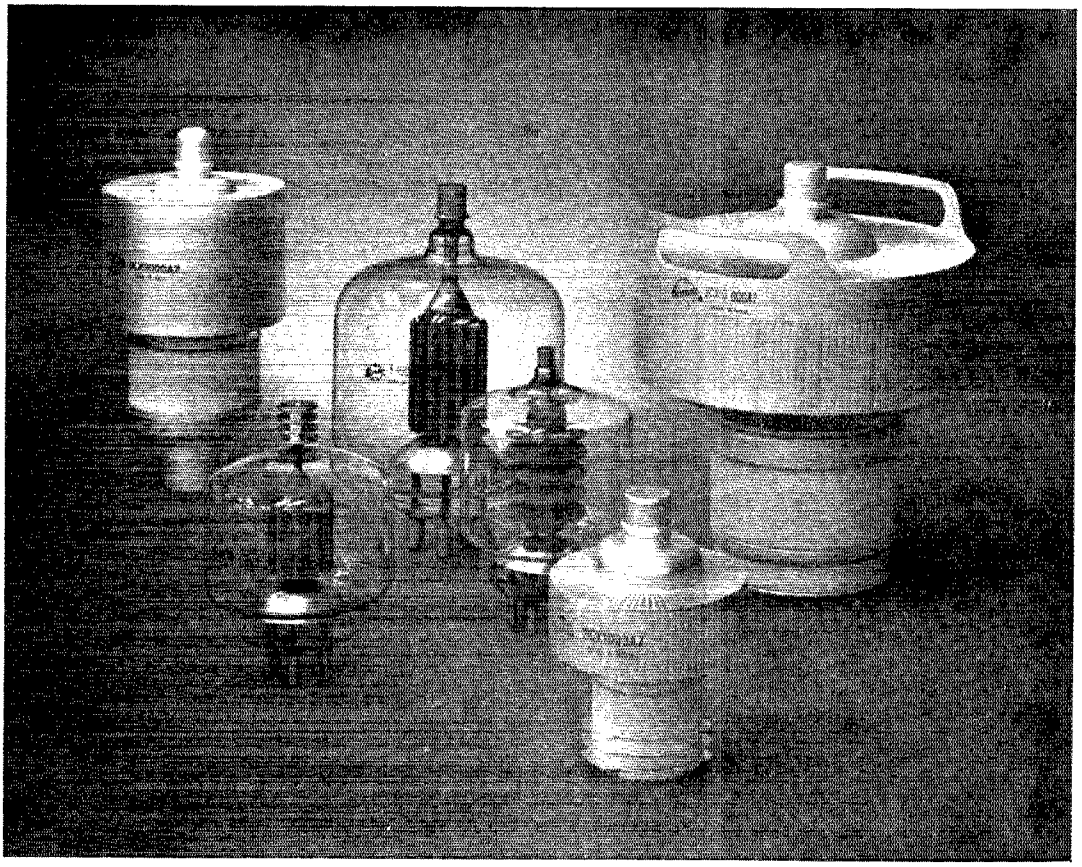

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The EIMAC metal ceramic X2099B is the only tetrode combining 500 watts of plate dissipation with instant warm-up. The quick-heat cathode in the X2099B takes only 250 milliseconds to warm up to half power or 70% of peak current. You can drive the X2099B with low level solid state, and you can air cool it.

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TYPICAL OPERATING CHARACTERISTICS
Class AB1 Radio Frequency Linear Power Amplifier

	DC Plate Voltage 1600	2600	
DC Screen Voltage	200	250	V
DC Grid Voltage	−24	−34	V
Zero-Signal Plate Current	250	225	mA
Max Signal DC Plate Current	455	370	mA
PEP or CW Plate Output Power	400	500	W
Third Order Intermodulation Distortion	−36	−38	dB
Fifth Order Intermodulation Distortion	−54	−46	dB
Filament Voltage	2.5	2.5	V
Filament Current	10.0	10.0	A
Warm-up Time (to half power)	250	—	ms

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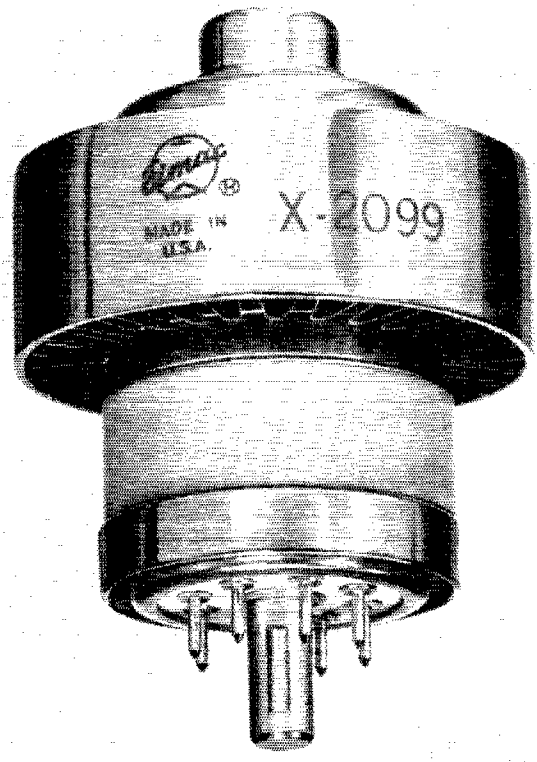

thank all the net managers for their hard work in compiling the net statistics each month. Net reports for May:

Net	Freq.	Time	Sess.	Tfc.	Stations	Mgr.
OZK	3790	0000Z	31	70	250	W5NND
RBN	3815	2330Z	32	150	694	WA5PPD
APN	3885	1130Z	28	91	616	K5ABE
APON	3925	2130Z	22	191	283	W5MJO
RACES	3990 & 50.5 During Severe Weather Alerts					

The North Arkansas ARS has beefed up its monthly bulletin and it looks real good. The Southeast Arkansas ARC continues to publish good technical tips in its monthly bulletin. The Fort Smith Area ARC has appointed a committee to review its emergency communication procedures after the deadly Greenwood tornado. Traffic: W5OBD 1194, WA5PPD 415, WA5AVO 364, W5NND 167, WA5KEF 123, W5DTR 34, WA5IIS 29, WA5QPI 19.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: K5ANS/5. V.H.F. PAMs: WA5DXA, W5UQR.

Net	Freq.	Days	Time/GMT	Net Mgr
LAN	3615	Daily	2330/0300	W5MBC
DELTA 75	3905	Sun.	1330	WA5EVU
LAPON	3915	Sun.	1300	W5KC
LARTTY	3612.5	Sat.	0100 (Sun.)	W5GHP

W5CJ, up Shreveport way, says an effort is being made to organize a club. WA5OHH is in Canada until Sept. W5DKR, your SCM many years ago, has returned to the airways and is making 7 Mc. hot with c.w. W5EA participated in the recent MARS Convention in Arkansas. SEC W5BUK is QSL Mgr. for FG7TG. The 6-Meter AREC Net is in operation on 50.25 at 0100 GMT daily. The GNOARC's code and theory classes have been highly successful. OBS K5ANS/5, who sends the Bulletins on RTTY, has suspended schedules until DLST fades in Oct. The Forty Meter Teen Net meets at 2200 GMT Sun. Check with WA5NYY if interested. WN5VED is now on 40. W5MXQ is planning an antenna party even though his 2-meter antenna is up. The SWLA ARC furnished communications for the Cajun Grand Prix Sports Car Races. The Lafayette ARC did a tremendous assist in the Cancer Drive recently held in that city. W5VUH says that 2-meter QSOs with W5MCC were "at will" during May. At its recent auction the Ozone ARC raised a sizable amount of the green. WA5QCX recently made his first solo in a plane. W5BV recently joined the ranks of the OOTC. The Louisiana QSO Party Committee has set Jan. 18 and 19, 1969 as the dates for the Annual QSO Party. A nice silver trophy will be awarded the La. winner. Permanent possession hinges on three wins. W5VUY, W5MPX and W5NQQ are now Advanced. WA5BDO is leaving to join Uncle Sam's Navy. Traffic: W5CEZ 193, W5MXQ 97, WA5NYY 46, WA5OHH 38, W5EA 10, K5ANS/5, 8, W5KC 8.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—For daytime on 75 meters look for W5ESC, who sits in the slot for the daily Miss. outlets. It's a pleasure to welcome the following new amateurs: WN5UKQ, WN5ULR, WN5ULY, WN5UMQ, WN5UMG, WN5UOD, WN5UOE and WN5UOT, and new General Class WA5UOG. W5JHS and his helpers had a fine semi-annual Gulfcoast Sideband Dinner, with fine food, fellowship and eyeballs. Proud new linear possessors are W5JHS, WA5TUD and WA5RXV. Some of the loudest stations in Mississippi seem to be W5EHZ, W5WMQ, W5LEA, W5PTE, W5JHS -all with beautiful signals. K5MDX reports receiving his fifth straight cup for winning the YL/OM Phone QM Section Contest—five tries and five cups to show for it. WA5JWD is very active in v.h.f. K5SSZ is now running a Swan 500L. W5CKY made an exceptional showing in the recent FMT.

TENNESSEE—SCM, Harry A. Phillips, K4RCT—Asst. SCM: Lloyd Shelton, WA4YDT. RM: WA4YEM. PAMs: WA4CGK, W4PFP, WA4EWW, WA4CRU.

Net	Freq.	Days	Time	Sess.	QNI	QTC	Mgr.
TSSB	3980	M-Sat.	2330Z	27	1573	212	WA4CGK
TPN	3980	M-Sat.	1145	31	1113	92	W4PFP
		Sun.	1300				
ETPN	3980	M-F	1040	23	505	61	WA4EWW
TCN	3980	Thurs.	0100	(Wed. night CST)			W4OGG
TPO	3980	Sun.		4	53	3	W4AST
TN	3635	Daily	0000	31	226	151	WA4YEM
TTN	7290	Daily	2100	31	361	105	WA4CRU
ETVHF	50.4	M-W-F	2300	14	224		WA4TJJ
ETVHF	145.2	Tue. & Thurs.	2300	9	57		K4FKO

K4TXK reports 2-meter traffic links have been passing traffic through 3 relay operators from Nashville to Atlanta twice weekly. EC WB4EHK reports the organization of a 2-meter net on 145.590 Mc. Thurs. at 0130Z. W4PRY reports the RATS has secured the call of the late Bill Meiers, W4PQP. The RATS has moved into its new quarters at the Red Cross building and have put its Galaxy 5 into operation. WA4ZZU, treas., reports the Vanderbilt ARC, W4VSV, is now organized with Dr. Larry Wilson as trustee. The club's equipment includes an S/Line (and 301-1). WB4FZP is now Advanced Class. The Delta ARC and Mid-South ARC combined forces to produce a fine hamfest in Memphis. The Tenn. QSO Party will be held in Sept. Traffic: WA4YEM 196, W4OGG 171, W4FX 165, K4AT 126, WA4YDT 107, WA4CRU 73, WB4HYY 68, WA4GLS 64, WB4BGU 59, W4WBK 59, WB4FEC 58, WA4NEC 48, WB4ESE 42, K4MQI 39, K4AMC 35, WB4FCE 27, K4RCT 26, W4PFP 23, WA4CGK 20, WA4YHO 20, W4PRY 18, WA4TWL 18, WA4URA 16, WB4ANX 15, W4AST 15, K4TXK 15, WA4YFG 13, K4UMW 9, WA4BXH 7, WB4EHK 7, K4PUZ 5, K4BTY 2, K4FKO 2, WB4FZP 2, W4WJH 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: W4OYI. Endorsement: K4JOP as OPS.

Net	Freq.	Days	GMT	QNI	QTC	Mgr.
KRN	3960	M-F	1030	398	40	K4KIS
MKPN	3960	Daily	1230	440	81	K4TRT
KTN	3960	Daily	2300	817	395	WA4AGH
KYN	3600	Daily	2300/0200	412	711	W4BAZ
FCATN	50.7	T-W-S	0200	—	—	WB4BKG

WA4UAZ has moved to Clarksville, Tenn., and WB4AFH is now WA9YXA after moving across the Ohio River. WA4SMS has the new second call of W4VYS. The Mammoth Cave Ham Reunion was held June 2 with a nice turnout in spite of bad weather. W4ISF lost his beam again and now has a strong mast for it. Don't forget the ARRL Louisville Ham Convention Aug. 31. Traffic: (May) K4YZU 350, WA4DYL 185, W4EON 124, W4NBZ 123, WA4AGH 103, K4MAN 97, WA4VUE 72, W4BAZ 63, WA4GHQ 62, WA4KFO 61, WA4UAZ 61, WB4HUS 51, WA4IBG 39, WB4BKG 32, K4TRT 32, K4FPW 31, WB4FOT 25, WA4GMA 25, WA4SMS 25, W4KJP 23, W4MWX 20, WA4WSW 20, W4SZB 19, WA4UHR 16, K4SWL 15, K4VDO 15, K4UMN 14, W4ISF 12, W4YOK 12, WB4EOR 10, W4KKG 8, WB4IPE 7, W4CDA 6, KAHOE 5, W4BTA 3. (Apr.) WA4DYL 184, W4NBZ 121, W4UMN 23, K4VDO 19, WA4GMA 15, W4CDA 13, K4FPW 11, W4KKG 8, W4MWX 6, K4AVX 1.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8FWQ, W8RTN, WA8OGR, K8KMQ. PAMs: W8IWF, K8JED, V.H.F. PAMs: W8CVQ. W8YAN. Appointments: Y8YHJ as EC; K8GOU as OPS; W8CUP, W8DQL, WA8KME, WA8MAM, WA8SQC as ORSs. Net reports:

Net	Freq.	Time	Days	QNI	QTC	Sess.	Mgr.
QMN	3663	2200	Dy	938	510	62	W8FWQ
WSSB	3935	2300	Dy	972	126	31	K8WRJ
UPEN	3920	2230	Dy	496	90	31	K8ZSM
PON-DAY	3935	1600	M-Sat.	345	196	27	WA8OGR
PON-CW	3645	2300	M-Sat.	126	41	27	VE3DPO
B/R	3930	2130	M-Fri.	1036	74	27	W8ZBT
M6MTN	50.7	2400	M-Sat.	297	42	27	WA8LRC
LENAWEE 2	145.36	0200	Dy	187	33	27	WA8UWQ

New officers of the FARL are WA8GDT, pres.; WA8KMW, vice-pres.; K8SGL, corr. secy.; WA8FIF, treas.; WA8FCL, W8AVI, K8LIB, act. mgrs. W8SWF had a stroke, but should be back on now. The S.W. Mich. V.H.F. Picnic will be held Aug. 4, the same time as the U.P. Hamfest. The Tawas V.H.F. Hamfest will be held Oct. 4-5-6. Hills ARC prexy W8EZX moved to Texas. K8SGJ will take over. WA8KME is going to W.M.U. and WA8MCQ to Kazoo Valley College. WA8TDY made General and has a new Swan W/inverted "V." K8KMQ sold WA8BQH's gear for him. WA8MCQ built the IC keyer from April *QST* and says it works fine. WA8PII passed 3 novices on code. WA8NGO has a new "harmonic." We finally got a traffic report from W8ZBT, after waiting 9 years! W8OWG worked lots of Russians on 20-meter c.w. The Eye Bank Net passed the 2500 mark for eyes transferred. Ex-W8DVB is now W8ER. K8TLR is now KX6DB in the Marshall Islands on 14.250. WA8BRD is using a barbed-wire antenna—that's one way. WA8UIK now is on the air, thanks to SPARS members WA8BKS, K8OXI, K8PWA, W8LN, W8ENE and W8RLT. Van Buren ARC is handling exams to 18 hams students. W8CQU passed the Extra Class exam. WA8ENW has recovered from surgery. Silent Key: WA8FSS, Kinross, Mich. Motor City RC, W8MRM, has a good Old Timer's Night. WA8YGA is now WB4JNP. From SEMARA, all on 160: K8HWW, WA8YWC, WA8ZDR, WA8ZYX and K8DX. The Great Lakes Repeater

Assn. got started. Contact K8IAZ or K8NUI if interested. Traffic: (May) K8KMQ 328, WA8SQC 320, WA8OGR 239, WA8LXY 167, K8MXC 160, WA8MCQ 158, W8IWF 125, WA8UPB 103, K8ZJU 93, W8TDA 85, W8NOH 66, W8QQK 61, W8RTN 60, W8IUC 59, WA8PII 57, WA8LRC 53, W8MO 53, WA8UWQ 42, W8FX 41, W8UFS 36, W8YAN 35, K8JED 31, W8EU 30, WA8IAQ 29, W8WVL 29, WA8KRH 27, WA8VBL 27, K8NAW 17, W8FWQ 16, W8ZBT 14, W8ILP 12, W8OWG 12, W8BEZ 9, W8HKT 8, WA8ORC 8, K8HKM 7, W8DSE 5, WA8TSB 5, WA8VGQ 5, K8VDA 4, WA8PZT 3, WA8WHG 2, W8AAM 1, WA8VVK 1. (Apr.) WA8PZT 6.

OHIO—SCM, Richard A. Egbert, W8ETU—Asst. SCM: Roger Barnett, K8DDG. SEC: W8OUU. RM: W8IML. PAM: W8UBK. V.H.F. PAM: WA8ADU.

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time*	*Mgr.*
BN	570	431	61	3580	2300 & 0200Z	W8IMI
OSSBN	1662	995	58	3972.5	2245Z	K8UBK
06MtrN	181	44	29	50.6	2300Z	WA8ADU
OSN				3580	2225Z	WA8VNU

There are 15 nets listed in the current Net Directory as traffic nets. We would very much like to have reports from all of them to add to those above. WA8VNU is now the manager of the Ohio Slow Net. This is the ideal net for those wanting to get their feet wet in c.w. traffic handling. Traffickers desiring BPL mention should send their traffic breakdown when reporting. Net certificates (Buckeye Net) went to W8SZU, K8DDG and W8ERD in May. Recent Extra Class: K8EJN, W8HMO, WA8KPO, W8BRW. Advanced: WA8NFY, WA8VNU, WB8AEI, WA8ACZ, WA8KPN, W8NAL, K8MZS, K8MZT, K8NBQ. May appointments: W8VZE as Clark Co. EC, K8ONV as Erie Co. EC, WA8AUZ as Portage and Summit Co. EC. W8MK (ex-8MII) and WA8GFL joined the Silent Keys. The Canton Chapter of the QCWA Dinner was attended by 74. W3BA spoke on FCC. Stark Co. AREC held a drill with the Canton American Red Cross. Lima ARC Club station W8EQ was set up at American Mall in Lima May 11 and 12 for public demonstration. The group originated 125 messages for the public. New amateur station W8BI, in the Observatory Bldg. of the Museum of Natural History in Dayton, was officially opened on May 26. The first contact was a specially approved one-time phone relay between Dayton's Mayor and the Mayor of Angsburg, West Germany. New officers of the Shawnee Hills RC are W8DLB, pres.; WA8UGL, vice-pres.; WA8RCN, treas.; WA8PXL, secy. OBS W8UAI departs the section for Michigan in July. WA8ZDF, of Columbus, handled traffic requesting an exotic drug for a girl in Cali, Columbia. The drug was shipped pronto from Cleveland upon delivery of the message. *The Monitor* (Lorain Co. ARA and Elyria RA) reports plans to install a kw. 2-meter repeater atop a hospital south of Cleveland. The Cincinnati Stag Hamfest will be held Sun., Sept. 22, at Stricker's Grove on Compton in Mt. Healy. Contact W8ALW. QCEN and Franklin Co. AREC/RACES took part in flood disaster alerts during the heavy rains in May. Appointment vacancies exist for all activities. If you would like to be a part of the League's Field Organization, apply for the appointment that suits your operating preference and help push your section toward the top of the pile. Information on all ARRL appointments can be found in a number of League publications. Drop me a card or send me a radiogram. Let's make this the doingest section of all. Traffic: W8SZU 425, W8QZK 423, W8IMI 359, WA8UTI 326, WA8PQL 301, W8RYP 247, K8ONA 183, W8ERD 164, W8UDG 164. WA8TWC 161, W8QXQ 125, W8QCU 116, WA8VNU 102, W8NAL 97, WA8QFK 95, W8CHT 94, W8EFB 88, WA8SED 83. WA8LAM 78, WA8UTX 74, WA8OCG 71, WA8RWK 69, W8OE 68, W8DAE 66, W8GOE 66, W8FGD 62, K8DDG 57, K8DHD 55, WA8FSX 55, WA8MHO 45, W8IWX 44, WA8PPK 38, WA8ZGC 37, K8LGA 36, WA8SHP 34, K8WZU 30, W8WDU 29, WA8ADU 27, W8LZE 25, WA8MVV 23, K8QVR 20, W8ETU 14, WA8KPN 14, WA8COA 12, K8DMZ 12, WA8WJR 10, W8HNP 8, K8DHJ 6, W8WEG 6, W8EEQ 5, WA8LEM 5, W8TV 5, K8PJH 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: WA2VYS. PAM: W2IJG. Section nets: NYS on 3675 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Appointments: W2SZ as ORS and OPS. Around the club circuit, K2LMG of General Electric (Syracuse) spoke at Schenectady on how to improve the effectiveness of stations. At the Albany Club, W2EOM spoke on "Two-way Radio Medical Conferences—Thanks to Amateur Radio." This evolved into WAMC, the f.m. commercial station at the Albany Medical Center. The new officers of the Schenectady Club include WA2SFP, pres.; K2EJL, vice-pres.; WB2RWT, secy.; WB2BDB, treas.; WB2VLF, W2CVR, WB2ZRZ and WB2HNO, directors. The club's "Broughton Award" for meritorious service was granted to WA2CGD. Congrats, Charlie. WB2FOA is a new member of Army MARS and building a 50-watt rig for 6 and 2 meters. The new pres. of the Albany H.S. ARC is WN2EAH. New ticket-holders in Albany include WA2VQZ, WN2EAH and WN2EAJ. Among those accepted for college this fall are WB2PUH (Clarkson), WA2VQZ (RPI) and WN2EAJ (Buffalo). Congrats to all. Since this is the last activity report prepared by your retiring SCM after four terms of office, let me thank all the clubs, nets, traffic-handlers and individuals who contributed information over the years. Give my successor, K2SJN, the same enthusiastic support by sending news in the form of letters and club (or net) bulletins or radiograms. Keep the column filled with the call letters of those who perform newsworthy functions which enhance both amateur radio and the ARRL. Traffic: (May) WA2BHN 256, WA2VYS 209, WA2VYT 101, W2ODC 82, K2SJN 41, W2ANV 19, WB2UEQ 11, WA2JWL 3, K2BJG 3. (Apr.) WB2FOA 43.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2FDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. PAM: W2EW.

NLI*	3630 kc.	1915 Nightly	WA2UWA-RM
NLI VHF*	145.8 Mc.	1930 MTWTF	WB2RQF-PAM
NLI Phone*	3932 kc.	1600 Daily	WB2ZET-PAM
NLS Slow*	3715 kc.	1845 Nightly	WB2UQP-RM
Clear Hse	3925 kc.	1100 MTWTF	WA2GPT-Mgr.
Mic Farad	3925 kc.	1300 Ex. Sun.	K2UBG-Mgr.
Eastern U.S.	3683 kc.	0001 Nightly	K2UBG-Mgr.
All Sve	3925 kc.	1300 Sun.	K2AAS-Mgr.
NYSPTEN	3925 kc.	1800 Daily	K2AAS-Mgr.

**Section Nets.* All times shown above are local.

The midnight session of the Mike Farad Net has changed its name to Eastern U.S. Net (EUS) and its frequency to 3683 kc. to beat the RTTY stuff. WB2JJW has completed the conversion of the mobile, which is now operational on 20, 40 and 75 meters. WB2QIL, trustee-elect of the C.W. Post ARC, has applied for the club's station license, so things are looking up again. W2TUK, dad of famed DXCCer WB2UZU, spoke at the Amateur Radio Luncheon Club's May meeting at the N.Y.C. Engineer's Club and reported on the ARRL Board of Directors meeting. The two college-type daughters of W2NXB had him motoring over 400 miles this month, which shut the rig down a little bit. WB2DXM reports that he survived one more school year so there is hope yet. WA2QJU was accepted into another engineering honor society, Tau Beta Pi, and plans to spend the summer assisting with microwave research at Columbia. WA2TAQ advises that the FLIRC Hamfest and Picnic will be held come *rain* or come *shine* on Sun., Sept. 1, 1968, at the Town Park, Point Lookout, Long Island. W2HAE had no problem moving the furniture to the new QTH, but the Junk Box gave him conniptions. K2AAW's son, WN2FNQ, recently joined the Huntington RACES guys. WB2TDK is back on 6 meters with a new Lafayette 750 all-transistor job. K2HTX installed a remotely-controlled Squalo on the good old mobile. WA2FAK put up a new 2-meter beam just in time to pick up the recent high winds for a thorough shake-down test. Congratulations to WB2FDH, who captured a General Class license. WB2DLA appeared on the television show "It's Academic" this past May. New father WA2HYY reports that the New York QRP #1 received a letter of thanks from the hams of India for the box of components donated by the club. New officers of the New York RC are K2QDC, pres.; K2CON, vice-pres.; WB2RGQ, secy.; W2TOV, treas. WA2RUI is another guy with a Squalo pinned to the mobile car. WA2GMB, WB2HLM, WA2LKL, WB2WNW and W2ZVJ also are new members of the Huntington Town RACES group. Traffic: (May) WA2UWA 912, K2UBG 189, WB2DRW 163, W2GKZ 66, WB2HYK 56, W2EC 46, WB2AEK 33, WB2RQF 22, WB2JJW 18, WB2QIL 12, W2PF 8, W2EW 6, W2DBQ 5, W2LGK 4, WB2MZE 1. (Apr.) WA2UWA 862.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2LQP—Asst. SCM: Edward F. Erickson, W2CVW. SEC: WA2ASM.

ARPSC Section Net Schedules

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695 kc.	7:00 P.M.	Dy.	31	416	352	WA2KIP
NJSN	3740 kc.	8:00 P.M.	Dy.	18	59	21	WB2RKK
NJEPTN	3928 kc.	6:00 P.M.	M-Sa.	31	469	142	W2ZI
NJPON	3928 kc.	6:00 P.M.	Sun.	—	—	—	WA2TEK
NJAN	50,300 kc.	8:00 P.M.	M-F	23	261	41	WA2KZF
PVETN	145,710 kc.	7:30 P.M.	Dy.	31	402	168	K2KDQ
ECTN	146,700 kc.	9:00 P.M.	Dy.	31	219	104	WB2IYO

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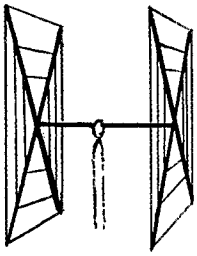
How did Gotham drastically cut antenna prices? Mass purchases, mass production, product specialization, and 15 years of antenna manufacturing experience. The result: The kind of antennas you want, at the right price! In QST since '53.

QUADS

Worked 42 countries in two weeks with my Gotham Quad and only 75 watts . . . W3 ---



CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

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.

SWR: 1.05:1 at resonance.

Boom: 10′ × 1¼″ OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Steel wire, tempered and plated, .064″ diameter.

X Frameworks: Two 12′ × 1″ OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞″ OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

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

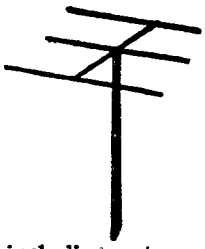
Now check these startling prices — note that they are ***much lower*** than even the bamboo-type:

10-15-20 CUBICAL QUAD	**$35.00**
10-15 CUBICAL QUAD	**30.00**
15-20 CUBICAL QUAD	**32.00**
TWENTY METER CUBICAL QUAD.	**25.00**
FIFTEEN METER CUBICAL QUAD.	**24.00**
TEN METER CUBICAL QUAD	**23.00**

(all use single coax feedline)

BEAMS

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



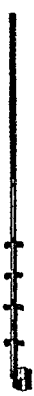
Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36′ of tubing for *each* 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞″ and 1″ aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

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

*20′ boom

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!



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

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect.

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RMs: W2BVE and WB2RKK. PAMs: W2PEV, K2KDQ, WA2KZF, WA2TEK and WB2IYO. New appointments: K2PBP as OVS. Endorsements: W2TSN and WB2DXW as ECs, W2ABL and WB2NZU as ORSs; WB2FUW as OPS and OBS. WB2CWP has a new Tri-band beam. WB2DRX passed the Advanced Class exam. WA2WLW is a new ham in Rochelle Park. WN2EUX is using a homebrew transmitter and the NC-57 receiver. WA2UES is back from Vietnam and is on 2 meters. K2DEL is planning Warren County operations during the Sept. V.H.F. QSO Party. WB2PXO cleared up his rig problems. W2AIB is using FET converters on 6 and 2 with the HBR-16. W2HN is on RTTY and 2-meter f.m. K2KDQ reports the PVETN is planning a Sept. 28 Net Dinner. WB2FUW and WB2MEE are enjoying the traffic nets during the vacation break. WB2VLC is now using the NCX-5. WA2CCF received his WAVE and WACAN awards. K2IEF is up to 99 confirmed for DXCC and just added a new 40-ft. tower. WB2RJJ has a new HAM-M for his antenna system. WN2DRJ and W2LQP added a Marauder to the stack. WA2ASM and I are looking for ECs in Hudson, Hunterdon and Ocean Counties. If interested, please contact WA2ASM, our SEC, or the SCM. Remember the N.J. QSO Party and try to get the logs in on time. It takes a lot of time to check them out, so be prompt. How about a few more reports? Traffic: (May) K2US 302, WB2RKK 242, WB2DDQ 154, WB2VLC 106, WB2ZSH 94, WA2ASM 93, W2QNL 91, W2IIN 87, K2KDQQ 82, WA2TBS 78, WB2NSV 73, WA2ACJ 58, WB2TKP 45, WB2IYO 44, WB2FIT 41, W2ZVW 39, WB2UIR 33, WB2WNZ 32, K2JSJ 31, W2BSC 29, W2LQP 29, W2EWZ 25, K2EQP 24, WA2CCF 23, WA2KZF 19, WB2FUW 14, W2JDH 12, WA2WLW 12, K2ZFI 12, W2AIB 10, W2CVW 9, K2MFX 8, WA2TNA 8, WA2ZDA 8, W2TFM 6, WA2NJB 5, WB2PXO 5, W2DRV 2, W2NKD 2, WB2ZCI 2, WN2DRJ 1, WB2DRX 1, WB2JWB 1, WA2UZH 1. (Apr.) WA2IGQ 594, WA2ACJ 188, WA2ASM 137, WB2NZU 109, WB2AMV 66, WA2VQP 46, K2EQP 38, W2QNL 33, WB2PXO 15, W2DRV 3. (Mar.) WB2PXO 40, WB2FUW 3.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, WØBDZ—Asst. SCM: Bertha V. Willits, WØLGG. SEC: KØBRE. PAM: WØNGS. RM: WØTIU. About the biggest news in Iowa in May was the series of tornadoes that struck N.E. Iowa including the cities of Charles City and Oelwein. Many Iowa and Minnesota amateurs aided in communication with their personal equipment and portable generators. The Iowa WX Net was on duty during the disaster with portable equipment in Elma. New Generals in the Charles City area include WAØSMD, WAØRMC and WAØQQX. WØKUS and WØYVU, who taught the Advanced radio course that resulted in these new amateurs, now have their Extra Class licenses. A report from WØPFP indicates that he was quite active on 50 Mc. during Es openings in May. WØEIT has finished his 2-meter v.f.o. OBS WØJAQ sends Official Bulletins on 3975 kc. M, W and F at 1725Z.

Ia 160-Meter Net	QNI 550	QTC 7	31 Sess.
Ia 75-Meter Phone Net	QNI 1332	QTC 211	27 Sess.

Traffic: (May) WØLCX 915, WØCZ 220, WØLGG 131, WAØMIT 103, KØJGI 66, KØKAQ 61, KØEVC 60, WØKRU 44, WAØAIW 24, KØTDO 20, WAØSDC 18, WØNGS 12, WAØOTE 6, KØGHH 4, WØGPL 4. (Apr.) WØNGS 19.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RMs: WAØMLE, WAØJFV. V.H.F. PAMs: WAØCCW, WØHAJ WAØLSH. Renewed appointments: KØUVH as EC, Zone 15; W9ECV/Ø as OO. KØEMB reports only 492 amateurs now are signed up in the AREC ranks. Any questions will be answered on the EC Net, which meets Sun. on 3920 kc. at 1300 local time. I have been informed that the Wheat Shockers Award still is being awarded by the Jo. Co. Club. For details contact KØPFV. WAØQOH is being transferred by Boeing to the West Coast. WAØCCW reports that summer has begun to take its toll on the v.h.f. nets. Reports for the month of May total 132 QNI and 13 QTC in 29 sessions, including all sections of the Kansas PI Net and V.H.F. AREC Zones 7, 11 and 15. Low-band AREC Zones 7, 10, 13 and 15 report QNI 186. QKS reports for May QTC 86; KSBN, QNI 782, QTC 155; KPN, QNI 152, QTC 16; KPON, QNI 1035, QTC 396; QKN, QNI 16, QTC 13; EC Net, QNI 30, QTC 11; Kansas WX Net, QNI 825, QTC 53. The newest thing to appear is the joint three-club news bulletin by the clubs in the Wichita area. WAØTHQ has started the Central Area Amateur Radio Service by monitoring 7260 kc. Daylight hours. Contact Bill for more details. Traffic: (May) WØINH 274, WØPSN 215, WØLXA 170, WAØMLE 121, WAØLLC 100, KØHGI 83,

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The Model 410C Frequency Control Unit is designed for full coverage of 80, 40, 20, 15 and 10 meters. It is intended for fixed station operation and plugs directly into Model 500C. It may also be used with Model 350C. Eight ranges, 500 kc each, 5 kc calibration.

$115

DUAL VFO ADAPTOR

Provides for the addition of second VFO for separate control of transmit and receive frequencies. Plugs directly into Model 500C and may also be used with Model 350C and other Swan transceivers.

MODEL 22 . . . . $32

MARS OSCILLATOR

Five crystal controlled channels with vernier frequency control. Plugs directly into Model 500C and may also be used with Model 350C and other Swan transceivers.

MODEL 405X (less crystals) . . $45

Be sure to visit your Swan dealer soon.

SWAN 500C SSB-AM-CW TRANSCEIVER

Five band, 520 watts for home station, mobile and portable operation.

The new model 500C is the latest evolutionary development of a basic well proven design philosophy. It offers greater power and additional features for even more operator enjoyment. Using a pair of the new heavy duty RCA 6LQ6 tetrodes, the final amplifier operates with increased efficiency and power output on all bands. PEP input rating of the 500C is conservatively 520 watts. Actually an average pair of 6LQ6's reach a peak input of over 570 watts before flattopping!

The 500C retains the same superior selectivity for which Swan transceivers are noted. The filter is made especially for us by C-F Networks, and with a shape factor of 1.7 and ultimate rejection of more than 100 db, it is the finest filter being offered in any transceiver today.

For the CW operator the 500C includes a built-in sidetone monitor, and by installing the Swan VOX Accessory (VX-2) you will have break in CW operation.

Voice quality, performance and reliability are in the Swan tradition of being second to none.

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Complete A.C. supply for 117 volts, 50-60 cycles, in a matching cabinet with speaker, phone jack, and indicator light. Includes power cable with plug for transceiver and A.C. line cord. Ready to plug in and operate.

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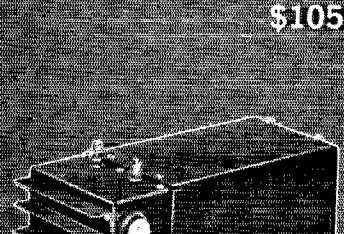

SWAN 14-117 12 VOLT DC SUPPLY

Complete D.C. supply for 12 volt mobile or portable operation. Includes cables, plugs and fuses. Will also operate from 117 volt A.C. by detaching the D.C. module & plugging in 117 volt line cord. Negative ground standard. Positive ground available on special order.

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KØBXF 72, WAØCCW 70, KØJMF 63, WAØPQL 62, KØLPE 57, WØZJY 57, WAØNDZ 55, KØGZP 50, WAØKPE 30, WAØNFP 29, WAØTJU 26, WAØJOG 25, KØUVH 20, KØEMB 15, WØFH 13, WAØJQV 12, WAØJFV 10, WAØSWC 10, KØMRI 8, KØGH 3. (Apr.) WAØJFC 8.

MISSOURI—SCM, Alfred E. Schwaneke, WØGS—SEC: WØBUL. WNØSBP is a new OVS. WØBUL renewed as SEC. WAØRMW graduated from high school. Graduating from college and from UMR RC (WØEEE) are KØDJG, pres.; WAØIKI, vice-pres.; WAØEZX and KØJBH. KØONK passed the Adv. Cl. test. WØBV reports a highly successful Novice class conducted by the Northeast Mo. ARC. New Nov. Cl. licenses from the class are WNØTWX, WNØTYD, WNØTYE, WNØCHE, WNØUNQ, WNØUNR, WNØUOX, WNØUQN and WN2EWQ/Ø. WØGQR received the #3 class AA Worked All Mo. Counties Award issued by the SMARC (Springfield). NCSs on MEN are KØWKC, WAØBWW and WØBUL. WAØKUH reports that Mo-Kan II, a 4-county simulated disaster test, was held Apr. 25. Clay Co. RACES set up mobile at Wm. Jewell Coll., the disaster scene, and at Smithville Hospital, Excelsior Springs Hospital and c.d. hq. QTC was 45. Operators were WØAMO, KØCEV, WØDDX, WAØEMS, KØIQS, KØJMI, WAØKQM, WAØKUH, WAØQLN, WAØRCL, WAØRFD, WAØRMX, WAØSHC, KØSPE, WNØTSI, WAØODS, WØUQP, KØWHI and WØWWO. Operation was on 2, 6 and 75. WØBV visited with WØOUD. WAØFLL has a new HW-22 and a vertical. KØWBD (Ft. Wood) is on with a new Drake R4B, a T4XB, and a Henry 2K. The Zero-Beaters Hamfest will be held Aug. 4 in Washington. Net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2230Z	M-W-F	14	135	7	WØBUL
MON	3585	2400Z	Daily	31	188	149	KØYBD
MNN	7063	1800Z	M-Sat.	25	62	34	WØOUD
MoSSB	3963	2300Z	M-Sat.	25	623	171	WØRTO
MoPON	3930	2000Z	M-F	22	246	159	WØHVJ
QMO	7075	2100Z	Sun.	4	11	23	WAØFKD
PHD	50.4	2430Z	Mon.	4	89	5	WAØKUH
MSN	3715	0200Z	Daily	31	6	10	WNØSBP
HBN	7280	1705Z	M-F	22	752	208	———

Traffic: (May) KØONK 2102, KØYBD 238, KØRPH 190, KØAEM 174, WØOUD 126, WAØHTN 125, WØBV 116, WØHVJ 88, WØZLN 60, WB4AIW/Ø 57, KØVVH 45, WØRTO 42, KØJPS 33, KØORB 30, WØBUL 27, WAØJIH 20, WØBVL 19, WAØFMD 15, KØGOB 13, WØGS 8, WNØSBP 8, WAØKUH 6, KØDEQ 2, KØREV 2. (Apr.) WNØSBP 5.

NEBRASKA—SCM, V. A. Cashon, KØOAL—SEC: KØOAL. Monthly net reports for May: Nebr. Emergency Phone Net, WAØGHZ, QNI 1740, QTC 280. West Nebr. Phone Net, WØNIK, QNI 651, QTC 30. Nebr. Morning Phone Net, WAØJUF, QNI 1045, QTC 49. Nebr. C.W. Net (NEB), WAØQMQZ, 0000Z and 0300Z sessions total QNI 63, QTC 21. AREC C.W. Net, WAØEEI, QNI 12, QTC 2. Nebr. Storm Net, WAØLOY, 2330Z session, QNI 902, QTC 78; 0030Z session, QNI 786, QTC 34. Cornhusker Teenage Net, WAØOCW, QNI 203, QTC 16. Net Managers will appreciate check-ins through the summer months to keep the traffic flowing. Reminder: July 28, Central Nebr. ARC Steak Fry, Victoria Springs. Aug. 18, Tri-State ARC Picnic, Bridgeport. Traffic: (May) WØHTA 264, WAØIBB 185, WØLOD 104, WAØGHZ 87, KØJTW 79, WAØLOY 65, WØBEV 46, WAØBOK 20, WAØFIG 17, WAØOCW 16, WAØPIF 15, KØFRU 14, KØJFN 14, WAØDXY 11, KØDGW 10, WAØGVJ 10, WAØJUF 9, KØIXY 8, WAØEEI 7, WAØIVV 6, WAØPCC 5, WØFCE 4, WØVEA 4, WAØFNY 3, WØHOP 3, WØNIK 3, KØOAL 2, WØPHA 2, WAØPSN 2. (Apr.) WØVEA 8.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John McNassor, W1GVT—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. V.H.F. PAM: K1SXF. Net reports for May:

Net	*Freq.*	*Days*	*Time*			*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845			31	363	452
CPN	3880	M-S	1800	Sun.	1000	31	613	230
V.H.F. 2	145.98	M-S	2200			16	52	17
V.H.F. 6	50.6	M-S	2100			22	290	43

High QNI: CN—WA1HSN, WA1IGF, WA1GIX. CPN—WA1BDA 28, W1GVT 27, W1YBH 25, WA1FXS, K1YGS and WA9QVU/1 24, W1LUH 23, K1CEC, WA1CRS and WA1EEJ 20, K1EIC and WA1HEW 18, K1DGK and WA1IEG 17. WA1HEK and WA1IWN 16. SEC W1PRT reminds us that successful EC work can provide club publicity while proving amateur radio does operate in

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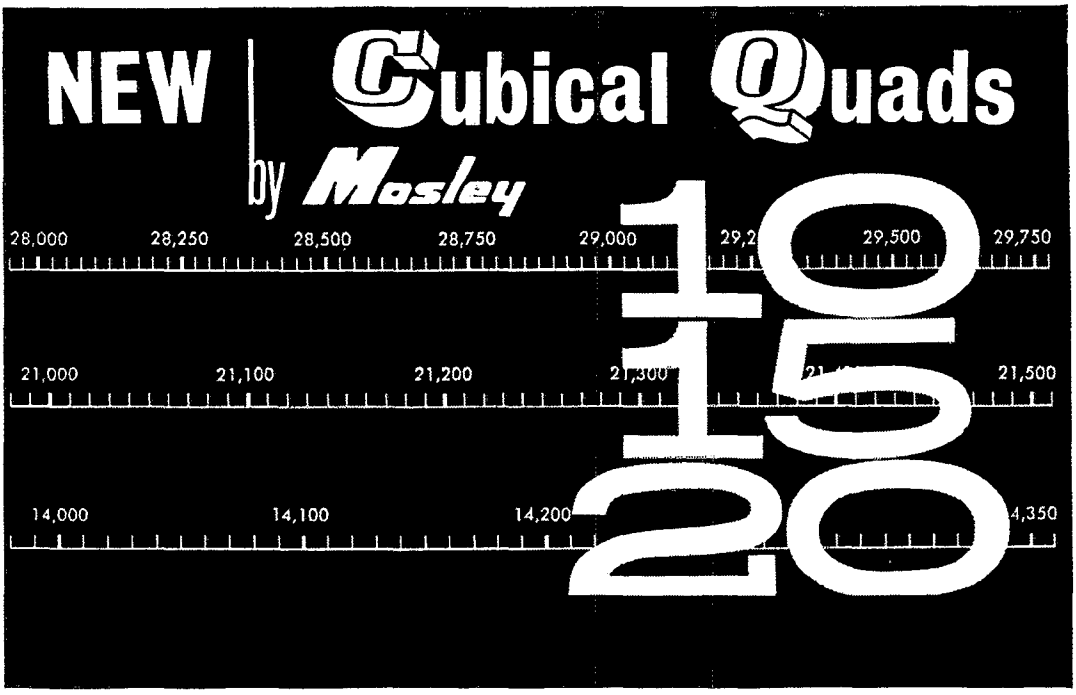

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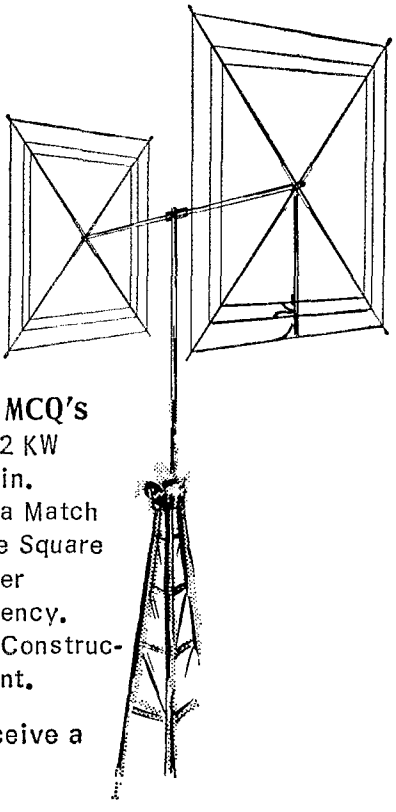

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the public interest. Please ask your club to cooperate. Reports on the ARRL Convention in Swampscott indicate it was another successful one. Club activity slacks off during the summer but most clubs get a good workout during Field Day. Club bulletins keep members up to date on activities at all times—your club should have one! The Southington ARC enjoyed an interesting illustrated lecture on his trip to Brazil by W1FYG. Anyone interested in PY-Land should contact W1FYG. With deep regret we add the call of K1MRI to the list of Silent Keys. WA1FGN is moving to Texas. W1WEE has a new Collins receiver. W1BD1 is busy with his MARS station. W1HAX is building 2-meter transistorized gear. WA1HLP is building a new c.w. rig from an old TV set. Congratulations to: K1TKS, K1THQ and K1CEC on the Extra Class; WA1HGJ and WA1IVG on Advanced Class; WA1GIX on the 30-w.p.m. sticker; WA1GGN on making the BPL; WA1CYS, WA1FZE and WA1GGN on becoming new ECs. Happy vacations! Traffic: W1EFW 353, WA1GGN 275, WA1HSN 242, WA1HEW 187, W1AW 168, WA1HGF 135, WA9QVU/1 131, W1ARR 98, WA1FGN 92, WA1GIX 81, WA1FNJ 72, WA1FXS 63, W1GVT 61, WA1CYV 56, WA1GFW 51, K1SXF 45, WA1HWX 43, WA1HLP 37, WA1IEG 35, W1YBH 32, W1BDI 22, W1KAM 22, WA1EHK 20, WA1GUD 18, K1CEC 12, W1QV 12, K1YGS 10, W1GVJ 9, W1BNB 6, W1CTI 6, W1CUH 6, WA1GLS 6, WA1IVG 5, WA1GOI 2, K1TKS 2.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1CLF. RM: W1BJG. PAM: WA1FLG. Traffic Nets: Sea Gull Net meets Mon. through Sat. on 3940 kc. at 1700; Pine Tree Net meets daily on 3596 kc. c.w. at 1900. We are still looking for liaison stations to help with traffic and the PTN. W1BJG attended the New England Division Convention at Swampscott and the NTS session. The Public Service Net operates on Sun. with good results. Traffic: W1BJG 325, W1GU 141.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from W1s RPF, JVZ, K1PNB and WA1DXI. W1AOG took a trip to VE1-Land. W1BGW and K1QDR took part in the May FMT. W1GGH went on a trip to Norway. The 6-Meter Crossband Net had 19 sessions, 125 QNIs, 6 traffic. W1AAA is a Silent Key. New officers of the Yankee RC are K1ZJK, pres.; W1AWO, vice-pres.; K1SMP, treas.; WA1DTI, secy.; W1RLJ, WA1s HOF, HVX and GCO, directors. W1ADD is RO for Lynn. W1AQP's daughter is now General Class with the call WA1JPS. W1YMW is back from the Navy. W1AEC is in our EMN. W1QFO is on 2 again. The T9 Radio Club met at W1IBF's, W1TZC is pres. and WA1DDM secy. of the Whitman RC, now an ARRL affiliate. W1HHA is in the hospital. Our sympathy goes to W1CKW on the death of his wife. W7LHL was here on a trip. W1PV is ex-W1LEL. The South Shore ARC had its Annual Banquet and Ladies Night. K1DZG took a trip to VO1-Land. K1HHN, Norwood EC, says the group has portable rigs for 6 to 10. New officers of the Bedford RC are W1ZSG, pres.; W1YWY, vice-pres.; W1ETQ, secy-treas. W1HF is ex-W1JJZ, now in Warwick, R.I. Eastern Mass. 2MN reports 21 sessions, 118 QNIs, 96 traffic. New officers of the Wellesley ARS are WA1FSH, pres.; WA1EGL, treas.; WA1DRC, vice-pres.; WA1FSI, secy. W1MNK is now secy. of the T9 RC. An SCM/SEC meeting was held at the convention with the following present: W5QKF, W1s QV, EAE, NJM, SWX, ALP, AOG, PRT, YSA, ARR, YYM, VB, K1s AAV and MPN. N.U. held Radio Day and W1KBN made the BPL. WA1FSI passed the Extra Class exam. VK2ON was here on a visit and stayed with WA1FHU, who is holding classes in Lynnfield at c.d. hq. for advanced Class licenses. WA4TTG is building a v.h.f. transistor s.s.b. exciter for W1MIX. WA1HHK is in EMN and EM2N now. WA1DPX reports DX on 6. New officers of the Mass. Chapter NAH are WA1DFL, pres.; WA1EZA, vice-pres.; W1DKD, secy.-treas.; W1DOM, awards custodian; K1s WRO, YII, W1LES, trustees. W1DYS has an HW-100. W1BV now is with FAA. The Capeway RC met at W1ZXG's. The Massasoit ARA had a "Home Brew Night." W1RST has the call W2LX also. W1GW has a new call, formerly held by his brother, W1CID, ex-W2ETJ, W3VPO. W8GXE is on several bands in Acton. W1ZQQ is now Advanced Class. Appointments endorsed: W1s EHT, EIQ, K1s EPL, HHN, DZG as ECs; W1s ZQQ, RST, VAH as OOs; WA1s DEC, DED, W1MIX as OPSs; W1KBN, WA1GXC, W1MIX as ORSs; W1KBN as OBS. W1BVP is in Vietnam. WA1GQT is on all bands. We hope W1LJT is feeling better after an operation. W1NF met Harold Voorhis from N.J. at the convention. Both the OOTC and QCWA had booths at the convention. W5QKF, a vice-pres. of the ARRL seemed to enjoy our convention. W1QV, our Director had his Annual Fellowship Breakfast Sun. morning. Traffic: (May) W1OJM 481, W1KBN 460, W1PEX 444, WA1EYY 340, WA1FAD 178. W1EMG

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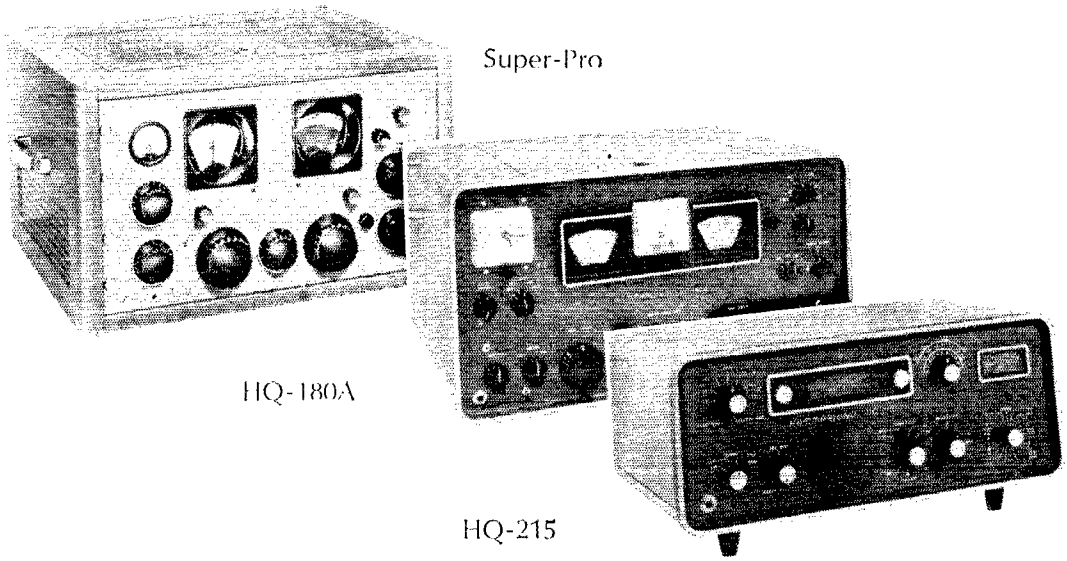

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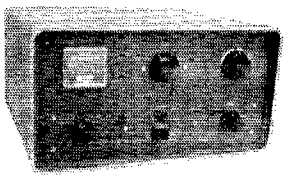

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165, WA1FSI 83, K1CLM 66, W1CTR 64, W1DAL 59, WA1HVZ 58, WA1GXC 29, WA1FHU 27, W1MX 24, WA1DPX 21, W1AOG 16, W1DOM 13, WA1AJN 10, WA1DEC 8, WA1HHK 8, K1YUB 8, K1OKE 4, WA1DED 4, W1CT 2, W1LE 1. (Apr.) WA1HXF 261, W1SMO 43, WA1GXC 35, W1KBN 20.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: K1QES. PAM: K1APQ. RM: K1BCS. The GSPN meets at 0000Z Mon. through Fri. and Sun. at 1430Z. The NHEPN meets at 0000Z Sat. Both are on 3945 kc. On 3685 kc. the c.w. net, NHVTN, starts at 2330Z Mon. through Fri. Endorsements: W1CTW and W1IQD as OVSs. WA1IBD MCs the W1HPM Net Fri. at 7 P.M. on 50.4 Mc. Welcome to new hams: WA1JHT Portsmouth, WN1JIP and WN1JIQ Weare,, WA1JIU Plaistow. The GSPN certificate was issued to K1FMP. WA1EUF, of Manchester, continues excellent detailed reports of club activities. How about you other clubs? W1CTW says his new station installation at W1IQD is proving successful except for a smoking 811 rig. Yours truly just met W1QVZ after many QSOs in years past. Tom is home resting after hospitalization. W1KGZ reports continued progress on the Mt. Uncanoonuc 2-meter repeater. W1BXM continues to be New Hampshire's most active 2-meter s.s.b. station. W1YWC has his new shack almost completed. W1RCC has been on vacation. W1JB/-W1APK and W1YMJ did an excellent job in the recent FMT. K1SHC has a fine portable signal from Ossipee Traffic: K1PQV 60, W1BYS 3, W1SWX 2.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LII. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. RISPN report: 31 sessions, 391 QNI, 80 traffic. As the summer season is now with us I would ask that you not forget to send in your reports. It is quite noticeable that traffic will drop and ham activity will diminish during the summer months. The Cranston RA, W1VXL, elected the following officers: K1QZB, pres.; W1POP, vice-pres.; K1KCZ, treas.; Nick Ricci, secy. K1QZB recently won the U.S.A. County Award. He was the first in New England to receive it. The W1AQ Club of Rumford reports that renovations on the club are proceeding to schedule and it is hoped that they will be complete for the Sept. meeting. W1JFF, of the Newport County RC, W1SYE, reports that the club is s.s.b. with an NC-200. Members participating in the Emergency Net are W1TXL, WA1AUL, W1JHF, W1JFF, W1WLG, K1VPK, K1YGY, WA1CSO, WA1DRB and W1HEH. Traffic: WA1EEJ 318, W1BTV 109, W1TXL 109, WA1CSO 56, K1VYC 29, K1VPK 24, K1TPK 14.

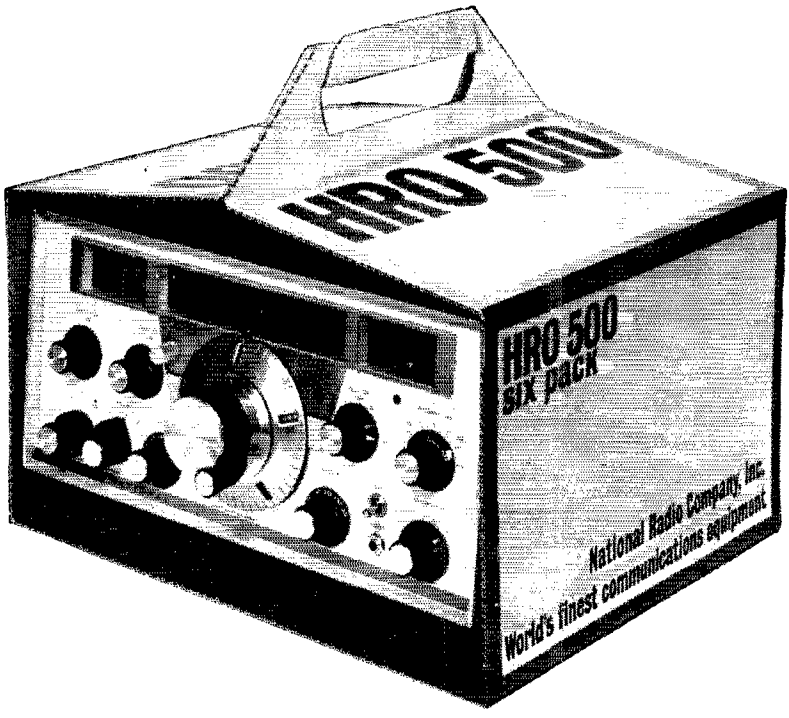
VERMONT—SCM, E. Reginald Murray, K1MPN—

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
Gr. Mt.	3855	2130Z	M-S			W1VMC
Vt. Fone	3855	1300Z	Sun.			W1UCL
VTNH	3685	2230Z	M-F			K1UZG
VTCD	3990½	1400Z	Sun.	47	27	W1AD
Carrier	3855	1200Z	M-F	390	5	W1KKD
VTSB	3909	2130Z	M-S			W1CBW
		1230Z	Sun.			

From above, you can see the need to get net reports to me early each month. Don't forget that wonderful Inter Field Day Aug. 18 at Old Lantern Inn, Charlotte, Vt. For registration write Bill Fake, W1FS, 30 So. Hill Drive, Essex Jct., Vt. 05452 ($2.50 for early bird—$3. at the gate). On Aug. 4, the Carrier Net will have a picnic at Lake St. Catherine State Park, south of Poultney. Welcome to Novices WN1JIA Brattleboro, and WN1JMS (son of K1UZK and K1UZG, Chester). Traffic: (May) K1BQB 273, K1MPN 44, W1MRW 24. (Apr.) W1FRT 34.

WESTERN MASSACHUSETTS—SCM, Norman P. Forest, W1STR—RM W1DWA reports total traffic 89, number of sessions 31, with attendance in the order of activity: W1DVW, K1AEC, W1BVR, K1WZY, W1ZPB, W1STR, K1IJV. Central New England Net, W1IC, reports 1201 QNI, 43 traffic. The Monday Night Conn. Valley V.H.F. Net continues to attract many along with the Wednesday Night Hampden County ARAI Ten-Meter Net doing well. W1EOB continues to lead the gang with a 156 traffic count. Most of Vic's activity is in the National Traffic System. Central Massachusetts ARAI has W1DQP as chairman of a group proposing to set up a 2-meter f.m. repeater station. WA1FVX heads a committee to get action on some dipoles for the club. K1RNG and WA1GTM are assisting. K1YRV ably assisted Professor W. H. Roadstrum, of Worcester Tech., in giving a demonstration on "Transistor Amplifiers" at the May meeting. The Valley ARC recently elected K1GPK, pres.; K1DFC, vice-pres.; WA1BRU, secy.; K1ZKH, treas.; Directors are K1QMV, K1YQQ, K1ZQB, WA1CXD, W1NPL, K1IYT, K1NEZ and WA1ICA. W1DGJ reports all sorts of DX coming through

six pack



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during May. Congratulations to the Zimmerman's Shirley on her new ticket, WN1JOK, and Peter on his new Extra Class, WA1EKB. WA1IAU received his Advanced Class ticket the same day. Traffic: W1EOB 156, W1BVR 98, W1DVW 69, K1WZY 44, W1ZPB 33, K1AEC 30, W1STR 19, WA1DNB 4, WA1ABW 1.

NORTHWESTERN DIVISION

ALASKA—Acting SCM, Albert F. Weber, KL7AEQ—KL7EDK is now stationed at Northway and will be bouncing 2-meter signals off the Wrangell Mts. soon. This will be a first try and should be mighty interesting. Via *NARC News*, we understand that KL7CAH now resorts to ice-pans for mobiling as well as fishing. What's the real story, Sandy? Congrats to WL7FLU on passing that pesky General. Keep it up, Fay, the Advanced comes next. Will the editors of the various club papers please send me copies so I can include dope from your areas in this column? Traffic: KL7FRZ 18.

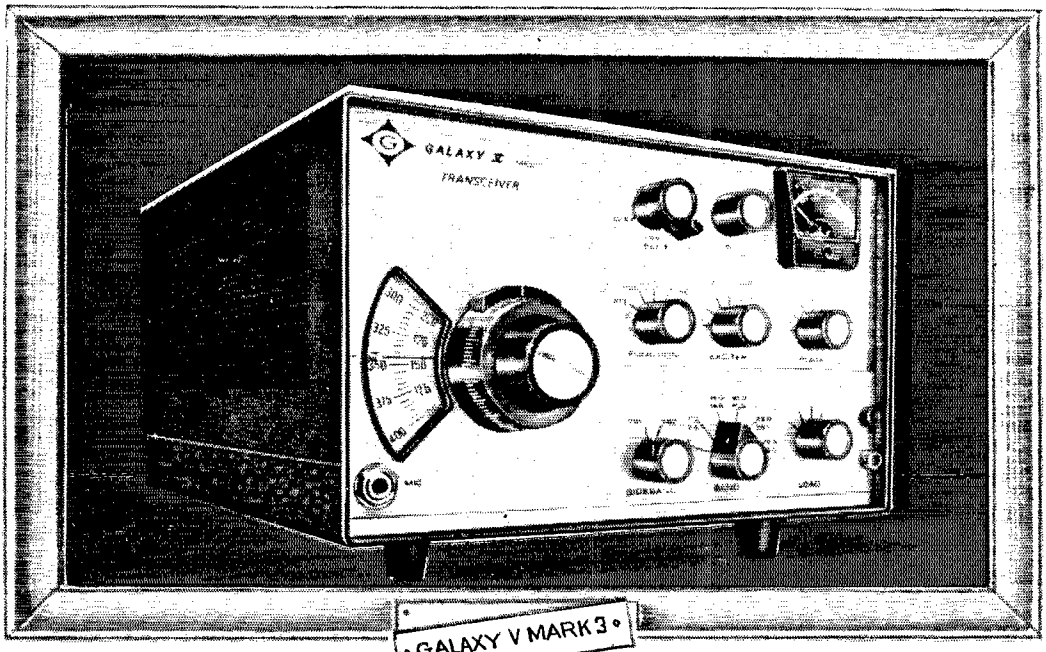
IDAHO—SCM, Donald A. Crisp, W7ZNN—SEC: K7THX. The FARM Net convenes on 3935 kc. week days at 0200 GMT. W7AXL has been appointed EC for Fremont County, and has a new power plant for emergency use. K7KRO has been appointed EC for Bingham County. WA7EWV has a new HW-12 mobile installation. WA7FFZ has installed a tower and 10-meter beam. K7UAL is recovering from a minor operation. The W1MIU Hamfest will be held Aug. 2, 3, 4 at Macks' Inn, Idaho. W7IUO is active in DX Contests. FARM Net report for May: 22 sessions, 737 check-ins, 71 traffic handled. Traffic: (May) WA6BDD 161, WA7ETO 65, W7ZN 9, K7CSL 2, W7IY 2. (Mar.) WA7BDD 113.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. RM: WA7DMA. Section net: Montana Section Net, 3910 kc. 1700 GMT Sun. Appointment: W7EKB as ORS, W7RZY, our SEC, gave a talk to the Yellowstone Radio Club on the usage of v.h.f. and the use of 2-meter f.m. The Butte Amateur Radio Club provided communications for the Annual City of Butte Clean-up Drive. Its AREC 2-Meter F.M. Net was used along with the local 15-90CB group. W7COH and his XYL have returned from Wyoming. New calls in Missoula are WN7JOC, WN7JVG, WN7JQS and WN7JSN. K7ELW and K7MOW are proud of a new ham in the family, WN7JQU. W7QGJ is working on a new antenna. W7IUN is building a ham band antenna. W7SMY is brewing up a transistor modulator. K7KFU is a new call in Anaconda. The Great Falls Club is gathering Montana calls for use in a state directory. W7LBK received an average error of 17.4 p.p.m. in the recent FMT. WN7JXT, WN7JXU and WN7JBX are new calls in the Bozeman area. WA7AZN, WA7BQS, WA7HDD and K7PGY have received their Advanced Class licenses. K7KOK and WA7DVU have received their Extra Class. I wish to thank everyone who helped me during my term as SCM. Traffic: W7EKB 124, W7LBK 24, K7EGJ 17, WA6MDL/7 6, WA7IZR 5.

OREGON—SCM, Dale T. Justice, K7WWR—RM: W7ZFH. PAM: K7RQZ. Section net reports: K7IFG reports for the BSN for Apr., sessions 58, traffic 94, contacts 176 and check-ins 982. For May sessions were 60, traffic 115, contacts 169 and check-ins 1048. WA7AHW reports for the AREC Net, sessions 31, maximum number of counties 20, traffic 49, contacts 107 and check-ins 915. Also, Ray notes that one emergency was handled by the net on May 19. New appointment: WA7BYP as OBS. K7WWR is now among the ranks of the Extra Class licensees. W7YUY reports that a new club has been formed in Tillamook with W7UPR as pres. K7OUF has built an IC keyer and a crystal calibrator. The Klamath Basin ARA is having 2-meter mobile hunts. The Portland mobile hunts on 75 meters are held every 3rd Mon. WA7FTN is very active on Army MARS, telephone relaying for servicemen in South East Asia, and had a nice article written about him in the Bend newspaper. WA7GFP reports many 6-meter openings in May. W7DEM reports that 25 Grants Pass amateurs helped get election returns to the local news media on May 28, and 23 helped out during the Annual White Water Boat Race on the Rogue River. Traffic: (May) K7RQZ 245, WA7FTN 212, W7ZFH 144, K7NTS 94, K7OUF 81, WA7BYP 72, K7IFG 63, W7ZB 56, WA7HKV 47, K7WWR 33, WA7AHW 25, W7MLJ 12, W7BNS 10, WA7EZJ 9, WA7DWK 2, K7DXV 1. (Apr.) K7IFG 92, W6DSC/7 22.

WASHINGTON—SCM, William R. Watson, W7BQ—SEC: W7UWT. RM: K7CTP. PAM: W7BUN.

WSN	3950 kc.	Daily 0145Z	QNI	333	QTC 395	Sess. 31
NTN	3970 kc.	Daily 1830Z	QNI	809	QTC 300	Sess. 31
WARTS	3970 kc.	Daily 0100Z	QNI	1160	QTC 84	Sess. 29
NSN	3700 kc.	Daily 0200Z	QNI	353	QTC 123	Sess. 30



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The week of Sept. 1-8 has been proclaimed by Governor Daniel J. Evans as Washington State Amateur Radio Week. Present at the signing on June 6 were W7BQ, SCM; W7UWT, SEC; K7CTP, RM; W7BUN, PAM; W7HMJ, pres. PSCARC; W7CJL, pres. BEARS; and W7UU. Special guest was Ed Link, Washington State C.D. Director, who praised the state's amateurs for disaster preparedness. Encouraging word was received that there are no forseeable problems in having the cost of amateur plates reduced to the $5.00 figure in the next legislature. Among the varied programs for Amateur Week is the Washington State QSO Party sponsored annually by the BEARS, which will take place over the week end of Sept. 7-8. On Sept. 1st Gov. Evans will originate goodwill messages to be sent to all other Governors via amateur radio. The PSCARC is working on a Governor's certificate for contacts with Washington amateurs during the week. SCM W7BQ attended the Grays Harbor, Lake Washington and Bremerton Club meetings. Congrats to the Spokane Radio Amateurs, Inc., on its League affiliation. WSN Mgr. W7ZIW issued its first *Newsletter* with widespread compliments. Advance notice: Walla Walla Hamfest Sept. 22nd. The Tacoma Club had a fine Mother's Day breakfast. New officers of the Lake Washington Club are W7VFV, pres.; K7DT vice-pres.; WA7GNI, secy.; K7CHG, treas.; W7KLO, council del. New officers of the Clark County ARC are W7BG, pres.; W7FNY, vice-pres.; K7SUX, secy.; WA7HPC, treas.; W7DZB, W7SAP, W7EEA, W7IOU, trustees. Note the new 160-meter band segment now is open in Washington as of July 1. See *QST* for details. Tri-city clubs are working on the water follies, using 6 and 2 meters. W7FNA and W7EJD logged excellent scores in the May FMT. The Northwest Tech. Net has recessed for the summer and will resume Aug. 4 on 3970kc, at 4 P.M. PDST with last Extra material before the Nov. 22 band changes. Traffic: (May) W7BA 1899, W7DZX 883, WA7DXI 737, W7ZIW 384, WA7DZL 256, WA7ICA 234, K7CTP 156, W7AAO 148, W7PI 135, WA7EYN 132, W7JEY 120, W7BQ 95, W7IEU 71, WA7EDQ 59, WA7HKR 50, W7APS 42, W7GYF 42, W7BTB 41, K7KPA 36, WA7HSJ 34, K7THG 29, W7OEB 23, WA7FKM 16, W7BUN 14, K7OXL 14, W7UU 14, K7YFJ 13, W7ZHZ 12, W7AIB 10, K7EFB 10, WA7DBQ 5, K7MGA 5. (Apr.) WA7BZY 65, WA7ACQ 16, W7RXH 16.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN/6—Please note the new address for the SCM is 629 Blue Ridge Dr., Martinez 94553. Because of the lack of Form 1s there has been no station activities report in *QST*. This causes some concern. (1) The lack of reports and (2) the lack of complaints or comments. If anyone has any complaints, questions or anything he wants to get off his chest, please drop me a line or phone if you are in a toll-free area. W6OJW continues his OO operations. W6UZX will be off the air between Sept. 15 and Dec. 15. W6IDY has a new job working evenings. WA6RRH is active with the WB6OQS repeater. W6CBF is now living in Walnut Creek. K6HWL is now located at Bethel Is. WB6FHH is sailing and scuba-diving besides being active on NCN. WB6PCQ is active on NCN, RN6 and PAN and has been entertaining many of the traffic gang. WA6AGA is the new trustee for the WB6AAE repeater. W6OA worked all continents in 2½ hours and has the cards to prove it. WN6WFN has worked 48 states, 37 confirmed and 11 countries and is looking for a novice net he can QNI. K6JZR is active on NCN/1 while XYL WA6DOO is active on NCN/2. NCN/2, by the way, is the slow-speed section of the Northern Calif. Net. The speed limit 15 w.p.m. If you don't feel up to NCN/1 at 0200Z, try NCN/2 at 0330Z each night at 3.630 Mc. Traffic: (May) W6UZX 50. (Apr.) K6LRN 39, WB6FHH 11. (Mar.) WB6PCQ 272, W6TYM 64, K6LRN 18, W6UZX 17. (Feb.) WB6PCQ 357, W6TYM 179, K6LRN 78. (Jan.) WB6PCQ 653, W6TYM 294, W6UZX 99, K6LRN 70.

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6GHZ. PAM: KH6EEM. RM: Vacant. RACES Nets (40, 10, 6 and 2 meters) Coordinate with KH6AIN.

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

Congratulations to KH6GHZ and KH6BZF on the Code Proficiency Test endorsements. Congratulations also to KH6GBX on his recent ARRL Frequency Measuring Test results. Stan, as you know, is our State C.D. Comm. Mgr. Kudos to KH6GHZ, KH6EEM and KH6BZF, who had perfect code copy on this year's Armed Forces Day message. KH6BB and KH6JQ were among the leaders in the recent QCWA (QSO) Party for 1968. Kudos to WA6MLW/KH6, Director Navy MARS Hawaii, who has been selected for the Navy's Warrant

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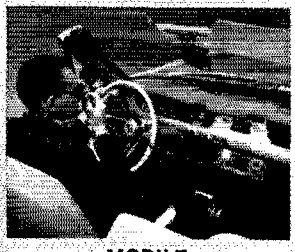
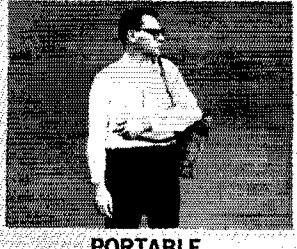


MOBILE

BASE STATION

BOAT



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SIMPLE OPERATION—Only three front panel controls. An untrained operator can use the Co-Pilot with less than 5 minutes of instruction.

LOW POWER INPUT—The Co-Pilot operates from 12 volt D.C. power. Power consumption in receiver is about one watt (80 ma).

SMALL SIZE—The Co-Pilot measures 10x10x4 inches and weighs under 12 pounds.

QUALITY CONSTRUCTION—All materials and construction of highest commercial quality. Can be used in regions of high temperature and humidity, and under conditions of high shock and vibration.

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Officers Training. 5W1AS and his most gracious XYL were in town recently and dropped by the Aloha DE Club. That club meets the 1st Thurs. of each month at the Liliha Branch of the Library of Hawaii at 7:30 P.M. W5RG was in town recently and visited with KH6s AX, BX, IJ and BZF. KH6CUP recently returned from Bangkok, Thailand. Ex-KH6BZD is now WA7HHX. He writes from 2434 N.E. Couch #5, Portland, Ore. 97232. John is on 20-meter s.s.b. Send your station reports today—this is your column. See page 6 for my address. Traffic: KH6GHZ 1955, KH6BZF 17, WØPAN/KH6 1, KH6EQA 1, KH6EQF 1, KH6WO 1.

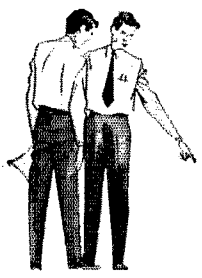
NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. K7RKH and K7ZOK are believed to have made the first two-way contact on 1228 Mc. K7ZOK made WAS on 6 meters as WØFKY and now has 43 states confirmed as K7ZOK. W7YDX and K7NKH are active on 6 meters. The NARA's new club officers are HH2PR, pres.; WA7EGW, vice-pres.; W7OYQ, secy.-treas.; Paul Etcheberry, Sgt. at Arms; W7SKP and K7NKF, directors. K7ZAU is doing an FB job running WCARS-7255. The SNARC has suspended club meetings until the last Mon. in Sept. The LVRAC has picnics and outdoor meetings scheduled for the summer. Worked 25 Nevada Achievement certificates have been issued to K7AOA No. 97, K7QGO No. 98, WA7DUG No. 99. All QSL cards for this award should be sent to SNARC, P.O. Box 73, Boulder City, Nev. 89005. W7JLV/K7UEW would like to hear from those interested in a state-wide RACES Net. WA7HHY is active on 40 meters. W7TVF will schedule anyone needing a Nevada contact. W7LHQ has been reappointed Nevada Public Service Commissioner. WA7AEL received a certificate of merit from the Public Health Service for communications activities during the Alaskan earthquake. WA7BEU is active on RTTY. Traffic: WA7BEU 10, W7PBV 2, W7YDX 2.

SACRAMENTO VALLEY—SCM, John F. Minke, III. WA6JDT—ECs: WB6MXD, K6RHW, WB6RSY, W6SMU, WA6TQJ .RM: W6LNZ.

Net	*Freq.*	*Time*	*Days*	*Mgr. or NCS*
NCN	3630	0200Z	Daily	WB6HVA
NCN/2 (slow-speed)	3630	0330Z	Daily	WB6HVA
Nevada Co. Slow	3749	0300Z	Fri.	K6HRW
SCEN	146.25	0500Z	Wed.	———
Yolo Co. CD	146.94	0200Z	Tue.	WA6TQJ

The Nevada Co. ARC now has a slow speed net Thurs. evenings running around 10 w.p.m. The Yolo Co. group participated in an exercise with county emergency services in May to supply communication between a simulated disaster site at Capay and Woodland hospitals, amateur radio being the only communications used. W6ZJW has applied for a 2-letter call. W6EOU is now K6DR. Your SCM has taken over the duties of the California QSO Party to be held this fall. Let's hear some of you rare S.V. counties! It is not too late to get to the Sierra Hamfest at the Bowers Mansion Picnic Grounds, half-way between Reno and Carson City Aug. 24. Contact W7OYQ, P.O. Box 7517, Reno 89502, for details. W6MWF now sports a six-element beam monoband on 20. WA6JDT has been maintaining weekly schedules with W2PVC in Potsdam, N.Y., on 21-Mc. s.s.b. with a very high degree of success. Traffic: (May) W6LNZ 74, WB6QZZ 32, WB6YTX 25, K6KRL 16, WB6MAE 11, WA6JDT 3, W6NKR 2. (Apr.) WB6YTX 23, WA6TQJ 12.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD —SEC: W6WLV. Field Day saw activity in all counties with the San Francisco, HAMS, Marin, Tamalpais, Petaluma, Santa Rosa and Humboldt Clubs turning out. In the recent FMT W6RQ, ex-W6GQA, again added to his long string with an average error of .6 parts per million. Al was commended in the ARRL Annual Report for his string of unbeaten FMTs, now nearing 15 years. K6ALI also tried his hand at the FMT. The PARK Club in Petaluma has been stimulated and the club station has been relocated. WB6LFT is working with a Petaluma Explorers Post and has WB6YEY, WN6FOW, WB6ZKP and WB6TPS as licensed amateurs in the group. W6WLV attended the NCN luncheon in Turlock. WA6BHX has worked up a transistorized keyer which works FB. WB6WMB reports working out of the state to 5-Land on 6 meters. WA6JUV is finishing up a course in calculus. W6KVQ made the BPL again in May. WA6RWH won the 75-meter hunt at the Fresno Hamfest. W6DTV presently is at Old Station in Shasta County, portable for the summer. W6SLX has a new NC-200 rig and WB6QAT is finding the articles in *QST* helpful while studying for the Extra Class exam. W6BWV is organizing the AREC setup in Humboldt County. WB6JQP is home after a trip to the Far East. WN6GVD is a new Novice in San Rafael. W6JXK had his gear stolen and has replaced it with an HA-500 and



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A NEW DIMENSION HAS BEEN ADDED TO OMNIDIRECTIONAL GAIN!

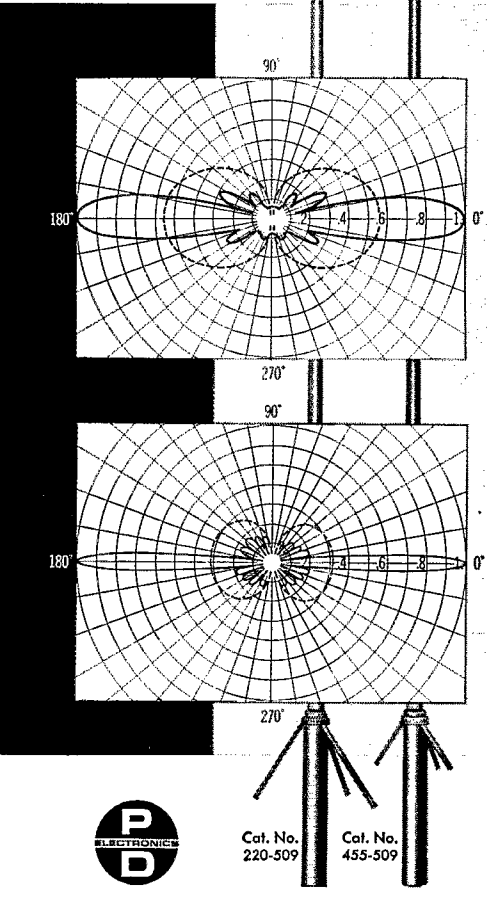
These CPC broadband Super Stationmasters are specifically designed for applications requiring a base station antenna with high omnidirectional gain — yet incorporate *lightweight* construction for ease and convenience of installation.

Only five models are required to cover the 136-174 Mh_z band. The Super Stationmaster is produced in several overlapping ranges: 136-143 Mh_z, 142-151 Mh_z, 150-159 Mh_z, 155-164 Mh_z, 157-166 Mh_z, 160-169 Mh_z and 165-174 Mh_z.

These antennas have a measured gain of 5.25 dbd across the specified bandwidths except the models from 136-143 Mh_z and 142-151 Mh_z. At these ranges the gain is 4.8 dbd. For special frequency ranges, contact the CPC Engineering Department.

Only two models are required to cover the 450-470 Mh_z band; 450-460 Mh_z and 460-470 Mh_z.

Super Stationmaster Antennas



Cat. No. 220-509, Frequency Range 136-174 Mh_z*

Electrical Specifications:

Nominal Input Impedance	50 ohms
VSWR	1.5:1
Maximum Power Input	500 watts
Omnidirectional Gain (150-174 Mh_z)	5.25 dbd
Vertical Beam Width	18°

Mechanical Specifications:

Radiating Element Material	Copper
Element Housing Material	Fiberglass
Element Housing Length	20 ft.
Rated Wind Velocity	100 MPH
Lateral Thrust at Rated Wind	79 lbs.
Weight	25 lbs.

Cat. No. 455-509, Frequency Range 450-470 Mh_z*

Electrical Specifications:

Nominal Input Impedance	50 ohms
VSWR	1.5:1
Maximum Power Input	250 watts
Omnidirectional Gain	10.0 dbd
Vertical Beam Width	7°

Mechanical Specifications:

Radiating Element Material	Copper
Element Housing Material	Fiberglass
Element Housing Length	20 ft.
Rated Wind Velocity	100 MPH
Lateral Thrust at Rated Wind	79 lbs.
Weight	25 lbs.

*Exact frequency range must be specified.

Cat. No. 220-509 Cat. No. 455-509

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a Swan VFO. W6ZZK reports that strong signals are booming in at his mountain top QTH. W6PTS was on hand to greet DL7FT on his arrival in San Francisco. Traffic: (May) W6KVQ 642, WA6BYZ 253, W6WLV 188, WB6FLT 68, W6BWV 39, K6TWJ 16, WA6AUD 14, WB6JQP 10, K6TZN 10, W6JXK 8, WA6YNL 8, WB6IMO 6, W6SLX 5, WA6BHX 2. (Apr.) WB6LFT 33, K6TZN 8.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The Central California Single Side Band Assn. held its Annual BBQ Dinner at WA6EDQ's QTH with 40 in attendance. WB6INO has moved back to Alaska and is operating from KL7BRD again. WA6ZSB is checking in on the TCARC 2-Meter F.M. Net and also is active in MARS. WB6YCK, W6ILR and W6IFC are heard on the WB6OBP repeater. W6NKJ has a new 350C. After many years, W6LTO is active again on all bands with a TR-3. W6ARE has a new 6-meter beam. JA3MD made a recent visit with W6NKJ. K6VSK is having 6-meter problems. WN6ERF is a recent Novice in Porterville. WB6YVM worked Arizona on 2 meters with K7NII at the other end. W6RRN has a new solid state v.f.o. WB6SUP is operating on 10 meters when the band is open. W6KTW is rebuilding his final amplifier. The Turlock Radio Club is holding 160-meter transmitter hunts using transistor radios as direction finders. The NCN had a luncheon and meeting in Turlock May 26. W6IPC has a Model 15 and is using an integrated circuit TU. WN6FDM is a New Novice in Twain Harte. WN6ZIP passed the General Class exam. WN6ZJY is studying for her General Class license. Both are active on 80. Traffic: W6ADB 351, WB6HVA 280, WB6INO 274, W6IPC 207, K6KOL 174, WA6SCE 167.

SANTA CLARA VALLEY—SCM, Edward T. Turner, W6NVO—SEC: W6VZE. RM: WA6LFA. This report was submitted by WB6IZF.

Bay Area AREC Net	3900	Sun.	1830 GMT
Northern California Net	3630	Daily	0300 GMT
Monterey Bay Emergency	147.16	Tue.	0400 GMT

WA6LFA reports that NCN had a good meeting in Turlock May 26. W6VZE made a trip to Northern California. W6YBV reports PAN is starting a second session on Sun. local time. W6DEF wagers he is the only NTS member who originates traffic in poetic form. Hal is now active on the WB6OQS 2-meter repeater. W6AUC is keeping skeds with W6WDY/M and is secy. of the Northern California Chapter of the QCWA. The San Jose RACES Net, including W6OOX, W6MIU, W6HZW, W6SXO and K6RJE, participated in a drill with the San Jose Police Dept. and the National Guard. WA6YMX, treas. of the SCARA, is now K6CU. W6YBT has moved to San Francisco. WB6IZF had a grand tour of 7-Land, including several good eyeballs and some QRP operation from a suitcase. Our best wishes to newly-elected SCM Ed Turner, W6NVO. Our thanks to all who helped WB6IZF as Acting SCM. Traffic: (May) W6RSY 1228, WA6LFA 208, W6VZE 144, W6YBV 110, W6DEF 104, W6AUC 39. (Apr.) W6VZE 153.

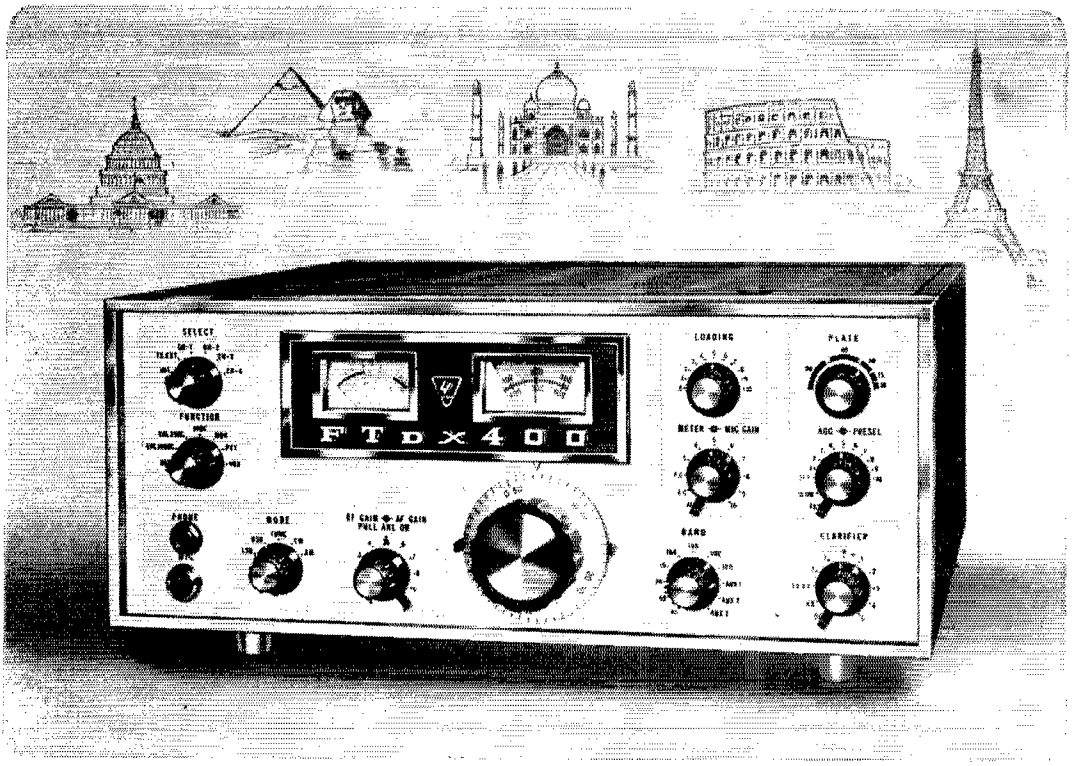
ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: James O. Pullman, W4VTR. SEC: WA4LWE. RM: K4CWZ. PAM: W4AJT. V.H.F. PAM: W4HJZ. W4ZZC says he now has his 2- and 20-meter beams up on a 50-ft. utility pole. K4TTN reports the Buncombe County ARC code and theory classes now complete, very successful, and will open again in Sept. K4EO reports the organization of a new radio club in Stanley County called the Yadkin Valley Amateur Radio Club, with membership open to all amateurs in adjoining counties. The Roanoke Division ARRL Convention is to be held in Greensboro, N.C. Sept. 28/29 and I'm sure there will be something of interest for all amateurs, so plan to keep that week end free for the convention. I'll see you there.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
THEN	3923 kc.	0030Z	Daily	295	W4ZZC
NCN(E)	3573 kc.	2230Z	Daily	122	W4IRE
NCN(L)	3573 kc.	0200Z	Daily	80	WA4CFN
SSBN	3938 kc.	2330Z	Daily	36	WA4LWE

Traffic: (May) WA4HCW 267, W4RWL 224, W4EVN 197, W4FDV 131, K4YCL 89, WA4VNV 59, K4EO 42, K4PKE 40, WA4GMC 37, K4VBG 26, WA4AKX 25, WA4UQC 25, W4ZZC 25, WA4ZLK 23, W4VTR 20, WA4ZPC 19, W4RF 17, W4BNU 15, WB4AYU 12, W4YMI 12, K4ZKQ 8, K4TTN 6, WB4BGL 1. (Apr.) WA4VTV 14.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: K4MLC, WA4EUL. PAM: W4OKN. Regretfully we record the passing of these amateurs during



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FTDX-400

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The usual "accessories" are standard equipment in the FT dx 400. Features built-in power supply, dual calibrators — 100KC and 25KC, break in CW with sidetone, fully adjustable VOX system, four switch selected crystal controlled transmit channels in addition to VFO positions, and varactor controlled clarifier offers receiver offset tuning capability.

Remember, all these extras are included in this new imported transceiver. Check the specs and ask your local dealer for a demonstration dx trip with the FT dx 400.

$599.95 including power supply and all accessories except speaker.

SP-400 matching speaker **$14.95**

DEALER INQUIRIES INVITED

SPECIFICATIONS

FREQUENCY RANGE: 3.5-4Mc, 7-7.5Mc, 14-14.5Mc, 21-21.5Mc, 28-30Mc (3 more 500KC receiver bands can be added).
FREQUENCY STABILITY: Less than 100 c/s drift in any 30 minute period after warm up.
ANTENNA IMPEDANCE: 50 to 120 ohm unbalanced.
MAXIMUM INPUT: 500W P.E.P. SSB, 440W CW, 125W A.M.
CARRIER SUPPRESSION: —40db
SIDE BAND SUPPRESSION: —50db (at 1,000 c/s)
DISTORTION PRODUCT: Down at least 25db
AUDIO BANDWIDTH: 300-2,700 c/s
RECEIVING SENSITIVITY: 0.5uV,. S/N 20db (14Mc SSB)
SELECTIVITY: 2.3Kc (—6db), 3.7Kc (—55db)
IF AND IMAGE RATIO: More than 50db
AUDIO OUTPUT: 1 watt @ 5% distortion
OUTPUT IMPEDANCE: 8 ohm, 600 ohm
TUBES AND SEMICONDUCTORS: 18 tubes, 9 transistors and 33 diodes
POWER SOURCE: AC 117 volts, 50/60 c/s
DIMENSIONS: 15¾" wide x 6¼" high x 13¾" deep
WEIGHT: 50 Pounds

SPECTRONICS

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May: W4EI, W3UE (formerly W4FF and Virginia SCM) and WA4VKF, engineer-in-charge Norfolk FCC office. WB4DOY has been named Asst. PAM and WB4GTG has earned a VSBN certificate. WB4FLT has been awarded CP-20. Unexpected seasonal problems have backlogged the SCM office. If you are overdue an answer to some item, please be patient and accept our apologies for the delay. Traffic: (May) K4CG 379, WB4GTG 268, W4UQ 240, W4NLC 199, K4DC 186, WB4FDT 150, WB4DRB 125, WB4GAN/4 104, K4FSS 88, K4TSJ 75, WB4CVY 74, W4ZM 71, WA4EUL 49, W4OKN 47, W4RHA 46, K4NDH 43, WB4DOY 37, WB4GTS 32, W4HE 31, WA4PBG 28, W4IA 25, WA4JJF 24, W4THV 21, W4YZC 18, WA4WQG 14, K4VCY 13, K4ASU 10, WB4FLT 10, W4KX 10, W4JXD 9, W4ZAU 9, W4SHJ 8, W4MK 7, W4GEQ 6, W4JUJ 6, WB4GYV 4, W4KFC 4, W4WG 4, W4TE 2, WA4YRH 2, (Apr.) W4IA 37, W4THV 30, WA4JJF 19, WA4FCS 10, W4BZE 3. (Mar.) WA4FCS 19.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8IRN. RMs: K8MYU, K8TPF. PAMs: K8CHW, W8IYD. C.W. Net meets on 3570 and Phone Net on 3890 daily. The month of June was proclaimed Huntington, Amateur Radio Month and members of the Tri-State ARA presented a 30-minute Public Service program on WHTN-TV. The Greenbrier ARA, WB8AWR, is now affiliated with ARRL. Officers of the Cabell County C.D. WB8ARY are WA8HVM, pres.; WA8NJB, vice-pres.; WA8KCJ, secy.-treas.; W8EII, trustee. Kanawha Valley area 29.6 stations are W8CLX, WA8AKU, WA8LAL, WA8PWM, K8WMX, W8IRN, now W8EV, and K8MHR in Huntington. W8BT, ex-W8PQQ now has ON8VO and keeps skeds with K8YBU and W8EV. W8OIV is in Belgium with W8BT. WA8RQB received the Tri-State ARA Amateur of the Year Award and is a new ORS. W8ORD now is W8FC. W8LBI is looking for call books for foreign amateurs. The West Va. C.W. Net reports 22 sessions, 75 messages; Phone Net, 31 sessions, 895 stations and 210 messages. W8GCN now is active as 7Z3AA. WA8WCK and WA8NDY are active in CAP and ARPSC work from Buckhannon. W8DUV switched to a keyer and W8DUW has a new suitcase mobile. Kanawha ARC won the Field Day Trophy at the State Convention presented by the State Radio Council. The Black Diamond ARC Ham-Picnic will be held in Bluefield, Aug. 25. Traffic: WA8POS 171, K8MYU 85, WA8WCK 75, WA8CKN/M 53, WA8YSB 53, W8SQO 49, WA8NDY 44, W8CKX 38, WA8RQB 34, K8BIT 31, K8MQB 22, W8DUV 20, W8JM 19, WA8TWR 18, WA8KMZ 17, W8GUL 16, WA8YOF 16, WA8WIX 9, W8WEJ 6, W8GQE 5, W8EV 4, K8QYG 4, K8CFT 3, W8AHZ 2, WA8CRW 2, WA8AFX 1, W8DJP 1, W8DPT 1, W8ERD 1, WA8HGA 1, WA8HPE 1, WA8IMY 1, W8IYD 1, K8KRW 1, W8LBT 1, WA8LFW 1, W8NCD 1, WA8STW 1, W8TGF 1, WA8TQD 1, K8ZDY 1.

ROCKY MOUNTAIN DIVISION

NEW MEXICO—SCM, Kenneth D. Mills, W5WZK—New OO: W5QNQ. W5PNY is now New Mexico SEC. Give him your support. I wish to thank Asst. SCM, WA5MCX; PAMs W5DMG, WA5FFL; OPSs, W5QNQ, WA5MIY, K5DAB, W5PNY, W5NUI, W5BWV, WA5BLI, WA5JNC; RM WA5FJK; OVSs, WA5FPS, K5TQP; ORS K5MAT, and others too numerous to mention. Without these people the Board of Directors would not have been able to vote a note of "thanks and appreciation" to the SCM. W5RFF has converted a 22-ft. house trailer to a ham shack. What a way to go portable! WA5RVX worked KA2RX on 6-meter E band skip. The Albuquerque V.H.F. Club made plans for the June QSO V.H.F. Party at its May meeting. K5TQP is building a completely transistorized s.s.b. transmitter for 75 meters. Traffic: K5MAT 46, W5MYM 34, W5NUI 7, WA5JNC 6, WA5BLI 5, W5NON 5, WA5MIY 3, W5PNY 2.

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

BUN	Daily	7272 kc.	1830Z
UARN	Sat.-Sun.	3987.5 kc.	1400Z

New officers of the BYU ARC for next year are K7RAJ, pres.; KØFNZ, vice-pres.; and WA7APT, secy. Communications for the Friendship Cruise in the Canyonlands country again was handled by amateur radio. Among those who participated were W7RQT, WA7BRS, K7SOT, W7DBR, K7HFV, WA7BME and WA7ICG. Many others stood by to receive messages from portable stations on the Green and Colorado Rivers. W7OCX, after the trip to the Board Meeting, went on to tour the Eastern U.S. and Europe. The Utah DX Assn. is planning a DXpedition to Wyoming in July. Official Bulletins can be heard regularly on 3935 kc. and 7272 kc. for OBS W7EM. A card or radiogram to W7EM or your

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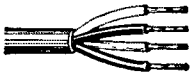

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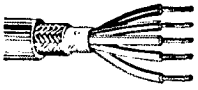

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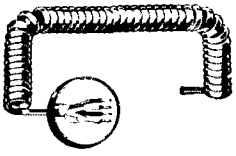

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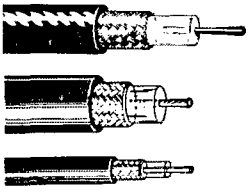

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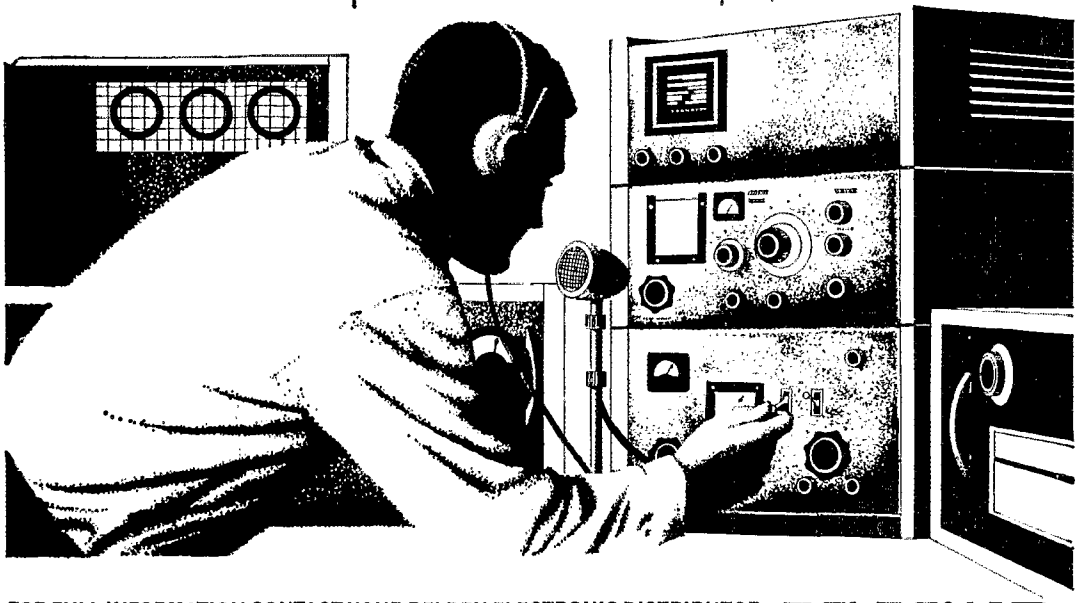

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SCM will get you an exact schedule of bulletins. Your latest operating news, such as changes in equipment, DX worked, etc., are always welcome for inclusion in the Station Activities column. Especially needed are regular reports on club doings. Traffic: K7HLR 345, W7EM 128, WA7BME 51.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: K7NQX. RM: WA7CLF. PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7NQX. Nets: Pony Express, Sun. at 0800 on 3920; YO, daily at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 7260; WX Net, 0630 Mon. through Sat. on 3920. It saddens me to report that W7YWY (wife of W7YJG) passed away in May. Evelyn was well liked and will be missed by all the Wyoming hams. Lots of v.h.f. interest this month: W7OBE and K7VTN are making regular contacts via a passive reflector on the summit. W7LVU and K7KMT have regular skeds on 2 meters and are looking into the possibility of a repeater on Casper Mountain. WA7EGK has applied for a repeater license. The Wyoming University Club is holding code and theory classes this summer. K7TAQ came home from vacation in May with a new transceiver and a new antenna for the home rig. Traffic: K7NQX 644, K7KSA 113, WA7DNZ 83, K7ITH 64, W7TZK 63, K7DEJ 47, W7YWW 42, K7SLM 24, K7VWA 24, K7QJW 12, K7AHO 10, K7YPT 7, W7OBE 5, WA7-EUX 4, W7GSQ 4, K7JED 3, WA7EGK 2, W7NKR 2, K7OAF 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4WHW—SEC: W4FPI. PAM: WA4EEC. RM: K4BSK. K4BSK recently assumed appointment as RM for the section. How about some of you fine c.w. operators dropping in on 3725 and 3575 and giving Earl a hand. We regret the untimely passing of K4PFM. John joined Silent Keys as a result of an auto accident on May 12. Make your plans to attend the North Alabama Hamfest in Huntsville, Aug. 17 and 18, 1968. This year the hamfest will be held in the Mall, on North Parkway. All events will be inside with 70 degree air-conditioning. All Alabama nets are now on Daylight Saving Time. We have a net and a time that should be convenient for all: AENP, 3955 kc, 0630 Mon. through Sat., AENT, 3970, 1630 daily; AEND, 3725, 1730 daily. AENM (s.s.b.), 3965 kc, 1830 daily; AENB (c.w.), 3757, 1900 and 2300 daily. The Alabama A.M. Net meets on 3955 at 1800 daily. V.h.f.ers can get into AENO on 50.54 Mc. 1915 Mon., Wed., Fri.; AENR, 50.52, 1915 Tue. and Thurs.; AENH, 50.7 2000 Mon. and Sat. Again, please note that these are listed in CDST. Traffic: (May) WA4FYO 143, WA4AVM 90, K4BSK 75, K4AOZ 54, W4MKU 53, WB4EKJ 39, WA4EEC 32, K4WHW 31, WA4AZC 14, WA4JSM 14, W4DGH 12, WA9NWI 9. (Apr.) WA4EXB 56.

CANAL ZONE—SCM, Russell E. Oberholtzer, KZ5-OB—The new SEC for KZ5-Land is KZ5JC. He is taking over from KZ5MV, who did a fine job during his term. Thanks, Mary. Anyone interested in joining AREC call the SCM or SEC. KZ5VF has a new FTDX-400 following in the footsteps of KZ5FN, who just got on the air with the same rig. KZ5FN, KZ5WR and KZ5LM all are enjoying stateside leaves. KZ50A and KZ50B operated maritime mobile aboard the SS *Cristobal* July 9 through July 13 and will again be operating southbound Aug. 28 through Sept. 1 and during the interim, mobile around the U.S. W4BWY/MM was hospitalized in the Canal Zone for a couple of weeks, giving a few KZ5s *an opportunity for an eye-ball QSO. Sorry it wasn't a* pleasure trip. Dallas. Traffic: KZ50A 63, KZ50B 24, KZ5FX 18, KZ5WR 11.

EASTERN FLORIDA—SCM, Jesse H. Morris, W4-MVB—Asst. SCM: William J. 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: WA4BMC. I had hoped that by now W4MVB would be through on the job up Virginia way and be back with us. However, such is not the case, but I hear that he has a new SB-101. Pinellas County has a new Emergency Coordinator in WA4BGW. Congratulations are in order. W4FPC and WA4FGH both sent their traffic reports in early because they are going on vacation. W8BZY/4 reports he has been elected secy. of the Indian River ARC now. *Congratulations*, Jim. WA4TJS is now all set up at his new QTH. He has a new Hallicrafters SR-46A transceiver and a 40-ft. tower. W4IYT, the SEC of E. Fla., reports that he is busy preparing the ground work for BEBA (Bring 'Em Back Alive). This is a very good public service that the hams of Florida have performed in the past for AAA. W4BKC reports that one of the Orlando gang really came up with a rare DX call on his license tag. He got 4KVFV instead of K4VFV. Oh well, nice try for a new country. Our newest reporting station, WN4JJH, says

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RBS-50	51	30	POPULAR MODEL FOR 3 EL. TRIBAND BEAMS AND QUADS.	WITH BUILDING MOUNT WITH WONDER GROUND POST	321.00 438.00
RBX-50	52	32	VERY HEAVY DUTY TOWER FOR STACKED ARRAYS AND LARGE BEAMS.	WITH BUILDING MOUNT WITH WONDER GROUND POST	424.00 571.50
6046	60	26	LOWER COST TOWER FOR SMALL 2 EL. QUADS AND VHF BEAMS ONLY.	WITH BUILDING MOUNT WITH WONDER GROUND POST	292.00 364.50
RBX-60	60	26	STANDARD DUTY TOWER FOR 3 EL. TRIBAND ANTENNAS AND QUADS ONLY.	WITH BUILDING MOUNT WITH WONDER GROUND POST	480.50 596.50
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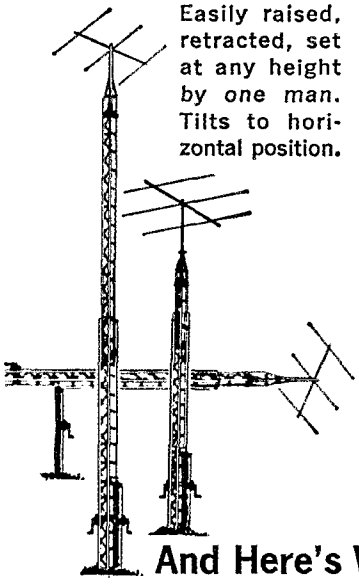
RBZ-66	66	33	EXTRA HEAVY DUTY FOR STACKED ARRAYS AND VERY LARGE BEAMS.	WONDER POST FOR CONCRETE ONLY	1259.50
RBX-70	72	31	STANDARD DUTY TOWER FOR 3 EL. TRIBAND ANTENNAS AND QUADS ONLY.	WONDER POST FOR CONCRETE ONLY	871.50
RBZ-75	75	35	EXTRA HEAVY DUTY FOR STACKED ARRAYS.	WONDER POST FOR CONCRETE ONLY	1426.00



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RBS-40 RBS-50 RBX-60 RBX-70	A-203C S-402 TA-33/40	DB-24 TH-3	TC-99D 40M-217M 20M-317B 10M-636	3 EL. QUAD
CRX-60	A-320 TA-36	TH-6	15M-532 20M-326B 40M-214 DB-30C TM-30C	4 EL. QUAD Short Boom
RBX-40 RBX-50 RBZ-66 RBZ-75	TA-20-40	205B	20M-646 40M-335	4 EL. QUAD

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that she spends most of her time on 15 meters trying to work WAS. Traffic: WA4SCK 634, WA4NEV 341, WA4-FGH 270, W4ILE 174, W4FPC 141, W4SDR 139, W8-BZY/4 98, K4DAX 82, W4UQZ 82, W4SMK 66, W4FP 59, WB4FLW 53, WA4OHO 53, K4LEC 52, WA4NBE 50, WA4HED 48, W4YPX 47, W4ZAK 47, WA4CIQ 42, W4-EHW 42, W4OGX 36, WA4PWF 33, WA4FJA 31, K4BLM 29, K4COO 26, W4LSR 26, WA4BGW 24, W4FHZ 23, WB4DSP/4 21, WA4TJS 21, W4BNE 20, K4LPS 18, W4IYT 15, W4BKC 14, WA4EYU 14, K4EHY 12, WB4-FSF 12, W4IAD 12, W4TJM 12, K4DSN 7, K4EBE 7, W4VPQ 7, W4SOM 5, K8LNE/4 5, K4SJH 2, WN4JJH 1.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: W4DDY. Asst. SEC: WA4WQU. RM: W4CZN. PAMs: WA4WQU, K4HQI. K4BAI now is on duty in Korea operating under the call HL9KQ. WA4UQQ reports that W4CZN is making long-distance telephone calls to deliver traffic. WA4CJN plans to be active by mid-summer after a training tour as a midshipman. WB4FMJ and K4HQI both report 6 meters as "hot." The band opens around noon and again from 8 to 10 P.M. local time. All U.S. districts as well as Cuba, Mexico and Canada. W4FEW, K4HQI and WB4FMJ are working with 2 meter a.f.s.k.

Net	*Freq.*	*Days*	*Sess.*	*QNI*	*QTC*
GSSN	3975 kc.	2000 & 2200 Dy.	46	918	161
GSSN	Late Apr. report		30	921	91
GSN	3595	1900 & 2200 Dy.	62	442	133
GTAN	3925	1730 Mon.-Wed.-Fri.	11	56	24
GTN	3718	1700 Dy.	14	50	18

K4HQI worked Arizona for No. 45 on 6. WN4GTB is working on an 829B final for 2. WB4FNS has a Swan 250 on 6. W4BGK has the XYL about ready for her ticket. W4HYW was active in the Ga. QSO Party. W4ARH/4 asks for more activity in the independent County Hunters Net at 1800Z daily on 14.336-kc. s.s.b. W4VE was elected pres. of the Marine Corps Reserve Officers Assn. Traffic: (May) W4FOE 272, W4CZN 95, W4PIM 61, WA4RAV 44, W4FDN 38, K4JFY 32, WA4UQQ 27, W4ARH 25, K4BAI 23, W4DDY 20, WB4EMF 20, W4-RZL 16, W4KE 10, WA4LLI 9, WA4JES 4, W4YE 4. (Apr.) W4DDY 43, WA4WQU 42, K4TXK 23, WA4JES 16.

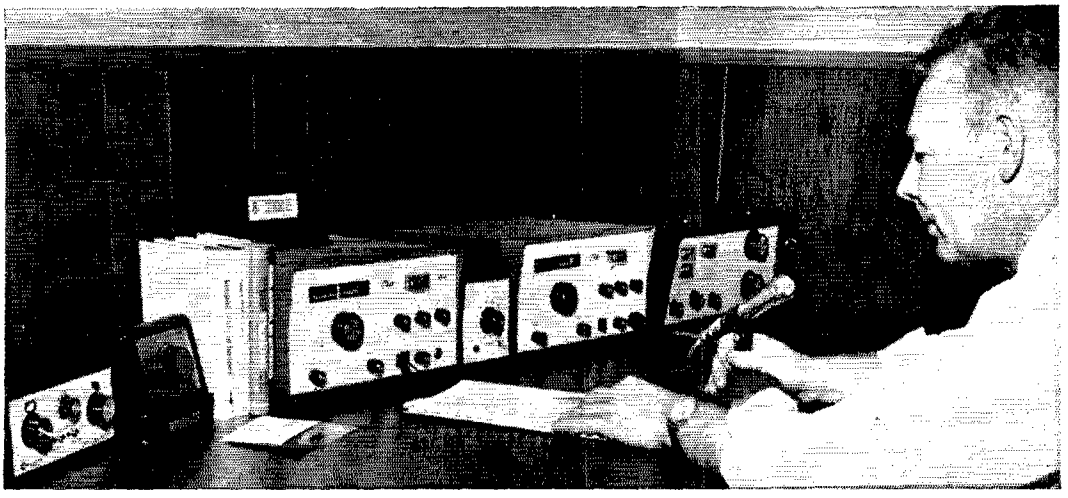
WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB. PAMs: H.F.- W7BNR/4. V.H.F.—W4UUF. RM: W4BVE. Section nets:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3957 kc.	2200Z	Daily	31	563	100
QFN	3651 kc.	2230/0200Z	"	62	——	——

Pensacola: WA4IZM left for an oversees tour. W4NOG has to resign as EC. Any takers? WA5KAK/4 made a nice score in the CD Party from WA4ECY. New USNCTC club officers are WA5KAK, pres.; WA3CRK, secy.; K3YWJ, supply officer. K4NMZ completed his 2-meter kw. linear. WB4DHL is on 2-meter s.s.b. as well as 6-meters. WN4JGY runs a DX-40 and an HQ-110 on 15 meters. Milton: WB4JRP just received his ticket and already has an S/Line. K4BDF/QOJ are QRL with their new home, Fort Walton: W4WBW and WB4HBY are newly-licensed. W4ZGS and the local 2-meter f.m. gang took part in the Red Cross SET. WB4GYX and W4BVE were loaded with traffic from Armed Forces Day at Eglin. The WA4EYU repeater was put to good use during a 2-day Scout Canoe Race. Marianna: Officers of the new club formed here are W4KCA, pres.; Ken Lester, vice-pres.; and WB4DFM, treas. The club meets every other Mon. at 7 P.M., at the Air Base. K4UNT took WA4DED's place as electronics instructor at F.S.B. Tallahassee: WB4JWZ is a new General Class: he runs a Galaxy III. Also new is WB4IXK. W4JGD put up a three-element 15-meter beam. Traffic: (May) WB4DHZ 126, WB4GYX 56, W4IKB 36, W4JGD 15, WA4EOQ 6. (Apr.) WA4ECY 66.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—PAM: W7CAF. RM: K7NHL. WA7CEM is the call of the new 2-meter f.m. repeater station located atop South Mountain near Phoenix. W7CEL is now on RTTY. WA7HRE has worked 52 countries using 65 watts. Among the new two-letter calls heard in our section is W7JN, formerly W7IMA. WN7ISP is now WA7ISP. Congratulations to K7RDH on completing his WAS with a Wyoming contact. Congratulations to WA7IF on receiving his ARRL Code Proficiency Certificate for 25 w.p.m. WA7INB has been appointed EC for the Sierra Vista Area. Traffic: K7NHL 196, K7MTZ 159, WA7IFD 102, W7FKK 11, K7RDH 4, WA7HRE 1.



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LOS ANGELES—SCM, Donald R. Etheredge, K6UMV—Acting SEC: K6AVQ. BPL cards were issued to W6GYH, WB6GGL, W6MLF, WB6BBO and W6DSC for their traffic handled during the month of May. WB6TVH is awaiting his new HW-100. WB6UHF has been working on a complete break-in system. The Palisades ARC has begun a code class Wed. evenings. WA6PVK is a recent recipient of the ARRL Public Service Award. K6QFG has a 25-w.p.m. certificate from W1AW code practice sessions and Code Proficiency run. W6HPE is now in the ranks of the Extra Class. W6MLF is involved with traffic from the USO in Hollywood. W6LDA is now K6EV. K6ROC-214 is now in the Air Force. K6JHX and W6IMD are new members of the WB6WPO group. K6BPC was reported active in the June V.H.F. Contest from "Image Mountain" (Mt. Wilson). W6MLZ recently operated K4NAA for a few days. WB6TSM has gone from 1296 Mc. to interest now in the 220-Mc. band. The Edison AR Net and the East San Gabriel Valley AREC provided communications for the 3rd Edison Golf Classic in Palm Springs recently with K6s AYT, BEP, CJM, KCO, W6s JQB, NQX, VBV, YAN, ZJZ, WA6s AXH, JXG, KLA, QZY. WB6s HIE, LOY and LOZ participating. A week later the East SGV AREC worked with parade control in Monrovia utilizing most of the above participants plus WA6s CJD, DNP, PAV, WB6s DZU, IQT, LXP, OCA, PQV, QZT, YPC. WB6VZD is working on a 2-meter a.m. battery-supplied transceiver. SOCON2 is now meeting on 146.1 Mc. at 0230 GMT. The Golden Bear Net 2 is on 146.57 Mc. at 0200 GMT. WB6SXY is now involved with Long Beach RACES operations. K6NA reports the 7-Mc. beam is going in the air shortly for the fall season. SCN members recently had a meeting at TRW Systems followed by a "Cook's Tour." WB6SCK has outdone himself with a supplement to the routing guide for SCN. Traffic: W6GYH 1410, WB6GGL 897, W6MLF 731, WB6BBO 573, W6QAE 355, K6CDW 236, WA6KZI 202, W6DSC 148, WB6SCK 84, WB6OLD 72, K6CL 63, W6OEO 49, W6BHG 39, WB6UHF 35, W6MLZ 31, WB6WDS 30, W6DQX 22, WB6YHD 19, WB6VZD 18, W6AM 16, WB6TMC 13, K6UMV 11, K6ASK 10, W6FD 8, W6TXJ 8, W6DGH 6, WB6SXY 6, K6EA 5, W6TN 5, WB6AEL 3, W6HUJ 3, WB6OUD 3, WB6SLG 2.

ORANGE—SCM, Roy R. Maxson, W6DEY—The Anaheim ARA, WB6FJE, pres., meets the 4th Mon. of each month at Keystone S&L, 555 N. Euclid at 7:30 P.M. Nets on Wed.: 50.304 A.M. at 8:30 P.M., WB6SAE NCS. 7.235 s.s.b. 9:00 P.M. WB6RQN NCS. The Fullerton RC, WB6KES, pres., meets the 3rd Tue. at 8 P.M. at Hillcrest Park Recreation Bldg. EC WA6GQJ, Inyo County, reports emergency communication plans for the area well organized. W6FB participated in Armed Forces Day with visitors W6DQE and WA6OBM/DU1DBT. The K6QEH Club has RTTY going. K6MBL, secy. of the San Bernardino Microwave Society, advises an article in *QST* covering the club's activities is expected soon. OO K6PWK has a new 75A-4. WB6PRP is operator again at K6MCA. Welcome back. AREC activities are a GO GO per SEC WA6ROF, EC WB6RVM, WB6RJX, WB6TYZ and many others. See details under doings of the AREC. OOs W6BUK and W6BAM took part in the recent FMT. John Trotter (W6BVX for 43 years) became a Silent Key on May 27. John and brother W6BAM and your SCM have been on-the-air friends for over 40 years. Support your local clubs and participate in AREC and RACES activities. Traffic: K6QEH 608, WB6TYZ/6 514, K6QEH 390, WA6ROF 386, WB6RVM 165, WA1JHZ/6 110, K6MCA 56, K6IME, W8ELW/6 19.

SAN DIEGO—SCM, James E. Emerson, Jr., WB6GMM—W6VNQ has taken over the duties of Manager of RN6 and is doing a fine job. WA6DEI, in addition to holding down the liaison spot between SCN and SDSW, is now RN6 liaison one night a week. W6CCM has been appointed chairman of the San Diego 200th Anniversary committee. Good luck, Dave. WB6WHM spent most of May keeping nightly skeds with WP6WEX aboard the Scripps Oceanography ship *RV Washington* on a scientific cruise off Baja, Calif. K6CAG is building a homebrew receiver to listen to the bands while on a year's tour of sea duty. During the month of May eight section members accounted for a total of 137 check-ins into the Southern California Net. SEC WA6KHN reports that both the 6- and 10-meter area nets have disbanded. RM W6BGF also relays that the SDSW, e.w., is thinking of disbanding. It would appear that most of our section members feel that our 75- and 2-meter phone nets are doing an excellent job and do not warrant duplication. Plans are in the works to have liaison between SCN and the 75-meter group. Traffic: (May) K6BPI 9503, W6VNQ 506, W6EOT 345, W6BGF 327, K6CAG 267, WB6UMT 198, W6SE 132, W6LRU 131, WA6QAY 54, K6HAV 39, WA6DEI 30, WB6VSQ 10, W6YKF 10, WB6GMM 5, WA6TAD 5, WA4KHN 4 (Apr.) W6SE 84.

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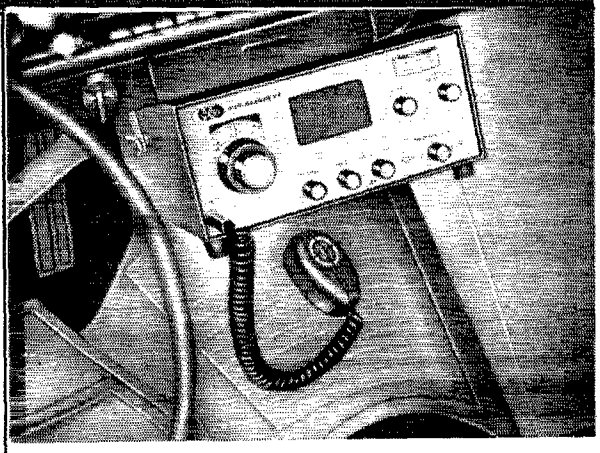

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SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—SEC: K6GV. New appointments: W6UJ as ORS and WA6CPM as OO. WB6WKC has been country-chasing but reports he is convinced he needs more power and a beam. WB6BWZ, EC for the Vandenberg AFB area, also is the MARS director of special projects and NCS for the MARS Net. W6ORW is trying to get on 2 meters but has problems. He, however, had no problem working all military stations during Armed Forces Day. WB6BWZ reports success also in working all Armed Forces stations. A new amateur club has been formed in Camarillo with the name of the Mike and Key Club. Call the following number in Camarillo for further details: 498-3846. The 3895 gang attended a pre-Field Day cook-out at the K6GV beach house. The Simi Valley ARC meets the 2nd and 4th Wed. at 8 P.M. at the Security Bank in Simi. The president is K6GV. The Ventura County ARC meets in Oxnard at the Community Center one Fri. night a month. Traffic: W6ORW 6, W6UJ 6, WB6WKC 4, WA6OKN 2.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LR. Congratulations to W5QKF on his election as a vice-pres. of the League. We hate to lose Doc as Director of the Division but I am sure he will do the League as good if not a better job as a vice-pres. The one thing that lessens the hurt of his resignation is the knowledge that we have a very capable and dedicated amateur to take his place. W5UYQ has done a fine job as Vice-Director and I think is well qualified to take over the office of Director. Congratulations, Ray, and I am sure you will have the cooperation and support of the West Gulf Division. As I write this I am feeling sorry for myself because I was not able to attend the National and West Gulf Convention in San Antonio. From reports I have received it looks like the Northern Texas section is going to be near the top as far as Field Day scores go. The Irving ARC had so many volunteers for the various jobs the club pres. made apologies for not being able to find jobs for all the club members. W5VSH has a fine Novice class going each Mon. night. K5DOA is running a class for prospective Generals and reports good attendance. Harpo Davis is now a Novice and a Technician, WA5SMO and WN5SMO. WA5OYH has a new Swan 250 6-meter s.s.b. rig. Traffic: K5BNH 770, WA5QQR 223, WA5QQQ 115, WA5TYH 80, WA5NSJ 50, K7NCG/5 22, W5QGZ 20, W5LR 19, W5JSM 18, W5MSG 2.

OKLAHOMA—SCM, Cecil C. Cash, W5PML—SEC: WA5AOB. PAMs: W5MFX, K5TEY, WA5JGU, K5ZCJ. I regret to report the addition of W5AZQ to the list of Silent Keys. The report from the Lake Texhoma Hamfest indicates a good turnout and a good time was had by all. Yours truly was not able to make it but our new Director, W5UYQ, reports about one hundred hams and their families attended. The meeting was highlighted by several real good technical talks. Amateur radio week as proclaimed by our Governor was observed in Oklahoma June 2 through 8 and received very wide publicity by practically every newspaper, and radio and television station in the state. Congratulations to new Advanced Class licensees W5HIM, K5MYS and WA5DZP; also to new Generals WA5UCK and WA5VAQ and to new Novices WN5UDK, WN5UMM, WN5UUT and WN5VCQ. Thanks and credit should be given where credit is due, which means the fellows at the Oklahoma City Central V.H.F. Club did their share in the Oklahoma City area. By the time you read this the Lawton Club will have graduated a new crop of Novices. The new club officers for the Lawton-Fort Sill Amateur Radio Club, Inc. are K5MBK, pres.; W5PWG, vice-pres.; K5DLP, secy.-treas.; WA5CUJ, social activities; WAØRBA/5, Editor. Net reports:

Net	*Freq.*	*Time*	*QNI*	*QTC*	*Net*	*Freq.*	*Time*	*QNI*	*QTC*
OPEN	3850	1300Z	189	5	OLZ	3682.5	0000Z	87	141
STN	3850	2230Z	635	156	SSZ	3682.5	0245Z	70	84

Traffic: K5TEY 2276, W5QMJ 209, WA5IMO 50, WA5KZA 39, W5PML 38, WA5KFT 30, WA5AOB 28, W5MFX 23, W5FKL 22, WA5DZP 13, WA5FSN 12, K5SWL 12, K5CAY 10, K5MBK 7, WA5MDN 7, W5UYQ 3, K5CBA 2, K5OCX 2, K5WPP 2.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. Congratulations to the San Antonio Club for an enjoyable National Convention. It was nice meeting the gang again and I am sure all enjoyed meeting the Headquarters gang. The South Texas Emergency Nets as well as the West Gulf Emergency Net check-ins have been holding up fine; also the TEX C.W. Traffic Net is attracting more operators. The West Gulf Emergency

No, we're not lazy! It's just that "Popular Electronics" (Dec. 1967) tells the DX-150 story so well.

Reprinted Without Editing

"What may be the first really noteworthy advancement in communications receivers is wrapped up in the new Radio Shack imported DX-150. Featuring continuous coverage from the top of the AM broadcast band (535 kHz) to the bottom of the 10-meter band (30 MHz), the DX-150 is a single-conversion superhet with a tuned r.f. stage, two i.f. stages, full-wave product detector for SSB/CW reception — and it's 100% solid state. Selling at $119.95, the DX-150 has the flexibility of a communications receiver that a ham or SWL is used to buying for $175-plus. To rattle off a few more "features": there is a front panel antenna trimmer, fast or slow a.v.c. attack, a cleverly concealed built-in monitor speaker, plenty of calibrated bandspread, and noise limiting in both the i.f. and audio stages. Because of the solid state circuitry, the usual warm-up drift expected with a tube-type receiver is virtually absent here. And, although the DX-150 is primarily a base station receiver with a 117-volt a.c. power connection, it can be operated from an outboard d.c. power supply consisting of only 8 D-cells. Radio Shack claims that the receiver will operate for 100 hours — continuously — using only the d.c. supply. Ideal for Field Day and emergency work! The proof of the pudding so far as any communications receiver is concerned is how well it works "on the air" At POPULAR ELECTRONICS, the DX-150 was hooked up to a 125-foot long-wire antenna and tuned across the AM broadcast band. Needless to say, the S-meter was pinned on just about every single channel, and the audio quality with Radio Shack's voice-selective speaker (extra, $7.95) was crystal-clear. Tuning the band between 1.55 and 4.5 MHz, your reviewer got a chance to appreciate the comfortable handling on SSB reception. Going a little higher (4.5-13.0 MHz), the 25- and 31-meter bands were "alive" and signals appeared to leap out of the air — possibly due to the very quiet background of the DX-150. While quietness is usually regarded as a lack of sensitivity, that wasn't the case with the DX-150. On the top band (13-30 MHz), the sensitivity still seemed high; and on the CB frequencies, the DX-150 could hold its own against a dual-conversion receiver built just for CB work. **Summary:** Radio Shack has the Model DX-150 in most of its 160 retail outlets. Take a look at it, and get the "feel" of this unusual receiver."

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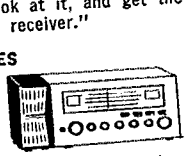
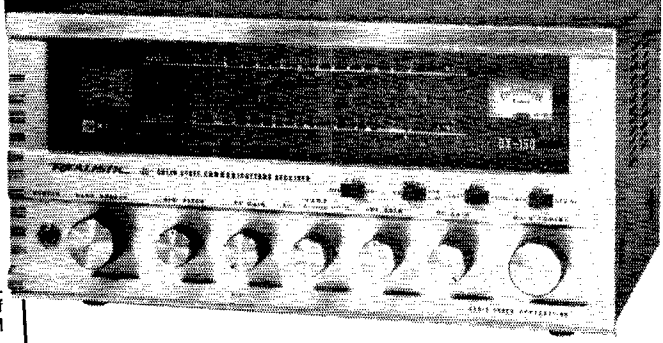
12 VDC Power Set



Matching Speaker



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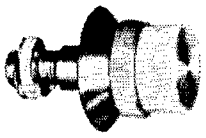
Net held a picnic at Milby Park. Members were talked in by K5HXR, EC Harris County, on 2 and 75 meters. The turnout was a little light but those who made it enjoyed a nice day at the park. W5ABQ advises he will discontinue the Novice speed bulletin on 3790 kc. until cooler weather. The Austin ARC bulletin was received and congratulations to K5EJL on the ARRL membership application at the bottom of the bulletin. *Off Resonance*, the Texas Southmost ARC bulletin, editor EC W5KR, indicates the Carbide ARC of Brownsville has been assigned the call WA5VEI. W5NGW is doing an excellent job as editor of the El Paso ARC *W5ES Bulletin*, as well as doing a swell job as OO. WA5KHE new Nacogdoches County EC, will be working 2 through 80 meters with 1000 watts p.e.p. on 40 and 80. It was real great seeing you-all at the convention. Traffic: (May) WA5QKE 176, WA5MBC 154, WA5LVJ 120, W5AC 65, K2EIU/5 60. W5EZY 58. W5ABQ 47. W5KLV 29. W5TFW 24, K5WYN 16. (Apr.) W5EZY 171, WA5MBC 118.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE-6TG—SEC: VE6FK. APSN PAM: VE6ADS. ECs: VE6SS, VE6XC, VE6PL, VE6AFQ, VE6AFR, ORSs: VE6BR, VE6ATH, VE6ATG, OPSs: VE6HM, VE6SS, VE6ATH, VE6AFQ. OOs: VE6HM, VE6TY. OBSs: VE6HM, VE6AIF. At this time I would like to thank all who took part in "Bring 'Em Back Alive" and would like to say that the same good job can be done for July and Sept. As the A.M.A. directors stated, the job would not have been successful without the ham mobile operators, and they thank you all. We have not heard VE6AAI on since she received her Advanced Class ticket. VE6WN has been quiet for the past few months. Our SEC reports no reports from ECs. If you can not write, let him know on the net near the end of the month. The Edmonton DX Club, with VE6PL at the wheel, is hitting the high spots with its meetings. We are very sorry to hear of the passing of VE6ALI, of Edmonton. Traffic: VE6HM 23. VE6FK 22, VE6TG 9. VE6SS 7. VE6AFQ 6, VE6BL 6, VE6XC 6, VE6AOO 4, VE6AFJ 2, VE6-ZY 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —VE7OT and VE7PO are in the hospital suffering from cardiac attacks. VE7EC is out of the hospital. One of our large chain stores is blessed with two managers with one thought. Meat Manager, VE7ABS and Grocery Manager, VE7BLD. The Northern Net meets on 3785 kc. at 0330 GMT Sun. and Wed. The Victoria Short Wave Club reports that your application for 1969 motor vehicle call plates will be in the mail shortly. VE7BJT reports he has been busy getting engaged and other foolish activities. VE8MD, who was VE7BCJ at Eisickson, is on 20. The Vancouver area 2-meter repeaters are North and West, VE7BYL, input 146.50, output 147.74; University ARC, VE7UBC, input 146.34 or 147.33 (preferred), output 146.58. The North and West Club's strength is growing in leaps and bounds. Burnaby ARC won its contest with the Burnaby Council and heights of radio masts. It is left as before and as set by DOT regs. Fort George reports its party was a thundering success, thanks to VE7WP. It is said VE7CN is coming out again. VE7BGX and VE7AWQ are now Advanced Class. VE7FG is on the air from City Hall with a 14AVQ and Johnson equipment. Traffic: VE7ZK 216, VE7FQ 16. VE7BLO 14, VE7FQ 14.

MARITIME—Acting SCM, William J. Gillis, VE1NR —Asst. SCM: R. P. Thorne, VO1EL. SEC: VE1HJ. It is with very deep regret that in this column we report the passing of EC VE1BL. His cheerful voice as net control for the NBARA and in many friendly contacts will be universally missed throughout the section. The Yarmouth ARC reports another successful Annual Lobster Supper and considerable interest in its code and theory classes. New SONRA officers are VO1BL, exec. pres.; VO1FY, vice; VO1CK, secy.; VO1JH, treas. and VO1GG, VO1FX, VO1CD, with VO1HF bulletin editor. ARC-OWL executives are VO2-AC, pres.; VO2AB, vice-pres.; VO2AJ, secy.; VO2RE, treas.; VO2EH, bulletin editor. Formation of the PEI Radio Society has been announced with VE1ARB, VE1AUG, VE1WA, VE1ATJ, VE1ACP, VE1UQ, VE1-AOL and VE1UA as executives. The Keith Rogers Memorial RC elected VE1ATJ, pres.; VE1ATS, vice-pres.; VE1ALO, SECY, VE1UE and VE1UA are soliciting material for a history of amateur radio on PEI. At a recent meeting of the NBARA executives it was resolved to renew efforts for call-letter license plates. VE1ZR is recuperating from a recent operation. VE1RO and VE1AMR are setting a good pace on APN. VE1FO is on the air from N.S. Tech., his first permanent set-up since 1939! New calls from Kentville include VE1s AVA, AVB, AVC, AVD and AVE. Traffic: VE1AUD 43, VE1RO 25.



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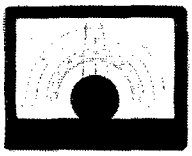

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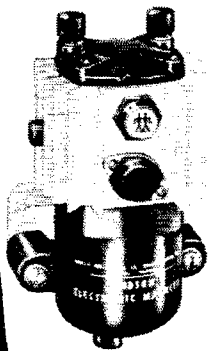

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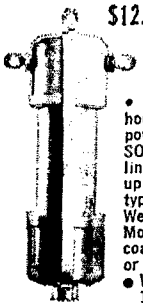

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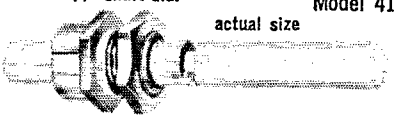
Model 4111/RV **$1.95**



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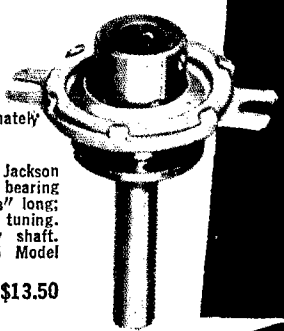

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ONTARIO—SCM, Roy A. White, VE3BUX—AREC Asst. National Coordinator: VE3YC. PAMs: VE3ETM and VE3BLZ. RMs: VE3AZB, VE3DPO and VE3EBH. In the absence of VE3BUX, this report was prepared by VE3BBQ. Congratulations to VE3BMJ and his XYL on the arrival of their first harmonic, a son. VE3BBO reports the winner of the Ontario Trilliums 1969 Convention Slogan Contest to be VE3FPP, of Oshawa. VE3GLZ suffered a broken leg in an unfortunate accident recently. Listen for him on 2-meter f.m. from the hospital. Also back in the hospital is old-timer VE3FOV, of Carrying Place. VE3CSH is a newcomer to the Belleville area and can be heard on 40 c.w. regularly. VE3DLB, in Colborne, is preparing to take the plunge to s.s.b. To reduce excessive travel in attending meetings the Niagara Peninsula gang is forming a new club with headquarters in Port Colborne to be known as the Niagara South ARC. It will be affiliated with the present Niagara Peninsula ARC, which henceforth will be known as the Niagara North ARC. Common events such as auctions, Field Day, etc., will be engaged in jointly. VE3FCW, VE3FYY, VE3FDI and VE3EBF are active on f.m. in the Grimsby, Fruitland and Hamilton areas. VE3ADO is reported to be doing a real FB job of securing RTTY gear for the Niagara gang. Congratulations to VE3CNA on obtaining his Advanced Class ticket. Also a fine welcome to five new members of the Scarborough Club, who have obtained the initial tickets—Wesley Lawford, Joe Willis, Ronald Nash, Fred Strang and Ralph Edwards. The Canadian DX Association now provides an outgoing QSL service for members. The address is P.O. Box 717, Station Q, Toronto 7, Ontario.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2ALE. *RM: VE2DR. PAM (v.h.f.): VE2AGQ. PAM (h.f.):* VE2BWL. SEC VE2ALE through his monthly reports shows at least three highway accidents per month reported by amateur mobiles to authorities. VE2BBL is going on the h.f. bands with a KW-2000. VE2DFW received his Advanced Class ticket but sticks to c.w. VE2DR continues his regular fishing trips. An antenna *construction bee is expected to put VE2HI really on* the s.s.b. map. VE2BAI, Chicoutimi, has accepted the AREC Net managership. The MARC has a fine looking certificate scheme. VE2IJ promises full details soon. VE2BGJ, with a change of address, has antenna problems. VE2DCW is active in the A-1 Operator Club. Tous les amateurs du monde entier sont invités à se mériter le diplôme de RAQI et tous les contacts effectués depuis le Premier janvier 1967, peuvent être valides pour l'obtention du diplôme. Les principales exigences sont les suivantes: A. Attestation de QSO avec 11 des douze districts de la province de Québec. B. Pour le Canada et les Etats-Unis: all districts sur deux bandes (22 QSL). Tout autre endroit: 11 districts sur 1 bande (11 QSL). C. Coût: $1.00 ou huit coupons internationales. Payable en fonds canadiens à l'ordre de: Radio Amateur du Québec Inc., Case postale 846, Québec (4). D. Les cartes QSL devront accompagner toute demande et seront retournées au candidat par la suite. Les districts sont: Abitibi, Hull, Montréal, Trois-Rivières, Québec, Chicoutimi, Bas du Fleuve, Montmagny, Mégantic, Sherbrooke, Iberille et Nouveau-Québec. Traffic: VE2OJ 82, VE2BRD 75, VE2DR 66, VE2BVY 48, VE2AJD 41, VE2ALE 28, VE2ADE 23, VE2EC 21, VE2CP 16, VE2DCW 16, VE2PJ 1.

SASKATCHEWAN—SCM, Gordon C. Pearce, VE5-HP—Watch for all details of our Saskatchewan Hamfest and Field Day in the next report. If plans materialize your SCM will be leaving with his family to eyeball with the Gs in England, Scotland, Wales and Ireland for a month. Also on the trip will be VE5JW, who will attempt to influence the continental amateurs. Anyone interested in a complimentary copy of *QSO*, the Saskatchewan Amateur Radio League magazine, just write to your SCM. The SARL is growing, growing, growing and looking for new members, including associates. A new award is out—it is called the ESK Award. You must work VE5VE, VE5WL, VE5HV and VE5GN with log dates subsequent to May 25 '68. Send your log entries to VE5GN at Esk, Saskatchewan. Traffic: VE5-RJ 20, VE5BO 17, VE5EQ 15, VE5CF 5, VE5VO 4, VE5FA 2, VE5LQ 2.

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How's DX

(Continued from page 93)

Russian entries outnumbered W/K filings about three to one. Mail those reports on last month's '68 LCRA shindig to HK3RQ & Co. as soon as possible, OMS . . . . . Announcement of this year's RCV (Venezuela) DX affair in July arrived too late for proper treatment here. Test managers world wide are reminded that most monthly ham periodicals, *QST* included, require notification roughly two months ahead of test target dates . . . . . Notes from the south by way of club publications: 9Y4LA sports an NC-200, 150 watts and vertical on Tobago isle. . . . HK9GQ (HK3GQ) may still be at it with his SR-150 and rhombic as you read this. . . . LABRE lads threaten another St. Peter & Paul production next month or next. . . . PZ1BX's return engagement in French Guiana is due in a few weeks.

HEREABOUTS—"DXCC²" (photo page 92, June *QST*, etc.) puzzles an occasional new reader. No, it's not an "award"; no certification is involved. Years ago we expressed interest in seeing a photo of somebody's collection of QSLs confirming QSOs with 100 ARRL DX Century Club members in 100 countries, hence DXCC-squared. Since then fifty-three such pix have arrived. The only "rule" we now stress is that said QSLs be from active DXCC members indicated in *QST*s of the 36 months prior to filing. All you get is acknowledgment here, our thanks, and a number—W5ODJ's No. 53 is the latest to date . . . . . "After nearly three years of interesting and rewarding operation in El Salvador I'm returning to W6GGR," writes erstwhile YS1THM . . . . . KP4DBJ (W1MBX) discovers, "The mainland switch to DST puts the east coast on Puerto Rico's AST. It's clearly evident in larger pile-ups in my morning operating periods." . . . . . WA1FHU encounters 16-year-old Extra Classmate WA1DRS in 80-c.w. DX doings. Laci also entertained visitor VK2ON in May, and reports DX hound W4KFC flogging the 40-meter key at AIR in Forces Day activity . . . . . "Had a ball on the most beautiful beach in this hemisphere," gloats W3EH on return from PJ5AH fun. "Twenty s.s.b. was beautiful, too, for ten straight nights." . . . . . K3CUI apprises us of a fresh definition for DX. It's a new type of Navy destroyer a-building in Maine . . . . . "I work mostly 14-Mc. c.w.," says W7ZC, glad to give Utah to all and sundry . . . . . Localisms noted in bulletins of DX clubs and groups: KL7FLB, 14,207 kHz, at 0730 GMT, still hails from Fletcher's famous ice island (T-3). . . . QSOs with three Curacao Radio Society members can net neat sheepskins via P.O. Box 383, Curacao, N.A. . . . K9GCE yearns to put Clipperton isle into the '69 ARRL Test. . . . Missionary VP1s RC and TC keep British Honduras on 20 and 15 sideband respectively. . . . VE3s ACD and EUU work on a deal to install a permanent Boy Scout station on hard-to-catch Anguilla . . . . . WA2YQB/mm and Shipmates aboard USS *Biddle*, now bound for Norfolk from the Pacific via long path, will especially welcome phone and code QSOs on several bands with midwest and eastern W/Ks. QST

Higher Class License Examinations

(Continued from page 76)

Answers to license quiz: Q1 — E; Q2 — C; Q3 — D; Q4 — E; Q5 — C; Q6 — D.

Following is the explanation of the numerical answers for the questions in Part V, July *QST*:

Q1 — The length, in feet, of a transmission line an electrical half wavelength long is

$$L = \frac{492\ V}{f(\text{Mc.})}$$

where V is the velocity factor of the line. The velocity factor of Twin-Lead is approximately 0.8, so a half wavelength at 7150 kc. would be

$$\frac{492 \times 0.8}{7.15} = 55 \text{ feet.}$$

This is the length specified in the question. The impedance at the input end of a half-wave line is the same as the impedance connected to the output end, and since the antenna impedance is 68 ohms the impedance at the input end of the line also is 68 ohms.

(Continued on page 140)

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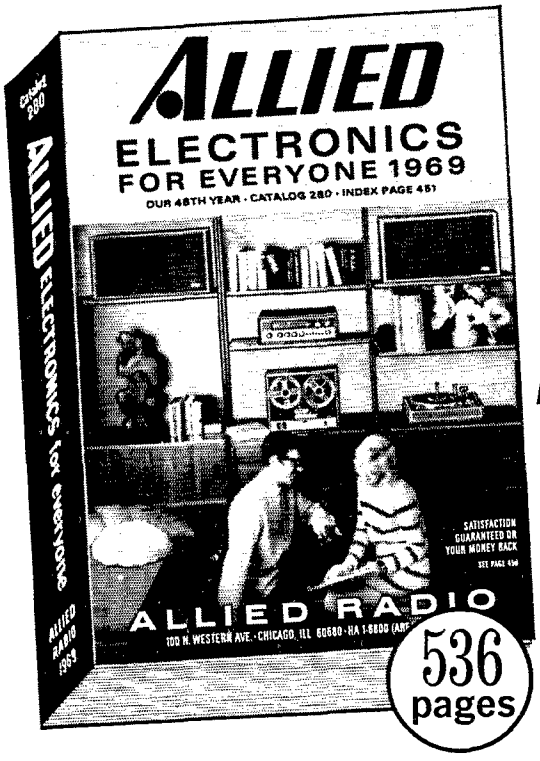

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Q2 The standing-wave ratio is the ratio of the line characteristic impedance, 300 ohms, to the load impedance, 68 ohms, and is therefore 300/68, or 4.4 to 1.

Q5 — The *nearest* voltage node is right at the current loop, so the distance is zero feet.

Q6 — The voltage standing-wave ratio is calculated from

$$V.S.W.R. = \frac{E_f + E_r}{E_f - E_r}$$

where E_f and E_r are the forward and reflected voltages, respectively. However, the forward and reflected *power* are given, so we must convert the powers into relative voltages. Since voltage is proportional to the square root of the power, the formula above becomes

$$V.S.W.R. = \frac{\sqrt{P_f} + \sqrt{P_r}}{\sqrt{P_f} - \sqrt{P_r}}$$

Where P_f and P_r are the forward and reflected powers. Since the square root of 225 is 15 and the square root of 25 is 5, the solution is

$$V.S.W.R. = \frac{15 + 5}{15 - 5} = \frac{20}{10} \text{ or 2 to 1.}$$

World Above 50 Mc.

(Continued from page 84)

And S/Sgt. Arthur E. Roberts, W5NWG, 460 RTS Box 8577, APO San Francisco 96307 would like to hear from 432 enthusiasts while he's stationed in Viet Nam.

1215 MHz. news comes from several sources this month. In Kansas, WAØJYK and WAØPWE are working with APX-6s, while the former is also working out 3300 MHz. klystron problems. On May 26th K7RKH and K7ZOK made a 5-mile contact for the first claimed 1215 MHz. two-way in Nevada. WB6IOM receives his echoes from the moon with 500 watts output and a 10-foot dish. These are received through a 2-KHz. mechanical filter and peak about 6 db. above audible threshold. Next month WB6IOM will tell us more about his 1296 e.m.e. experiments.

2300 MHz. finds some favor in Europe. A new distance record was made on January 21 when HB9RG, Switzerland, worked DJ4AU, Germany. The s.s.b. signals were 20 to 30 db. above the noise over the 208-mile path. The previous 170-mile record was established in July, 1963 by W1EHF and W2BVU. Other European 2300 MHz. work is being done by G3RPE, England, and F2FP, France.

In this country, W3GKP, Spencerville, Maryland is building various equipment for 2300. He has a 28-inch dish on a 75-foot tower, but is having difficulty with excessive feedline losses. He says even the expensive type N connectors can introduce a 2:1 s.w.r. W3GKP has built a crystal-controlled converter that tunes 2303.9 to 2304.1 and is fed into a 75S2. It is stable, holding zero beat for several hours, tuned to a varactor signal source.

Apparently the most active group of experimenters above 1000 MHz. is the San Bernardino Microwave Society, Dick Kolby, K6HIJ, president. Ed Munn, W6OYJ, reports attempts at a 10,240-MHz. contact between K6HIJ, Barstow, and W6IFE or W6SDE, Corona, a 90-mile mountain-obstructed path. Signals have been heard both ways so a contact is not far off. Most of the group's activity is now concentrated on 3300 MHz. QST

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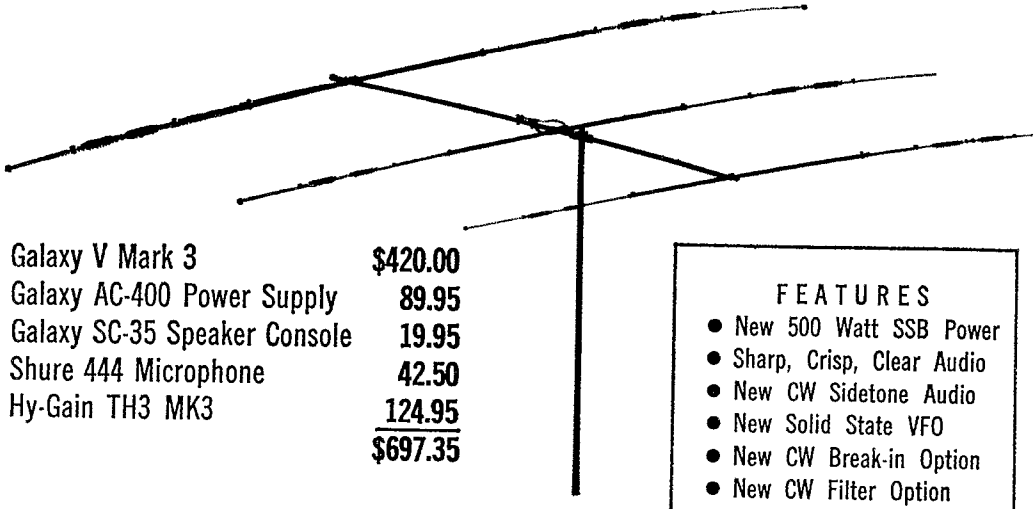

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W1AAA, Edward Bosma, Needham, Mass.
K1CFX, Nelson W. Hart, Nashua, New Hampshire
W1LFY, Leonard Oliver, New Bedford, Mass.
W2GC, Albert E. Sonn, Pine Brook, New Jersey
W2HTO, David Stuart, Baldwin, New York
W3QNH, Phillip Jones, Washington, D. C.
W3UE, H. E. "Lindy" Lindauer, Deale, Maryland
W3WNC, Hymen N. Hecht, Broomall, Pa.
W4EI, F. C. Huntley*, Manassas, Virginia
W4MTS, Claude "Shorty" Brock, Pisgah, Ala.
W4ZDV, John D. Boyle, Englewood, Florida
W5AQZ, Jack Stephenson, Oklahoma City, Okla.
K5AVP, Robert D. Spencer, Dallas, Texas
W6BRB, Lawrence J. G. "Larry" Kelley, San Bernardino, California
W6BVX, John O. Trotter, Santa Ana, Calif.
ex-W6EYV, Carroll E. Orchard, South San Francisco, California
W6FIS, Irven A. Weihe, Santa Monica, Calif.
W6ILJ, Roy Heckman, Elsinore, California
W6KTC, Cordis E. Ramsey, Los Angeles, Calif.
WA6OBF, Jeston D. "Jess" Atteberry, Palo Alto, California
W6REI, Joseph Carter, Long Beach, Calif.
K6UAF, Naomi J. Ballard, San Bernardino, California
WB6WJE, George W. Pennington, San Diego, California
W6WNG, Edward A. Schwartzenberg, Los Angeles, California
K7AX, Bruce Duncan, Seattle, Washington
WA7EBS, Anna L. "Lou" Daniels, Tucson, Ariz.
W7YWY, Evelyn DeBacco, Cheyenne, Wyoming
W8CZV, Robert "Bob" James, Akron, Ohio
W8HTU, William A. Powers, Dunbar, W. Va.
K8LMF, Bernard J. Bernon, Cleveland Heights, Ohio
W8MK, Kenneth L. Sliker, Canton, Ohio
WA8OUM, Bruno E. Alter, Jr., Charleston, West Virginia
K8PYS, Harry D. Boyer, Jackson, Michigan
W8RXI, Bob Ellerby, Birmingham, Michigan
W9ATQ, Nicholas P. Molitor, Aurora, Ill.
W9DSP, Willis J. Moulton, Chippewa Falls, Wisconsin
K9VQO, Wayne H. Peter, Rushville, Indiana
WØFOQ, Carl G. Strauss, Redfield, S. D.
WØHBF, C. B. "Chuck" Campbell, Louisiana, Missouri
WØUQ, Robert Leary, Clayton, Missouri
F8VI, Pierre Manhes, Cauderan, Gironde, Bordeaux, France
VE6LF, Kenneth Hutchinson, Edmonton, Alba., Canada
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A 65-Foot Crank-up

(Continued from page 21)

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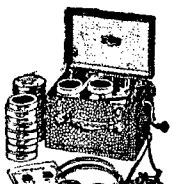

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supporting a four-element 20-meter Yagi with a 36-foot boom, and a 10/15-meter three-element unit 12 feet higher on a mast. Evaluation reveals that this structure should be capable of supporting in excess of 300 pounds of deadweight, and a wind load of at least 150 pounds. The cost of all materials, including guys, came to about $75 per tower. Although the tower cannot be said to be inspector-approved, since no inspection has been requested, we feel that the past performance is sufficient proof of its safety when properly installed.

This tower will probably support anything that you may now have, and perhaps a bit more. And, when you have it up there, you'll find, as I have, that you will hear and work more — definitely. But, in normal conditions, QRM will also be stronger.

In conclusion, I would like to thank VE2LO/-W6, WB6FYW, and WB6JWY who helped to bring this project to a successful conclusion. QST

The 1968 Simulated Emergency Test

(*Continued from page 56*)

NTS in origin, rather than from local drills." — *K3YVG, RM EPA, Pa.* "This was the first year the two 75-meter Pa. phone nets combined resources and operated on one frequency for the entire SET period. Although I organized everything on a last-minute basis, the operation was an overwhelming success. We were busy almost constantly, handling and clearing all traffic listed. There were no major problems and everyone had a lot of fun." — *K3MYS, PAM E.Pa.* "Good relay work was done by the VHF net serving areas of Northern New Jersey." — *W2PEV, Ass't Net Mgr. NJPN, N.J.* "We had a lot of fun during this SET, and worked with the local EC in a local SET also. Some of our NCS and liaison stations did double duty as others were not able to work the 40-meter frequency. Our 80-meter frequency, 3682.5 kc., was monitored continuously throughout both days of the SET, and participation with enthusiasm was unusually good." — *W5QMJ, RM Okla.* "Traffic was light on Saturday (45 handled), picked up on Sunday (64) and overflowed a little into the regular Monday NTS cycle. Participation dropped off significantly in the later sessions on both days, indicating fatigue or boredom. Boredom seems the more likely reason: most members can go for days without sleep, food or water in a good contest. Boredom is sometimes a very real part of emergency communications, however — waiting for decisions on what links are needed, or operating a link for which traffic is sparse." — *W8IMI, Acting Mgr. BN, Ohio.* "I feel that a real emergency would call for around-the-clock operations on all bands, not just 80 meters during the late afternoon and evening hours. We gain little knowledge of our true capabilities in an emergency by placing restrictions on the time we may operate. Emergencies are not confined to specified hours of the day." — *WØTDR, RM MON, Mo.* "No activity by AREC in Manitoba on SET weekend, so told the boys to help on TEN and CAN." — *VE4EI, RM.* "A few days prior to the Test, we sent every operator active on the traffic nets an 'operating manual' written in French, indicating how to originate messages, how to write them, how NTS is working. The purpose of the SET in the Province of Quebec was to encourage more originations and to have NCS that are not regular in the operation of the net. We didn't try to create additional routes or improve our coverage into remote areas, but I think that by showing all how to operate, we accomplished a tremendous step." — *VE2BWL, PAM.* "We still have the problem of the last session of the Area net running far beyond the time of the last sessions of region and section nets. This leaves quite a few stations loaded with carry-over traffic." — *W9HRY, RM Ind.* "The SET ran well this year, with more activity on all nets in the Washington section." — *W7ZIW, Mgr. WSN, Wash.* QST

YOU BET!

I would like to become a member of ARRL and help support its many services to amateurs and amateur radio. Here's my $6.50 (in the U. S. and Canada, $7.00 elsewhere). Sign me up for a year's membership and twelve big issues of *QST!*

My name .....Call.....

Street .....

City .....State.....Zip.....

(Please see the other side of this page for a list of available League publications.)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS-8-68

I would like the following League publications shipped to me postpaid. I am enclosing payment of $_____. (These prices apply only to the USA.)

Ship to this address:

NAME ..... CALL .....

STREET .....

CITY ..... STATE ..... ZIP .....

- ☐ **ARRL HANDBOOK** $4.00 — The standard comprehensive manual of amateur radiocommunication
- ☐ **UNDERSTANDING AMATEUR RADIO** $2.00 — Written for the beginner—theory and how-to-build it.
- ☐ **VHF MANUAL** $2.50 — A new and thorough treatment of the amateur v.h.f. field
- ☐ **LICENSE MANUAL** 50¢ — Complete text of amateur regs, plus Q&A for amateur exams
- ☐ **HOW TO BECOME A RADIO AMATEUR** $1.00 — All about amateur radio and how to get started
- ☐ **A COURSE IN RADIO FUNDAMENTALS** $1.00 — Use this in conjunction with the Handbook
- ☐ **ANTENNA BOOK** $2.50 — Theory and construction of antennas
- ☐ **SINGLE SIDEBAND FOR THE RADIO AMATEUR** $2.50 — The best s.s.b. articles from QST
- ☐ **THE MOBILE MANUAL** $2.50 — The best mobile articles from QST
- ☐ **HINTS AND KINKS** $1.00 — 300 practical ideas for your hamshack
- ☐ **OPERATING MANUAL** $1.00 — The techniques of operating your amateur station—DXing, ragchewing, traffic, emergencies, etc.

(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

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

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

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

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

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

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

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

LOUISVILLE Ham Convention, Executive Inn, Saturday, August 31, featuring fashions and wigs for the ladies. Manufacturer and Dealer Exhibits. DXers delight, state of the art forums, color ATV, semi-conductor seminar, Antennas, etc. Flea Market, HB-CW contest. Free coffee. $3.00/$2.50 advance to 648 South 4th, 40202.

PEORIA Hamfest, September 15, Peoria, Illinois. Same place as last year. For details, see September 1967 issue of QST. Hamfest Calendar. Advance registration: $1.50. Write: Ferrel Lytle, W9IDHE, 419 Stonegate Road, Peoria, Illinois 61614.

A.W.A. Historical Radio Meet for old time amateur and commercial operators, historians and collectors, Smithsonian, Washington, D.C. Oct. 5th. Write W2QY for details.

"SAROC" Fourth Annual Fun Convention scheduled January 8-12, 1969, in Hotel Sahara's new space convention center, Las Vegas, Nevada. Advance registration closes January 1, 1969. Ladies Program in Don the Beachcomber. Technical seminars, FM, MARS, RTTY, QCWA, WCARS-7255. Registration $12.00 per person entitles "Saroc" participant to special room rate, $10.00 plus room tax per night single or double occupancy, admittance to cocktail parties, technical seminars, exhibit area, Hotel Sahara's late show, Sunday breakfast equal to any banquet dinner. Ask any "Saroc" veteran. Brochure planned November mailing for details QSP QSL card with zip Southern Nevada ARC, Box 73, Boulder City, Nevada 89005.

13th Annual Hamfest by Four York County Clubs again sponsored at the Adams County Fair Grounds; 4 miles north of Abbottstown, Pennsylvania, September 1, 1968, rain or shine. Registration begins at 0900 hours. Talk-ins, 50.62 and 145.62 Mc. (A.M.) for the mobiles. York County hams were pleased with FM interest last year. This year greater emphasis is being put on the F. M. Swap and sell section. Talk-ins on 52.5 mHz and 146.94 mHz. There will be a portable repeater at the Hamfest on 146.34 mHz and 146.96 mHz. Plenty of eats, drinks, transmitter hunt—for XYLs. Auction bingo. For info, write K3POR, LeRoy Frey, 1705 Albermarle St., York, Penna. 17403. Keystone VHF Club.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 34th Annual Midwestern Hamfest, Sunday, August 11th, at Santa Fe Park, 91st and Wolf Road near Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, awards and a variety of activities for all. Clowns and games for the children, activities for the XYL while you enjoy amateur radio with friends and acquaintances. The Hamfest climaxes "Illinois Amateur Radio Week August 3 thru 11th" by proclamation of Governor Otto Kerner. For information and tickets write to Charles Borkowski, WA9TWA, 1851 W. 21st St., Chicago, Illinois 60608.

QCWA—Quarter Century Wireless Association is a nonprofit organization founded 1947. Any amateur radio operator licensed 25 or more years is eligible for membership. Write for information. A. J. Gironda, W2JE, 1417 Stonybrook Ave., Mamaroneck, N.Y. 10543.

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

QSLS?? Made-to-order. Largest variety!! State maps? Rainbow cards? Cartoons? Photographic? Religious? Samples 25¢. De-Luxe 35¢. Sakkers W8DED, Box 218, Holland, Michigan 49423.

QSLS "Brownie" W3CII, 3111 Lehigh, Allentown, Penna., 18103. Samples 10¢. Catalog 25¢.

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

C. FRITZ WSLs, samples 25¢. Stamps (deductible). Box 1684, Scottsdale, Arizona 85252.

QSLS—SMS. Samples 10¢. Maigo Press, Box 373, M.O., Toledo, Ohio 43601.

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

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

QSL, SWL cards that are different. Quality Card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015.

CREATIVE QSL Cards. Personal attention. Imaginative new designs. Send 25¢. Receive catalog, samples, and 50¢ refund coupon. Wilkins Printing, Box 787-J, Atascadero, Calif. 93422.

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

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

3-D QSL cards, recognized leader among raised designs. Compliments aplenty! Prized collector's item. Samples 25¢ (refundable). 3-D QSL Co., Monson, Mass. 01057.

QSLS, SWLS, WPE. Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

QSLS, samples, 20¢. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere, Massachusetts 02151.

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

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08848.

QSLS-100 3-color glossy $3.50; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

QSLS. Big catalog. 10¢. Fillcrafters, Box 304, Martins Ferry, Ohio 43935.

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

PICTURE QSL cards of your shack, etc. from your photograph. 500, $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.

QUALITY QSLS: Samples 25¢ (refundable). R. A. Larson Press, Box 45, Fairport, N.Y. 14450.

QSLS by K1FF, $2.00 for 100. Others at reasonable prices. Samples 25¢ deductible. K1FF QSLS, Box 33, Melrose Highlands, Mass. 02177.

QSLS's, Free samples, attractive designs. Fast return. W7IIZ Press, Box 2387, Eugene, Ore. 97402.

QSLS. Kromkote glossy 2 & 3 colors, attractive, distinctive, different. Choice of colors 100-$3.00 up. Samples 15¢. Agent for Call-D-Cals. K2VOB Press, 240 West Kinney St., Newark, New Jersey 07103.

QSLS. WA6QAY Press, 15008 Orchid Ave., Poway, Calif. 92054.

RAISED Lettering QSLs. Ace Printing, 6801 Clark Ave., Cleveland, Ohio 44102.

QSL cards. Finest quality. Economical prices. Fast service. Free samples. Little Print Shop, Drawer 9848, Austin, Texas 78757.

QSLS, 100, $1.25 and up' postpaid. Samples, dime. Holland, R3, Box 649, Duluth, Minnesota 55803.

RUBBER Stamps. Return mail delivery, postpaid. Basic price, $1.00 first line, 50¢ each additional line. Request type style chart. Fulton Rubber Stamps, Route 216-A, Fulton, Maryland 20759.

RUBBER Stamps. Four lines with call letters, $1.50 postpaid. Finest quality, fastest service. Sherman's Stamps, Box 234, Natrona Hts, Penna. 15065.

BADGES. Engraved laminated plastic 1" x 3". Call and your first name, also for "XYL" and "Jr. Op". $1.25 each, prepaid. Club badges designed. K6PBE, Box 1307, Alhambra, Calif. 91802.

NAMEPLATES. Call Letters, wall pressure-sensitive, $2.00; desk type, $2.50. Kronenberg, 1492 High Ridge Road, Stamford, Conn. 06903.

ENVELOPES! Amateurized wid ur call, adr! $12.00 per 1000. K3ZWA Press, R. 1, Elizabethtown, Penna. 17022.

QSLS. Finest, 10¢. Filmcrafters. Box 304, Martins Ferry, Ohio.

QSL. Free samples. CBM Printers, 5161 N. Hopkins, Milwaukee, Wisconsin 53209.

MANY Extras!! Free samples!! K.L.L. Press, Box 295, Martinsville, New Jersey 08836.

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.

3-D QSLS. The modern concept that makes all others old-fashioned. Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass. 01057.

QSLS cards. New owners, better service. Same good quality. Wayne Fannin, 707 Hilltop, RR 2, Bloomington, Ill. 61701.

CANADIANS: Collins KWM-1, speaker, AC supply, mobile mount, extra crystals. Also HT-37. Offers considered. VE7XF, 176 Baltic, New Westminster, B.C., Canada.

CANADIANS! For sale, in excellent condition: Viking Valiant with SB-10 adapter, Johnson Matchbox with standing-wave meter, SX-115 Hallicrafters receiver, Simpson wave meter, two mikes, key, auto-key and spare 6146s, and manuals for all equipment. Also, Johnson Adventurer TRX, $1000 for the lot, packed for shipping. VE3EPC, Wes White, Rolphton, Ont., Canada.

SWAP: QSTs 1947-1965 for parts H.B.R. 12. E. Bakker, 62 Cedar St., Brockville, Ont. Canada.

THE Ham-Dinger: Warren (Ohio) A.R.A. 11th Annual Hamfest, Sunday, August 25th, Newton Falls, rain or shine. Follow arrows from Rte. 534 or Turnpike Exit 14. Talk-in stations, 10-6-2. Swapshop homebrew-code contests, XYL-YL program, ragchews galore. Food sold, or bring picnic. For Hamfest Bulletin, write W.A.R.A., Box 809, Warren, Ohio 44481.

MOTOROLA used FM communication equipment bought and sold. W5BCQ, Ralph Hicks, 813B No. Federal Hiway, Fort Lauderdale, Florida.

WELCOME To Maritime Mobile service net. 14317 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.

TUBES Wanted. All types higher prices paid. Write or phone Ceco Communications. 120 West 18th St., N.Y., 11, N.Y. Tel: 242-7359.

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.

CLEGG Zeus, Interceptor, Venus with power supply. Mint condition, with manuals and factory cartons. Make offer whole or part. Barney Scholl, 1551 McDowell, Sharon, Penna. 16146.

HT-44 and A.C. Supply $250.00; SX-117, $225.00; SR-42 and VFO $150.00. All like new. W4MVC, 10 Carlen Ave., Asheville, N.C. 28804.

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, 1379 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

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 QSTS 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% of cost, some in stock. Professionally wired. Lan 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.

JOYSTOCK Variable frequency antenna systems solve space problems. Available immediately. SWL Guide, 218-S Gifford, Syracuse, N.Y. 13202.

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) WAlker 5-7003.

WANTED: Tubes and all aircraft and ground radios. Units like 171, 51X, 618T or S, R388, R390, GRC, Any 51 series Collins unit. Test equipment, everything, URM, ARM, GRM, etc. Best offer paid. 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.

WANTED: For personal collection: Learning the Radiotelegraph Code, Edition 4; How to Become a Radio Amateur, Edition 9; The Radio Amateur's License Manual, Edition 2, 11, 12. W1CUT, 18 Mohawk Dr., Unionville, Conn. 06085.

RTTY gear for sale. List issued monthly, 88 or 44 Mhy toroids, five for $1.50 postpaid. Elliott Buchanan & Assoc., Inc. Buck, W6PVC, 1057 Mandana Blvd., Oakland, Calif. 94610

WE'RE Trying to complete our collection of Callbooks at Headquarters. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington, Conn. 06111.

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.

SELL: CQ, QST, Handbooks, old radio magazines, any quantity. Buy old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif. 94062.

NOVICE Crystals: 40-15M, $1.33, 80M, $1.83. Free list. Nat Stinnette, Umatilla, Fla. 32784.

TOROIDS, 88 mh uncased, 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 73, Binghamton, N.Y. 13902.

SAVE. On all makes of new and used equipment. Write or call Bob Grimes, 89 Asten Road, Swampscott, Massachusetts, 617-598-2530 for the gear u want at the prices u want to pay.

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 TT/L-2. SASE for information. 88 Mh. toroids, uncased, 5 for $2.50. Herman Zachry, WA6IGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

TR-4, $480.00; AC-4, $83.00; DC-3, $123.00; R4-B, $360.00; T4XB, $360.00; MS-4, $17.50; RV-4, $83.00; L-4B, $580.00; W-4, $43.00; factory-sealed boxes, fully guaranteed. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. 27404. Tel: 919 299-8767.

1000 PIV 1.5 amp. epoxy diodes, includes by-pass capacitors and resistor. 10 for $3.75 ppd U.S.A. Fully guaranteed. East Coast Electronics, 123 St. Boniface Road, Cheektowago, N.Y. 14225.

ESTATE Liquidation. SSAE brings list quality equipment. Paradd Engineering, 284 Route 10, Dover, N.J. 07801.

TOOOBES—Tranzeesters: New, unused, 6146B, $4.00; 6CW4, $1.60; 811-A, $4.25; 417-A, $4.50; 6146-A, $2.95. Free catalog. Vanbar Distributors, P.O. Box 91z, Paramus, N.J. 07652.

AMATEUR Paradise Vacation. Livingstone Lodge, Mascoma Lake, Enfield, N.J. Cosy cabin for two weekly, $55.00. Swimming, fishing, boats, sports, ham radio. Dartmouth golf, tennis. Hot showers, fireplaces, light housekeeping, children half. Lake shore camp sites. Literature, A1, O. Livingstone. W2QPN, 12-01 Ellis Ave., Fair Lawn, N.J. 07410.

PROP Pitch rotors, excellent, small 10:000:1. $45.00. John Link, 1081 Aron St., Coca, Fla. 32922.

3000 V @ 3MfF brand new GE Pyronal oil capacitors, $3.00 each. Can mail, 3-lbs. each shipping weight. FOB P. Wandelt, RD #1, Unadilla, New York 13849.

TELETYPE Gears, shifts, keytops, typebars, motors, forks, typeboxes, typewheels, punchlocks, nonoverliners, CR-LFs TRs, TDs, KSRs, ASRs, FSCs, toroids, fresh paper, testsets, SRT subchasses. Buy, too! Typetronics, Box 8873, Ft. Lauderdale, Fla. 33312.

HAMMARLUND HQ-170C, factory installed I.F. noise blanker, speaker, manual, 6M preamp, $185.00. No scratches. W2-UPC. 75 Crestview Road, Mountain Lakes, N.J. 07046.

WANTED: Tubes, Diodes, Transistors and integrated circuits. Astral Electronics Corp., 150 Miller Street, Elizabeth, N.J. 07207. Tel: (201)-354-2420.

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.

WRLS Used gear has trial-terms-guarantee! 99er, $79.95; SR-46, $99.95; HW-12, $89.95; SR-150, $299.95; Galaxy V, $289.95; V Mk 2, $329.95; Viking II, $79.95; GSB100, $169.95; HA-10, $189.95; 75A2, $189.95; SX-101A, $189.95; NC-300, $149.95; RME6900, $159.95. Hundreds more, low prices. Free "Blue-Book" list. WRL, Box 919, Council Bluffs, Iowa 51501.

YAESU FT-DX-400 transceiver for sale. W8AO, 2912 Riverview Blvd., Silver Lake, Ohio 44224.

RTTY, Model 15 teletype and Barker & Williamson dual diversity converter. $75.00. K5GFB, G. M. Anderson, 520 Pasadena Ave., Metairie, La. 70001.

CATV Field Engineers! Challenging opportunities to be the technical representative of one of the leading CATV manufacturers. Position requires individuals with technical communications background and ability to "get the job done" with minimum supervision. Extensive travel required. Kaiser CATV, P.O. Box 9728, Phoenix, Arizona 85020.

TO Settle estate of W2ARW: Sell Collins KWS-1 with new 4CX250Bs, $550.00; Collins 310B-1, $75.00; Gonset 2 and 6 meter VFO, $30.00; Millen 2-6-10 meter transmitter and modulator, $65.00; Hallicrafters SX-101-111A, $150.00; SX-71, $100.00; SP-44, $50.00; Sonar SRT-120, $50.00; Heathkit HO-10 modulation monitor, new, $50.00. Send for list of other goodies. Will pack and ship collect. W2FNF, Mike Rosenberg, 35 Strawberry Lane, Roslyn Heights, N.Y. 11787. Tel: 516-MAI-4798.

SELLING Out: Homebrew crystal controlled RTTY FSK unit, OK, $8.00; D-104 mike/stand, FB, $11.00; RD-60 w/inked tape code recorder, w/filter, variable speed, etc. as is, gud shape: $19.00; Heathkit max. 200 w. isolation transformer, metered, fused, $7.00; Hallicrafters T-O keyer, HA-1 and Vibroplex T-O bug, perfect, $59.00. Explor-Air, shortwave receiver, 5-30 Mc., half works, $5.00; homebrew Handbook electronic keyer, OK, $13.00; ART-13 autotune transmitter, semi-converted to 10 M and 110 VAC, $11.00; RME-45 6" PM speaker/cabinet, $4.00; Bell sound speech input amplifier (receiver/transmitter) or P.A. w/handset and attenuator, excellent, $48.00. Prices f.o.b. Add 50% shipping. K. Kruse, East Shore Drive, Unionville, Conn. 06085.

WANTED: Collins F455J21 filter for 75A-4 receiver. Please state condition and price. B. Hallaway, WØHBT, 6101 France Ave., So., Minneapolis, Minn. 55410.

SELL N.C.L. 2000, $325.00 f.o.b. Flushing, Michigan F. D. craig, 205 Circle Drive, Flushing, Michigan 48433.

SELL: Heath HA-10 amp., in excint condx: $165.00. Link 1907 FM base-station with mobile transmitter and receiver. Needs work for 2 meters: $125.00. My handicap limits hamming. Ron Perry, WA2CGA, RD #1, Fishkill, N.Y. 12524.

WANTED: Collins 32S-1, 75S-3, 30L1. Must be mint with manuals. Will consider complete Collins station if price is reasonable. WA6JWK/4, 2304 N. Florida St., Arlington, Virginia 22207.

DRAKE L-4B with p.s., less than two hours in actual use, $500 cash. REA charges on shipment collect. Drake R-4A, mint condx, $275.00. TA-33 Jr, $25.00. WB4GGE, P.O. Box 372, Kingsport, Tenn. 37662.

SELL: Hy-Gain traps 40-80, pair $8.50; large variable capacitor 100 pf. and 75 pf. .2 airgap, $3.00 each. Eldico 2-meter receiver, $8.00. W2WHK, 210 Utica St., Tonawanda, New York 14150.

JOHNSON Ranger, $85.00; Heath Cheyenne $45.00; HP-10 mobile power supply, $20.00; National 173, $65.00; General Electric single sideband selector YRS-1, $20.00. All are in gud condx. Kenneth Hedstrom, 3418 Gabilan Way, Sacramento, California 95821.

WANTED Lampkin mod. 105B frequency meter and modulation meter model 205A. XE2Q, J. R. Agraz, P.O. Box 544, Hermosillo, Sonora, Mexico. Tel: 3-54-46.

WANTED: Ink code tapes for TF-34A code machine. Mack Owen, 206 arron Ave., Thomaston, Ga. 30286.

FOR Sale: Heath Marauder HX-10. In gud condx. $125.00. D. Thelin, WB2IRG, 60 Hammond St., Jamestown, N.Y. 14701.

FOR Sale: Vibroplex semi-automatic bug, good, $6.00; meters, all new: Simpson 0-500 VDC, $4.00; G-E, 0 600MADV, $4.00; Honeywell 0-20KVDC, $9.00; Burlington 0-300 VAC, $4.00; G-E 0-750 MAAC, $7.00; Simpson voltohm-ma, four scale 0-1500 ACV/DCU, ohms 0-3000, $11.00; Johnson 0-30 *PSI pressure meter, $8.00; Weston 5-50 Ma sensitive relay over* current meter, $13.00; 3-scale Western Electric volts-MADC, 0-4 & 20/MADC and 0-400 VDC, FS=200 mfd. A, $9.00. Alltronics-Howard RTTY converter, perf. condx, $29.00; New 3ABP2 5" CRT, $11.00. Linear Systems, Century 100 12 VDC, transistorized mobile power supply, new, 850 VDC, max. output w/remote control, $49.00. *RTTY tuning forks, 87.6/180* VPS, $6.50. Prices F.o.b. Shipping ch., add 50%. K1NN C. Kruse, East Shore Drive, Unionville, Conn. 06085.

WANT: Plug in spares for AN/SRR-13 receivers. Must be like new. N. K. Thompson, 5 Palmer, Gorham, N.H. 03581.

FOR Sale! Clegg Zeus 6 & 2 meters 185 watts with manual A-1 condx; one owner. $275.00, plus shipping. Maurice Harvey, K2SVV, 138 N. Baldwin St., Johnson City, N.Y. 13790.

PRINTED Circuit boards made to your specifications from schematic to finished board. Stafford Electronics, Greensboro, North Carolina 27401.

WANTED For private collection: de Forest parts and panel units for de Forest 15 panel unit receiver, loose couplers, slide-tuning coils, cased variable condensers, early receivers, spark gear. Describe condx and price. Glen Angle, KØTAM, Clear Lake, S. Dak. 57226.

INSTRUCTOGRAPH AC with 11 tapes, instruction booklet and Johnson High Speed hand key, in perf. condx; $40.00; DPZ window antenna, 10-15-20 meters, perfect, $15.00. Phil Gedaly, 41-15 50 Ave., Apt. 3P, Long Island City, N.Y. 11104. Tel: ST6-9372.

HEATH HW-12 transceiver, in exclnt condx. $95.00. Stan, 408 Anderson Ave., Closter, N.J. 07624. Tel: (201)-768-4760.

AR88D RCA *General Coverage receiver. Clean, manual,* working; spare tubes. Make offer. Pick-up deal. W2GVT, 157-28 18th Ave., Whitestone, L.I., New York 11357. Tel: (212)-FL-3-0914.

COLLINS 75-A1 receiver, in excellent condition: $140.00 firm. K3RWY, M. M. Kovar, 1642 Martha Terr., Rockville, Md. 20852.

3" scope tubes, 3ACP11A, at $2.00; 3DP1A @ $2.00; 1625 @ .50. Realistic TV marker and bar generator, $25.00. G. J. Pollock, 514 Wilde Ave., Drexel Hill, Penna. 19026.

COLLINS 75A3, calibrator NRFM adapter, speaker in mint condition $200. Julius Galin, W1EA, 71 Hilldale, West Hartford, Conn. 06117.

P&H LA-400C linear; 800PEP, 400CW, with spare tubes, $95.00; Drake 2B, speaker Q-miltinlier, extra crystals and crystal calibrator, $175.00. Want Collins 30L-1, will trade or cash. K1YYC, 14 Tonetta Circle, E. Norwalk, Conn. 06855.

WANTED: Drake T4X transmitter with power supply or Heath HX-10 Marauder transmitter. Must be in excellent condition, with no alterations. Please state age of the unit, serial number, and if you are the original owner. Contact WB4FNN at 1311 Sherwood Drive, Johnson City, Tennessee 37601, or please call 615-926-2471.

YOUR Call engraved on white plastic with black letters, or reverse. Choice lapel bar or tie-clasp, $1.45. Also 1½" x 6" wall signs, $2.95. W2DF, Gorby, Box 213, Farmingdale, L.I., N.Y. 11735.

SR-2000 Hallicrafters with power supply, new condition. First certified check or m.o. for $900 takes it. Paul Grauer, WAØLLC, Box 190, Wilson, Kans. 67490.

WANTED: *Central Electronics 200-V exciter/transmitter,* preferably including 160-meter, 1750-2500 kc, and all other broadband coupler coils 80 through 10 meters, with crystals. MM-2 'scope analyzer, Johnson or Millen 1000 watt Matchbox, without SWR indicator, Johnson HA-6 and HA-2 transverter, with power supply. TTY grade man. No junk. Will trade or *negotiate. Jack W. Williamson,* W5PJS, 127 Patton Ave., Shreveport, Louisiana, 71105.

SELL: Hallicrafters Hurricane Transceiver SR-2000, PS-2000 factory-sealed, unopened cartons. Warranty. Sacrifice offers. E. Grieco, 54 Andrew St., Meriden, Conn. 06450. Tel: (203)-235-9944.

COLLINS KWS-1 and 75A-4, all new tubes. Will deliver. Jeff Marsh, 4913 Elmhurst, Royal Oak, Michigan 48073. Tel: (313)-549-7263.

SALE: Heath 10-21 'scope, demodulation probe, Lafayette audio, generator, $50.00. William Karl, 24 Mill Street, Coopers-town, N.Y. 13326.

JOHNSON Invader 2000 VOX, SSB-AM-C.W. Spotless, like new condx, Microphone and m'sc., included. $1200 when new. Now only $465.00. Andy Kohler, 4710 Norquest Blvd., Youngstown, Ohio 44515.

FOR Sale: Drake T-4X, $325.00; MS-4, $10.00; AC-3, $70.00; R-4A, $325.00. Swan Mk I linear, $425.00. All $1095. Also Heath SB-610, $50.00. Gonset GPP-1, $75.00. K2MRB, N. Lifen, 491 Mayhew Ct., So. Orange, N.J. 07079.

FOR Sale: Hallicrafters HT-40 xmtr, $40.00; SX-140 rcvr, $70. Both: $100. Eico 710 grid dip meter with coils, $15. Ameco TX-62 with VFO-621, $140; B&W electronic T-R switch, Mod 381B, $25. All equipment in good working condx, with all manuals. Send certified check. Will ship collect. WB2TBW, Ken, 32 Owen St., Westbury, L.I., N.Y. 11590.

FOR Sale: Hy-Gain 3-element Tribander antenna, $50.00. F.o.b. KØHPG, 1507 5th Ave. NE, Jamestown, North Dakota 58401.

WANT To buy: S.S. Clegg Booster for 6 meter. E. W. Antonson, 4206 Lombard St., Duluth, Minn. 55804. WAØQHC.

WANTED: New 3-1000Z, 4-1000, or two 4-400s. PAØAFN/ *W1, P.O. Box 87, Topsfield, Mass. 01983.*

SELL: Two meter Gonset IV, mobile antenna, crystals. $175.00. Buford Sample, RR #2, Brighton, Illinois 62012.

HAM: T-60 Knight transmitter 3 xtals, in excint condx, manual, $38 postpaid and insured. Jon Fortune, WA9TTO, 225 S. Hickory, Arthur, Illinois 61911.

RECEIVER, Hallicrafters 101 Mark III and speaker; smtr Hallicrafters HT-37; D-105 mike, new; Vibroplex, like new, straight key, new; Mosley vertical for 40, 20, 15 and 10 meters, trap, new; headphones; callbooks, foreign and local, 1968 issue. Dow-Key changeover relay; SWR Bridge. All instruction books. Extra tubes, co-ad cable. All in perfect condx. Package deal: $350 buys a complete station. W2LZW.

HEATH HW-10 Shawnee 6-meter transceiver. $125.00. In excint condx. Home-brew 6 meter 700 watt linear, $200. Richard Tashner, WB2TCC, 163-34 21 Road, Whitestone, L.I.,N.Y.11357.

FOR Sale: SBE-34 with microphone, $250.00; Ameco TX-62 *and 6 and 2 Vanguard converters with power supply, $125.00.* HE45B 6 M. transceiver with VFO $50.00. WA1XI, 133 Thornridge Drive, Stamford, Conn. 06903.

2000 Watt Galaxy Linear and supply. Absolutely mint. Maintained by first phone licensed engineer. Like new in original factory cartons. Spare finals. Shipped prepaid, $300.00. W2DAP, 21 Twisting Dr., Lake Grove, N.Y. 11755. Phone (516). 588-7598.

LEAVING Chicago. Sell operating station, factory overhauled: HT-32A, SX101A, $400.00 both. Heath HA-10 linear 1,000 w. PEP. New tubes, $175.00; all for first check for $525.00, plus shipping. TA-33 beam, 55 ft. fixed tower, Ham-M rotator, $150.00 plus buyer takes down and removes this 2-year old equipment. K9KWV, Abramson, 2942 Jarlath St., Chicago, Ill. 60645.

QST: 400 copies, 1930 to 1950, cheap. Send requirements. s.a.s.e. W2CE.

GOING transceiver. Sell HT-37, $215.00; HQ-110A, $140.00. 6'er, $35.00 or all for $375.00. Send for information. Tom *Fitzpatrick, WB4TOT. 1923 Oxford Cir., Lexington, Ky. 40504.*

MODEL 15, with local loop supply, W2PAT converter, and a.f.s.k. oscillator, in excint condx: $125.00 or your best offer. K10JQ, 187 Phipps Street, Quincy, Mass. 02169. 617-PR-3-0284.

HALLICRAFTERS HT-32B. $275.00; NC-300, $125.00; matching pr 813s, grounded grid linear with power supply, $50.00; TR-4 with a.c. power supply and speaker, $500.00. Beautiful. K6SUQ, 5 Rydal Court, Orinda, Calif. 94563.

SALE: HQ-160 in better condx, manual, $145.00. H. Wallace Jones, 530 Iowa, Aurora, Ill. 60506.

COMPLETE KW rig, in gud condx: Gonset GSB-100, Heath HA-19 linear, Drake 2B and 2BQ with xtal cal., $625.00. WB4-FBR, 3417 Noble, Titusville, Fla. 32780. Tel: (304)-269-3865.

HAMMARLUND HQ-110. $125.00. John Seboldt, WAØQXG, 4701 Sunnyview Drive, St. Louis, Missouri 63128.

FOR Sale: KWM-2, No. 11,400, Noise Blanker, 516F2 (or PM2), $800; 516F2, $95.00; PM2, $100.00; HT33A, $250.00; *SM-1 microphone, $25.00; C-E 20-A, $70.00; C-E "B" slicer,* $45.00; Linear Systems 250-12, $65.00; Leece-Neville 100 amp system, $100; 75A-3/vernier knob, $25.00; Simpson #303 VTVM, $50.00; HW-32, $65.00; F-500B31 (51J4), $35.00; Capacitors: 4 mfd/5000, $6.00, 15 mfd./1500, $3; 400 MFD/450V., $1.50; UTC S-45, $5.00; Eimac 4-400-A, $10.00; 351D-2 (KWM-2), $75.00; E-V 664 and stand, $28.00. Transformers: 115/1300 @ 3.0 amps. $20.00; Collins filters, F300Z-4, F300Z-5, $15.00 each. Wanted: KWM-1, serial over 1000. Eldico SSB-100F, under $200.00. James W. Craig, 29 Sherburne Ave. Portsmouth, N.H. 03801.

WRITE, phone or visit us for new or reconditioned Collins, Drake, Swan, National, Galxy, Gonset, Hallicrafters, Ham-*marlund, 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, Mo. 64730.

ALL American OMs, XYLS, YLs visiting Spain are welcomed by Old Timer V. S. Alexandersen (T-2X, E13CX, ES3CX, (1925-1936) at his home in Palma de Mallorca (Baleares) Espana.

PREPARE For new FCC exams! You need Posi-Check. Multiple choice questions, diagrams, explained answers. IBM sheets for self-testing. Same form as FCC exams. General Class, $3.25; Advanced Class, $3.50; 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 Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322.

FOR Sale: Ham station, consisting of HT-44 transmitter with power supply and National NC-155 receiver. Relays included in the station. WB2DWJ, John Nella, 86-27 121st St., Richmond Hill, N.Y. 11418. Any reasonable offer acceptable.

WANTED: HW-12, 22, 32, preferably in non-working condx. *State price.* WA9NLA, 1332 Madison, Dyer, Indiana 46311.

CLEANUP. Bird wattmeter, elements, meters, 432 Mc., 1296 Mc., 20-10,000 mc. gear, military version S/Line, HA-6, HA-2, accessories, reasonable. List for stamp. W4API, Box 4095, Arlington, Va. 22204.

T-150A, T-R switch, $65.00. Never used Vanguard 20 meter converter, broadcast band I.F. $14.00. WA5KQN, George Marzloff, 7237 Anne, Arabi, Louisiana 70032.

WANTED: Johnson whiploader antenna coils. W4YOK, 2100 Scherm, Owensboro, Kentucky 42301.

SELL: Mint HT-37, gud RME 4300, 4301 slicer: $310.00. LaVern Smith, 3104 Catherwood, Indianapolis, Ind. 46226.

ONE Kilowatt DC linear amplifier, $100 or Drake 1-A. WB2-OLN, Tel: 516-764-8882, Rockville, Centre, L.I., N.Y. 11570.

MINT SB-10 with MK-1 kit, all manuals, $70.00; deluxe Joystick indoor antenna system, $17.50; Elmac AF-67 with six meter band and Shure mike, $50.00. W. M. McDonald, W4-PXM, Dadeville, Alabama 36853.

COMPLETE 40 meter cw. station. 15 watts, modified ARC-5 receiver, portable, compact, ready to go, $35.00; Gonset Super Six converter, $10.00; Johnson mobile transmitter, with manual, $20. All inquiries answered. WB6MNS, 440 N. Mentor Ave. #11, Pasadena, Calif. 91106.

FOR Sale: TR-3, RV-3, AC-3, $500.00; Collins KWM-1, ac power supply, wattmeter, speaker, console, $325.00, Collins 75A3, plug-in product detector, with .5 and 3.1 kHz mech. filters, $225.00. K1KTH, Conant Road, Lincoln, Mass. 01773. Tel: 259-8779 evenings.

WANTED: Swan 350 and Swan 175, in excellent condition, with manuals. No modifications or holes. With or without power supplies. Bob Taylor, W4YHC, 4450 Halls Mill Road, Phone 661-5073, Mobile, Alabama 36609.

WANTED: RM-84 receiver, in gud ontg. condx. Blake, K1-CPW, Summer Street, Andover, Mass. 01810.

SELL: DX-60B, in perf. condx, 1968, $60. Knight Star Romer rx fair condx, $20; Great preselector, $15, with power supply, Heath Q-mult., perf. condx, $5.00. WN6BVY, Harper, 26835 Ortega Dr., Los Altos Hills, Calif. 94022.

DX60A, $39.95; SX-99, $39.95; 6M station, converters, accessories. Request list. K4JCX, Box 162, Oak Ridge, Tennessee 37830.

SELL Or trade: QST, CQ, Electrical Experimenter, Radio, Modern Electronics Wireless Age and Callbooks, any quantity. Wanted: Old radio gear, books and magazines. Erv Rasmussen. 164 Lowell, Redwood City, Cal. 94062.

COLLINS. Rare KWM2-A SN-10784, with noise blanker, rejection tuning and all ham xtals, 516 F-2 AC supply, PM-2 portable a.c. supply and CC-2 suitcase. $1075. John Ashton, One Dew Lane, Darien, Conn. 06820. Tel: (203)-655-9997.

SELL: Collins 62S-1, $595; Johnson KW Matchbox, bridge, $120. Wagner, W8AHB, 3890 Tubbs Road, Ann Arbor, Michigan 48103.

SPECIAL Announcement: Evansville Amateur Radio Supply announces the opening of their new West Coast store in August. L. A. Amateur Radio Supply at 2302 Artesia Blvd., Redondo Beach, California. We invite you to stop by for your "best trade-in cash deals" on all ham gear. 73, Wm. Ogg, WA9RMO, Owner Manager.

SB-100, SB-200 good condx. Robert G. Klausner, 1339 Shanabrook, Akron, Ohio 49313.

COLLINS 51J4, manual, $550.00; Collins KWS-1, manual, $475.00; all items F.o.b. KØARV, 2925 Wildwood Ct., N.E. Cedar Rapids, Iowa 52402.

CREED Typewriter keyboard Wheatstone tape perforator, 60 cycles, $400.00. McElroy three-button perforator, 60 cycles, $50.00. KWM-2A serial 11543, $795. W2AYN, 11210.

FOR Sale: Hallicrafters HT-44 w/pwr, $250.00; SX-117, $215.00; TH-3 beam, $45.00; TR-44 rotor, $25.00; Rohn 28 ft. tower, $40.00. Larry Kraus, 147 Croydon Rd., Yonkers, N.Y. 10710. Tel: 914-779-4741.

HEATH SB-300 (plus CW filter), $220.00; Eico 720 and 722 with low-pass, SWR br. and mon. osc., $90.00. All gear little used. K2GBH, Oceanside, L.I., or H. Sweet, RD #2, Box 323, Apt. 23, Kingston, N.Y. 12401.

WOW! 6146 $1.80, 807, $1.40; 3E29, $6.00. Beckman 7260TIM 1MHz/6 digits, $190.00. Eico 710 grid dipper, $19.00. Send SASE for electronics stuff list. WØKPZ, Green, P.O. Box 1038, Boulder, Colorado 80302.

SELLING: Unused Mosley V-4-6 vertical, $15.00; AR-22 rotor with cable, $20.00; Telrex 3-element 10-meter Minibeam, $15.00; B&W Matchmaker SWR dummy load, $15.00. Prices plus shipping. K2UZJ/3, Box 112-C.M.U., Pittsburgh, Penna. 15213.

HY-GAIN 204BA four-element 20-meter beam for sale, in perfect condition, with BN-12 balun, manuals, all hardware. Purchased only 18 months ago but XYL refuses to put over new home. $65.00 f.o.b. Williamsburg, Virginia, 23185. Larry Guenther, W4UJT, 3 Foxcroft Road.

GROUNDED Grid filament chokes, 30 amps, $4.00; plate chokes, 800 Ma., $2.00 pp. William Deane, 8831 Sovereign Road, San Diego, Calif. 92123.

CHRISTIAN Ham Fellowship now being organized for licensed amateurs for the purpose of Christian fellowship and for distributing gospel tracts among radio amateurs. Christian Ham Callbook, $1.00 donation. Free details. Write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan 49423.

SBE-34 mint condition, VOX, calibrator, power cables, microphone and manual, $300 or trade for mint CE-100. W8QJ1/6, Box 1131 Sonoma, Calif. 95476.

CLEGG Thor 6, with AC supply and extras $175.00. Send SASE for details. WA9ORV, George, 2766 W. 96th St., Evergreen Park, Ill. 60642.

DX-100B xmtr, $90.00; SX-101 recvr, $125.00. Very clean, with manuals. Heath QF-1 Q-multiplier, $6.00 ppd. DK-60C2C ant. relay, $11.00. G. Black, K8VAS, 563 Center Ave., Essexville, Mich. 48732.

COLLINS 75A-4, #3495 three filters, excint condx, $385.00; RC-221, $45.00; LM-14, $35.00; Hickok OS8U scope, $40.00; Simpson VTVM, RF probe, $35.00; Eico dipper, $20.00. QSTs from 1930's to present. Large assortment of parts, tubes, meters, | ARC-5 recvrs, KW xmtr, SSB xmtr. At "give away" prices. W2ETM, tel: 212-375-6151/358-4241.

COLLINS 32S-3, 75S-3B with 800 cycle filter, 312B-4, 516F-2, SM-2, | 30L-1, Johnson KW Matchbox, with coupler and indicator, low-pass filter, Ham OM rotor and control; TH6DX antenna, 3 section Rohn tower. All like-new condx. $2000 for entire system, you dismantle and take antenna. Sry, no shipments anywhere and no bargaining. Harry B. Toland, K2BBM, 104-60 Queens Blvd., Apt 20W, Forest Hills, L.I., N.Y. 11375, Tel: (212)-897-1946.

SB-300, $195; SB-400, $200; HT-37, $185. Esmond Volz, 315 Morningside, Palm Harbor, Fla. 33563.

SELL: 125-watt VFO phone and c.w. 80 through 10 meters, transmitter, $25.00. It may be operated at 75 watts for Novice class. Try it and pick up at WA2THP, Merle Wynn, 703 Colfax Ave., Pompton Lakes, N.J. 07442, Tel: 835-6201.

WANTED: Good used RCA type CSF, 100A1 cartone 50 console transmitter, rcvr, P/S unit, 100W phase modulated, 25-54 meg. W3LOR, J. Arnold, 116 Georgetown Ave. Pittsburgh, Penna. 15229.

IRE PROCEEDINGS 1958-1967, QST 1951-1961, 42 in. rack cabinet w/fan, $17.50; Hallicrafters R-42 speaker, $7.50; Drake MS-4 speaker, $15.00. W5NTL, Rte 3, Box 79C, Oklahoma City, Okla. 73127.

FOR Sale: NCX-5 Mk 11, and NCX-A, in excellent condition, $450.00. Write K5TSR, 102 W. Rampart Dr., Apt. 22 Q203, San Antonio, Texas, 78216.

FOR Sale: Mint Drake MN-4, antenna matching network, $80.00. WN1IWD, Ernest Pollard, 136 So. 2nd Ave., Taftville, Conn. 06380.

SELL Hammarlund One Hundred Ten receiver, $155.00; W3IHF, 31 North Grant, Waynesboro, Penna. 17268.

NCL-2000, Latest factory modifications. Brand new 8122's, $450.00. Harold Greene, 377 Oldham, Pembroke, Mass. 02359.

FOR Sale: SX-111 and Ranger I, $175.00. Terry McKay, K9WRZ, 6900 Avers, Lincolnwood, Illinois 60645.

ANTENNA Security? Over 1200 highly corros.on-resistant tareaded washer items. June ad, page 159. We match samples. Quote your needs! Ham Hardware Headquarters, Walt Straesser, W8BLR, 29716 Briarbank, Southfield, Michigan 48075.

SALE: NC-300, $145.00; DX-40, VFO, HR-10, all for $115.00; HA-230 general coverage Rx, $65.00; Mint Wollensak 1980 stereo tape, $210.00; Eico 712 CB, $50.00. WA2BUF, 116 Hudson Ave., Haverstraw, N.Y. 10927. Tel: (914)-429-7007.

SB-100, HP-23, SB-600, HDP-21A, manuals, cables, etc. Used about 20 hours. All are in excint condx; $325.00. Will ship within Continental USA. First good check gets whole deal. J. McIntosh, 1387 Club Dr., Bloomfield Hills, Michigan 48013.

HALLICRAFTERS SR-2000, pwr/spkr, warranty, cartons, manuals. Used only about 5 hours, $995. Tel: 622-3578 weekdays, or WB2PBT, c/o Gurson, 2 Garden Street, Newark, N.J. 07105.

SELL: SR-150 station. Transceiver, AC and DC power supplies, mobile mounting rack: $450.00; Five band Hustler, $35.00; Heath Pawnee transceiver, $160.00; Heath HO-10 Monitor scope, $55.00; Heath HW-29 Sixer with 12 VDC power supply, $25.00. Gear in perfect condx, no scratches, with all manuals. R. G. Kirkpatrick, W8HWU, 4605 Poinsettia, SE, Grand Rapids, Michigan 49508.

SWAN 500 and 512 DC supply, $425.00; Eico 717 keyer and Autronic paddle, $45.00; Amphoyne 6 and 2 transmitter, $100; Lafayette HA350 ham-band receiver, $75.00; Elmac AF-68, $35.00. Philip Schwebler, W9GCG, 4536 N 50 St., Milwaukee, Wisconsin 53218.

WANTED: HP-23 AC supply or homebrew supply to run HW-12. W1KGU, 294 Summer Street, Brockton, Mass. 02402. Tel: 617-583-1233.

SELL: SB-300 with CW-AM filters, $245.00; HW-12A, $95.00; Mohican, $45.00; Cheyenne, $35.00. Johnson 6-2 converter, $35.00. SX-101A, $195.00. All perfect with manuals, no scratches. K8UYA, 4605 Poinsettia, S.E. Grand Rapids, Michigan 49508.

SELL: SX-101A, immaculate, in excint condx, complete set of spare tubes and "S" meter $225.00. W2ASF, 13 Sunnybrook Rd., Bronxville, N.Y. 10708.

SELL: Knight 152-174 Mc police receiver, with ground plane, $50.00; SBE Codapter, $40.00; Longines-symphonetta AM-FM radio, $55.00; Vibroplex Lightning Bug, $15.00. All new. WA4EPH, 1219 E. Cervantes, Pensacola, Florida 32501.

CAPACITORS for the KW rig, 7 mfd. at 4000 VDC. Oil filled, $5.00 each F.o.b. SASE for spec sheet. W9JVF, 1849 E 49th St., Indianapolis, Indiana 46205.

WANTED: Johnson Kilowatt Matchbox. Please give all details, i.e., how old, condition, lowest asking price, etc. I will answer all replies. Jesse Warren, WA9KWC, 2311 Buckingham, Westchester, Illinois 60153.

DRAKE DC-3; Webster bumper mount, folding mast and 40 meter coil w/can hat; also Master Mobil 10-15-20 mobile antenna. Only 2 weeks old. Mobile operation not for me. Cost me $200; First $140.00 takes all. Will ship. Robert King, 201 Nevada St., Idaho Falls, Idaho 83401. Tel: (208)-522-1241.

HEATH SB-101, HP-13, Hustler ant., mount, coils, floor mount: $430.00. W1WJO, 12 Longview Dr., Simsbury, Conn. 06070. Tel: 203-658-9182.

TOWER Sale: Tri-Ex extra large deluxe crank-up tower HZ-471N extended 71 ft. collapsed 21 ft. Weight 1050 lbs. Unit available for rotating entire tower from bottom. Self-supporting, 3 yrs. old. Gud condx for large beams. Ham net $1220. Other details and photo on request. Only $750.00. W9CKF, Porter Barnes, 2922 Muesterman, Evansville, Indiana 47712. Phone 812-4239857.

C-W Crystals airmailed after August 25th, end of vacation closing. Novice .05% FT-243 $1.50. Custom .01 any frequency between 3500 and 8600 Kilocycles, FT-243, $1.90. Write for information on SSB, Marine, MARS, Nets, CD etc. Order-bulletins free. Airmailing 10¢/crystal, surface 6¢. Crystals since 1933, C-W Crystals, Marshfield, Missouri 65706.

SELL Or trade: New Hallicrafters SR-2000 2 Kw transceiver and P-2000 supply, $1035; Gonset GSB-101 1200 watt linear, $149.99; Collins 516F-1 heavy-duty 12 VDC supply, $119.00. All mint condx. Don Burns, 440 Reading Rd., Dayton, Ohio 45420. Tel: 513-256-0345.

FOR Sale: Drake 2B recvr with xtal cal., $165.00; Knight kit T-150A xmtr, $60.00; R-100A recvr with xtal cal., S-mtr. spkr, $65.00. WA8ROF, Bill Warner, 1810 W. Granville Rd., Worthington, Ohio 43085.

HT44/PS-150, in exclnt condx, $225.00, sry, won't ship. W2AA, Box 913, Setauket, L.I., N.Y. 11785. Tel: 751-8539.

COLLECTOR'S Item. Philco Model 665 all-wave radio chassis. Vintage 1936, speaker and tubes, gud operating condx. $45.00. W6EBY, 789 Garland, Palo Alto, Calif. 94303.

SELL: Hammarlund HQ-150 rcvr, $130.00; Ranger I, $85.00; H1-40 xmtr, $45.00; Tener xcvr, $25.00. Want SSB scvr. Dave Wible, WA8RQU, 34230 Cannon Road, Solon, Ohio 44139.

HALLICRAFTERS SR-150, AC, DC, mobile mount, HT-33, 1 k.w. P.E.P. All are in excellent condx: $435. Dennis Russell, 4103 Highcrest Rd., Rockford, Ill. 61107.

WANTED: UHF transmitter and receiver for the 1296 Mc amateur band. J. L. Courtney, 222 S. Dale Dr., Lima, Ohio. 45805.

NCX-5 and NCX-A power supply, and speaker, factory converted to Mark II, in perfect condx, never mobile: $450.00 complete with original carton and with manual. A. M. Magagna, 224 MacAlpine Rd., Ellicott City, Md. 21043.

HALLICRAFTERS: R274/FRR (SX-73) general coverage receiver, .54-54. Mhz. Gud condx, $175.00. You pay shipping. Doug Flagg, 287 Main Street, Apt. #1, Northport, L.I., N.Y. 11768.

ARE You a ham who likes to travel? Four young men sailing to Philippines in October with 42 foot ketch. Need an experienced ham in his 20's or 30's for radioman. Must be willing to share expenses. G. Fulop, 2446 Creston Ave., New York, N.Y. 10468.

"DON and Bob" sell new and used nationally advertised ham gear as low as any advertised offers. Galaxy V Mk III, supply, VOX, calibrator, speaker, regular $580.60. Your cost, $499.95. New, guaranteed surplus. Jennings vacuum variables USC-500 10 KV, UCS-300 7.5 Kv $30.00; Rotron Sentinel fan 100 CFM, $7.95. Write for list. K5AAD, Don Busick, and WA5UUK. Madison Electronics Supply, 1508 McKinney, Houston, Texas 77002. Tel: 713-CA4-2668.

FOR Sale: Complete number one SSB, AM, CW station. Have gone wholly homebrew CW. This station is a full gallon and is in exclnt condx. NCX-5 Mark II with NCXA a.c. power supply, $450.00. NCL-2000 linear, $400.00. Electro-Voice mike 664, $30.00. Ralph Covington, WA4UGQ, 2072 B Werner Park, Ft. Campbell, Ky. 42223. Tel: 502-798-3135.

HEATH: HW-16, $95.00; HG-10B, $35.00; both for $125.00; 15 mtr. beam, $20.00; 80 mtr., ARC-5 portable sta., $45.00; HB keyer, $10.00. Gene Timpano, WB2ARO, 16 Elmira St., Hicksville, N.Y. 11801. Tel: (516):WE5-3112.

VIKING II, VFO, $122. Matchbox and Gonset mod. indicator, $75.00; SX28A with Central Electronics Q-multip. and matching speaker, $50.00. All clean, no scratches. Manuals for all. Sorry, can't ship. W2NZG, Tel: a.c. (201)-427-3893.

NEED A rotator for a big beam? Johnson rotator with control box, selsyn indicator, good used condx, $100. Also, used Hy-Gain roto-brake, with new wall indicator, $100. Heavy-duty prop pitch rotator, modified, with variable voltage DC supply, only $60. W7DI, 6633 E. Palo Verde Lane, Scottsdale, Ariz. 85251.

HOWARD Radio: SBE34—as new—$325.00; SW240 w/TCU & AC—$255.00; GSB100—$179.00; SW140—$119.00; 516E-1—$98.00; Communicator III—$119.00 (6 Mtr.); Utica 650-6 Mtr. —$99.00; Challenger—$69.50; HA6 w/AC-6-Meter—$179.00; and AF68/PMR8/M1070—$150.00. Free List. Howard Radio, Box 1269, Abilene, Texas 79604. Tel: A/C 915-672-9501.

SELL Drake R-4a, T-4X, AC-3, MS-4, original cartons. Perfect condition. $620.00. Dan Ringler, WA8PQA, 3250 Kingwood, Ann Arbor, Mich. 48103. Tel: (313)-663-3439.

COMPLETE Sideband station: Johnson Invader, 200 watts, Hallicrafters SX-101A, Johnson T-R switch, $425.00. In immaculate condition. WB4GTG, Brad McGann, 214 Kingswood Dr., Williamsburg, Va. 23185.

75A4 Ser. #3304 2.1 and 500 cycle filters. Mint, with manual and original packing. First certified check for $395. 32S-1 with 516F2 and manual. First certified check for $350. Cosper, 1603 Hoover Ave., South Bend, Indiana 46615.

SALE: Heathkit DX-60, $50.00 Heathkit HG-10 VFO, $25.00. Both in excellent condition. Hal Kusner, WB2PHW, 21 Charles Court, Fair Haven, New Jersey 07701.

WANTED: Atwater-Kent: variocouplers, variometers: Crosley: Musicone speaker, book condenser, spider web variocoupler with rotary type shaft, Trirdyn #1023 "Special" receiver. Model 51 portable receiver, Model X-4-tube receiver: RCA: 100A magnetic speaker. Radiola 25 super loop receiver; Victoreen neutrodyne coil set; honeycomb coils with mounts; 23-pate condensers. No trades! Quote price less transportation. Harold L. Brouse. Ex/W8CKB, 2290 Struble Road, Cincinnati, Ohio 45231.

TOROIDS, 88 and 44 mhy. Center-tapped, unused 5/$1.50 postpaid" 11/16" perforator tape $3/box. RTTY page-printer paper $5.50/case. New Heath DX-60A, $55.00; Globe Chief 90A, $25.00; HQ-150, $130.00; Tecraft "Criterion" six and two meter converters, $30 each. Tecraft two meter transmitter with power supply, $35.00. Johnson lo-pass filter, $8.00. Polar relay, $3.00; socket $1.25. Wanted: 2-meter Transverter. RTTY gear. Rotator. Stamp for list. Van. W2DLT, 302Z Passaic, Stirling, N.J. 07980.

BUILDING a rig? Control panel lettering on aluminum foil. Any size, color, terminology you require! 5¢ word: minimum order 25¢. "Travel-Pak", QSL Kit, $1, ppd. (stamp and call brings sample). Samco, Box 203, Wynantskill, N.Y. 12198.

MOSLEY CM-1, $75.00; Viking 1, $40.00. Tom Lewis, 201½ Quincy Street, Rapid City, S.D. 57701.

NATIONAL NC-98, excellent general coverage receiver with manual, $80.00; Globe VFO, like-new, $50.00, both, $120.00. WA5NLF, 1150 East Dr., Beaumont, Texas 77706.

SELL: SX-117, HT-44 and PS-150 a/c supply, exclnt condx. $495.00. Basil Thompson, K9KRN, P.O. Box 7, Winslow, Indiana 47598. Phone: 812-789-3482.

SELL: Heath SB-300 with speaker. Mint condition. Just realigned by Heath on June 18, 1968. Will ship. Write: Robert Simon, 94-31 60th Ave., Rego Park, N.Y. 11373. Call (212)-592-5099.

DAVCO DR-30 wanted. State condition and price. J. A. Tyson, W9JXD, 5345 University Ave., Chicago, Ill. 60615.

WANTED: Good communnications receiver for a like-new Concord stereo tape-recorder, Model 440, K3IGO, 1917 Haywood St., Farrell, Penna. 16121.

COMPLETE Station, Marauder, Hallicrafters SX-101A, TB-500 antenna, rotor, 24 hr. clock, mike, phones, relays, manuals, etc. Mint condition. $350.00 or your best offer. WA3-IQP, Box 51, Garrett Park, Md. 20766.

20 Mtr. Swan transceiver, AC and DC supplies. Antennas, coax, mike, etc. $200. Tel: 365-6315, Larry Loughran, 434 8th Ave., Menlo Park, Calif. 94025.

FOR Sale: New Galaxy V Mark II transceiver with d.c. power supply, $350.00. Reynolds O. Dorris, 4851 Luzon Cove, Memphis, Tenn. 38118.

SURPLUS, all good, no junk! TCS, rcvr, xmttr, ac., power supply, $25.00; TCM xmttr and 1.5 Kv power supply, $25.00; BC-779, Needs some work with power supply, $25.00; LM freq. meter w/power supply, $15.00; new LM-13 and power supply, $25.00; ART-13 w/tubes $15.00; ARC-1 $10.00; ARC-2, $10.00, ARC-21 xcvr 4-65g final and modulator, VAC variables, $40.00; BC-610, H.V. xfrmer, $25.00; several power supplies, $7.50 each; Teletype Mod. 15, $25.00; small a.c. xfrmrs, plate, filament, all voltages, $1.50 each; 522 VHF xmttr converted, new panel and controls, $8.00; 4-250s, $7.50; 813, $5.00; 5736, $10.00; 572-As, $1.00; KWM-1 w/noise blanker, $260.00; KW Matchbox, $75.00. C. Peilow, 1233½ W. 88th St., Los Angeles, Calif. 90044.

WANT Heath Mohican RX. Will pay shipping. Write SPEC14 Vernacchia, US51980406, USA Stratcom LLD, APO SF 96317.

SELL: Gonset Communicator III, 6 meter receiver, transmitter crystals, mike, instruction book, battery, electric cables, excellent condx, $125.00. Steve Lucas, W2MEA, Rundle Ave., Mays Landing, N.J. 08330.

"HOSS-TRADER" Ed Moory wants all the hams new and old to know we stock most major brands of new amateur equipment. We also have service and repair facilities operated by the best technicians available. W5GUG, W5CQJ and W5BDR. Write or telephone for best trades. Used equipment: HT-37, $169.00; SX-101 receiver, $159.00. Drake 2-A, $149.00; 75S-1, $289.00; 20-A, $79.00; TR-4, $439.00; L-4, $475.00; 75A-4, $399.00; Sb-301, $219.00; SB-34, $289.00; Swan 500, $349.00; Bandit 2000-B, $298.00; Galaxy V, Mk II, $279.00. New Rohn 50 ft. foldover tower prepaid, $189.00. Ham-M rotor, $98.95. Closeouts: new Swan 500, $395.00; Galaxy V Mk II, $319.00. Ed Moory Wholesale Radio Co. Box 506, phone a.c. 501-946-2820. DeWitt, Arkansas 72042.

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NC-300 receiver, $165.00; DX-60A transmitter, $60.00. Both for $210.00. Jerry Aberg, 704 McKee St., State College, Penna. 16801.

SELL: Heathkit HM-10A Tunnel Dipper, wired, mint condx, $25.00; B&W Pi network model 851, new in carton. $12.50; W2AU 1/1 balun, new in carton, $10.00; Lafayette 10" imported slide rule in leather case, $10.00; Hickok 600A dynamic mutual conductance tube-checker, $50.00. Dow-Key DKC-TRM-1 TR switch, $7.50. Globe VOX-10, VOX unit, $7.00. M. T. Donnell, Jr., W5HSE, 2805 First St., Brownwood, Texas 76801.

IMPSCOPE, Heathkit oscilloscope for biological studies, for sale ($1.50) or trade 'scope plus cash for kilowatt. Hank Magnusskie, W3DTG, 19 Dunlap Street, New Providence, N.J. 07974.

HALLICRAFTERS HT-37, perfect electrical condx. All new tubes, $200. No trades, please. L. E. Herring, Jr., WB4ARK. 2805 Glendale Rd., Charlotte, N.C. 28209.

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STAMP Collection wanted. Trade Swan transceivers k.w. amp., 60 ft. tower and miscellaneous. WA6RTD, 3874 S. Sycamore Ave., Los Angeles, Cal. 90008.

SELL: SX-101A and HT-32: both in excellent condx .$435.00. Might accept less. T-60, $35.00; DX-20, $20.00. WAØOXL, Michael Prust, 514 North Washington, St. Peter, Minn. 56082.

FOR Sale: Collins 30L-1 linear, excellent, $350.00 price is firm. Fo.b. Springfield, Ohio. Serial No. 12737. Richard Littler, 640 Snowhill. Tel: (513)-399-8697.

HALLICRAFTERS receiver SX-101A in mint condx. $175.00 firm. F.o.b. K2ANT, 1711 Exten Ave., Trenton, N.J. 08611.

ATTENTION. OMs! The "For Sale and Trade" on the 24-hr. military clock is now retracted. Found out it can be made to work. Please don't write for VFI-VFO. Was sold for $5.00. F. Rodio, K2TBZ, 243 Senator St., Brooklyn, N.Y. 11220.

SWAN 350 xcvr, 15 operating hours, 12V mobile power supply, Hallicrafters Auto-keyer with Vibroplex key, speed key, Shure 404c mike, Hustler ant. with 40M coil, mounts and cables for all. Will ship. First certified check for $450.00 takes all. G. W. Little, 218 W. Samuels Ave., Hazleton, Penna. 18201.

MOHAWK Rec RX-1 with matching speaker, $125.00; XC6-6 meter converter for RX-1, $15.00; HW-32, $75.00; Heath Q-multiplier, $5.00; pair of new 4CX250Bs, $30.00; 4CX1000A, used, $50.00. Albert Long, W2JIT, Box 423B, RD #2, Utica, New York 13502.

MINT SB-100, SB-600, HP-23, HDP-21A, $450.00. K9ZNZ, 1135 Bohland, Bellwood, Illinois 60104. Tel: (312)-544-6653.

DRAKE 2B, 2BQ, $200; Eico 720, $40.00; HA-5, $50.00; TA-31, coax, BW coax switch, $20.00; unfinished Handbook, half-kilowatt, needs tubes and pi-net, $30.00. Douglas Fearn, K30MP, 8433 West Chester Pike, Upper Darby, Penna. 19082.

SB-34 transceiver, perfect condition and alignment, spare tubes and power transistors, $325.00. Solid state diode direct replacements for 866 or 3B2, $10 each. Perfect for 30S-1. W1WNY, 1 Dew Lane, Darien, Connecticut 06828. a.c. (203)-655-9997.

BEAUTIFUL Gold bordered certificate that no ham station should be without. Answers questions that a visitor may ask. Yours for a donation of fifty cents in coin to: The Rockaway Amateur Radio Club, P.O. Box 205, Rockaway Park, L.I., N.Y. 11694.

FOR Sale: Johnson Kilowatt Matchbox, less indicator, $65.00. Sorry, cannot ship. K1KLO, Old Lyme, Conn. 06371.

WANTED: Professional 'scope cart. Will trade Heath 1B-2A impedance bridge, or cash. Bill Blake, W5SCM, Star Route, Box 135D, Columbus, Miss. 39701.

NCX-5 Mk II, with NCX A.C. supply, plus remote VFO, $550. Will ship your expense. Joseph J. Perry, 177 Paris Road, New Hartford, N.Y. 13413. Tel: 1-315-72-45374.

HEATH DX-60A transmitter, $50; Heath HR-10 receiver, $50; Heath HG-10 VFO, $25.00; Knight T-60 transmitter, $25.00. Photo enlarger, $20. (Trade?). Sy Balsenbaum, 9424 Ave. A., Brooklyn, N.Y. 11236. WA2CHE.

SB-101, factory aligned with power supply and c.w. filter. Perfect condx, six months old, $430.00. DX-100, $65.00. Viking II and 122 VFO, $90.00. HT-40, $45.00. Bob Seyler, WB2BDQ, 14 Charles Drive, Absecon, N.J. 08201.

FOR Sale: SX-101A, matching speaker, Viking Valiant II, T-O keyer, Vibroplex key, mike, $650.00. K7KTQ, 439 West Idaho, Weiser, Idaho 83672.

WANTED: Coils for National SW-3, Joseph Kolb, Medford, Okla. 73759.

SELL: AR22R, CDR ant. rotor, complete with control and all instructions, in original carton: $17.00. In gud condx. Used several seasons. W2KWC, 31 Swing Lane, Levittown, N.Y. 11756.

WANTED: 30S1, state condition and cash price. W7UDR, Seattle University, Seattle, Washington 98122.

HALLICRAFTERS HT-37, gud condx, $180, firm. R. A. Berg, 201 Pemberton Road, Rochester, N.Y. 14622.

SELL: HT-37, $180.00. HQ-170, $160.00. For other equipment, send for list. Graening, W9KHS, Tremont, Illinois 61568.

A Moose! Tri-Ex HZ588N 88 ft. motorized tower. Excellent condition. Galvanized $1200. Consider 75A4, 75S3, complete S/Line in trade, W4AXE, 1226 Rollingwood Lane, Lakeland, Fla. 33803.

SELL: QST 1947 through 1966, complete, and 28 back issues to 1937. CQ April 1950 through 1963. Four copies are missing. Make acceptable offer. R. M. Stevens, R #1, Winsted, Conn. 06098.

NORELCO Video tape-recorder, in perfect condx, tape and all additional parts: CCTV camera, $115.00, Vidicon, $10.00, vidicon yoke, $30.00, Elgeet 4" telephoto lens f2.7; Reverb, $15.00. Wanted: 6M SSB transceiver. WB2GKF, 506 Mount Prospect Ave., Clifton, N.J. 07012.

SELL: Jennings vacuum variable capacitor, UCS-500. Brand new. $56.00. Chuck Kaptain, WAØSUO, 2225 Albion, Denver, Colorado 80207.

HALLICRAFTERS HT-32, like new, $250.00; Globe King 500A, 160-10 C.W., A.M. with your exciter will run 700 watts SSG, ALC extra final VFO, $195.00. Like new 3-5KVA generator, $200. Ship. John Smith, 1924 Dolphin Blvd., St. Petersburg, Fla. 33707.

SELL: Heath Seneca VHF-1, 6-2 meter transmitter, $75.00. Eico 730 modulator, $45.00; both are in mint condition, manuals. W4RGL, C. E. Johnson, 161 Diane Circle, Indialantic, Florida 32901. Tel: (305)-773-3244.

NC-300 Receiver for sale. In excellent condition. 160-1¼ mtrs. $150.00. Phone (614)-451-8870 or write Dave Gibb, 2171 Pinebrook Rd., Columbus, Ohio 43221.

KNIGHT Station R100a w/s-mts/cal/sok/B&W 381 preamp FR/6m cvtr w/ps, T150a w/keyer & key. 80-6 mint intact, $250. WB2RES, Bob Collis, 618 Spruce, Pitman, N.J. 08071. Phone 609-589-1274.

SELL Brand new Heath SB-610 monitor scope, $60.00. Doug Edmonds, P.O. ox 382, Iowa City, Iowa 52240.

KNIGHT T-60, $38; Amco all-band rcvr preamp, w/p.s. $20; Dow-Key Antenna Switch, $10. All in excint condx. WN9WIR, 835 Greenwood Ave., Wilmette, Ill. 60091.

HY-GAIN Trap antenna 5BDQ complete, including instructions but no wire. One pair never used, others three months. All in mint condx, $22.50. Hy-Gain balun, BN86 as new, $7.50. Dr. McCarthy, 2843 Rutledge, Stockton, Calif. 95207.

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DRAKE TR-4 transceiver, AC-4 supply and DC-3 DC power supply, RV-4 VFO with speaker. Price: $550.00 plus shipping. J. R. Reagan, W4KGR, 2333 Elizabeth, Winston-Salem, N.C.

SELL: Excellent CE-100V, $495.00. Kent Merkel, Box 144A RR1, Lexington Park, Maryland 20653. Tel: (301)-863-5967.

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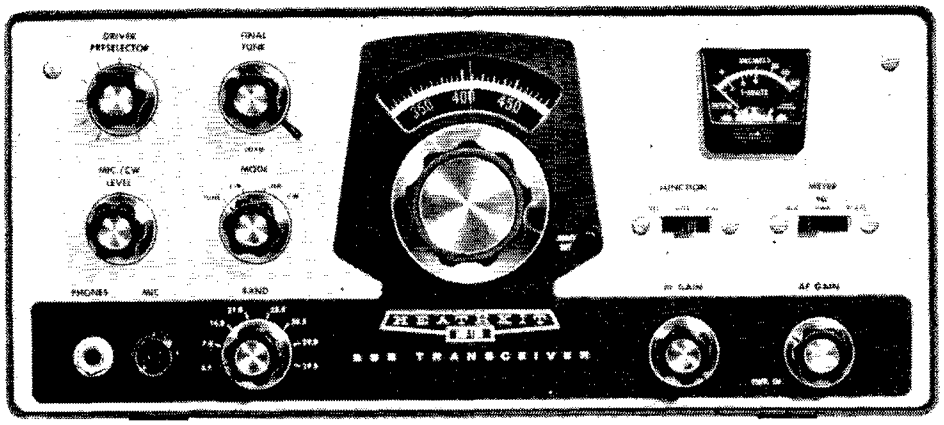

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Kit HW-100, 18 lbs., no money dn., $22 mo. **$240.00**
Kit HP-13, DC power supply, 7 lbs., $7 mo. **$64.95**
Kit HP-23, AC power supply, 19 lbs., $5 mo. **$49.95**
Kit SB-600, 8 ohm speaker, 6 lbs. **$18.95**

HW-100 SPECIFICATIONS — RECEIVER. Sensitivity: Less than .5 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. **Selectivity:** 2.1 kHz minimum at 6 dB down, 7 kHz maximum at 60 dB down (3.395 MHz filter). **Input:** Low impedance for unbalanced coaxial input. **Output impedance:** 8 Ω speaker, and high impedance headphone. **Power output:** 2 watts with less than 10% distortion. **Spurious response:** Image and IF rejection better than 50 dB.

TRANSMITTER. DC Power input: SSB: 180 watt P.E.P. (normal voice: continuous duty cycle). CW: (A1 emission) 170 watts (50% duty cycle). **RF Power output:** 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 Ω nonreactive load). **Output impedance:** 50 Ω to 75 Ω with less than 2:1 SWR. **Oscillator feedthrough or mixer products:** 55 dB below rated output. **Harmonic radiation:** 45 dB below rated output. **Transmit-receive operation:** SSB: PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. **CW Sidetone:** Internally switched to speaker or headphone, in CW mode. Approximately 1000 Hz tone. **Microphone input:** High impedance with a rating of —45 to —55 dB. **Carrier suppression:** 45 dB down from single-tone output. **Unwanted sideband suppression:** 45 dB down from single-tone output at 1000 Hz reference. **Third order distortion:** 30 dB down from two-tone output. **RF Compression (TALC):** 10 dB or greater at .1 ma final grid current. **GENERAL. Frequency coverage:** 3.5 to 4.0; 7.0 to 7.3; 14.0 to 14.5; 21.0 to 21.5; 28.0 to 28.5; 28.5 to 29.0; 29.0 to 29.5; 29.5 to 30.0 (megahertz). **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; 6BN8 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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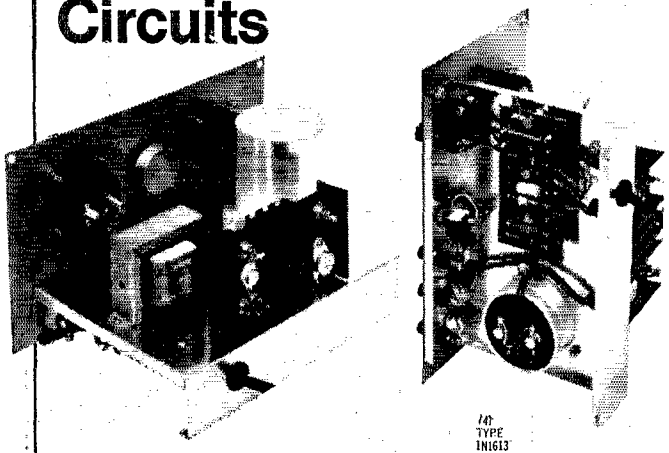

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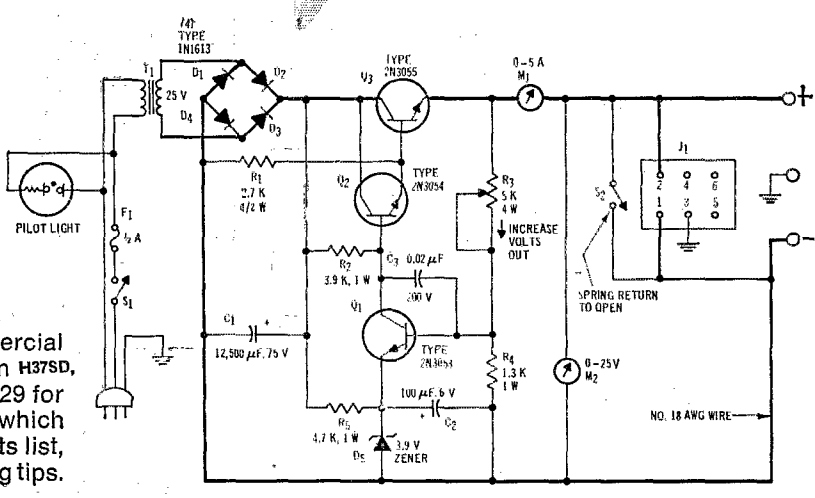
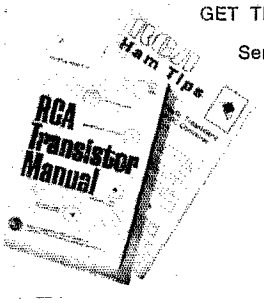


Write RCA, Commercial Engineering, Section H37SD, Harrison, N. J. 07029 for June '67 "Ham Tips" which includes full parts list, schematic and building tips.



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Your RCA Industrial Semiconductor Distributor stocks the RCA Transistor Manual which lists devices, shack projects and has technical information. For a sample copy of "Ham Tips" and information on how to subscribe, write to "Ham Tips", RCA, Harrison, New Jersey 07029.

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